



5. Public Reporting as a Quality Improvement Strategy

Closing the Quality Gap: Revisiting the State of the Science



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5. Public Reporting as a Quality Improvement Strategy

Closing the Quality Gap: Revisiting the State of the Science

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Preface

The Agency for Healthcare Research and Quality (AHRQ), through its Evidence-based Practice Centers (EPCs), sponsors the development of evidence reports and technology assessments to assist public- and private-sector organizations in their efforts to improve the quality of health care in the United States. The reports and assessments provide organizations with comprehensive, science-based information on common, costly medical conditions, and new health care technologies and strategies. The EPCs systematically review the relevant scientific literature on topics assigned to them by AHRQ and conduct additional analyses when appropriate prior to developing their reports and assessments.

In 2004, AHRQ launched a collection of evidence reports, *Closing the Quality Gap: A Critical Analysis of Quality Improvement Strategies*, to bring data to bear on quality improvement opportunities. These reports summarized the evidence on quality improvement strategies related to chronic conditions, practice areas, and cross-cutting priorities.

This evidence report is part of a new series, *Closing the Quality Gap: Revisiting the State of the Science*. This series broadens the scope of settings, interventions, and clinical conditions, while continuing the focus on improving the quality of health care through critical assessment of relevant evidence. Targeting multiple audiences and uses, this series assembles evidence about strategies aimed at closing the “quality gap,” the difference between what is expected to work well for patients based on known evidence and what actually happens in day-to-day clinical practice across populations of patients. All readers of these reports may expect a deeper understanding of the nature and extent of selected high-priority quality gaps, as well as the systemic changes and scientific advances necessary to close them.

AHRQ expects that the EPC evidence reports will inform consumers, health plans, other purchasers, providers, and policymakers, as well as the health care system as a whole, by providing important information to help improve health care quality.

We welcome comments on this evidence report or the series as a whole. Comments may be sent by mail to Mary Nix, Agency for Healthcare Research and Quality, 540 Gaither Road, Rockville, MD 20850, or by email to epc@ahrq.hhs.gov.

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Public Reporting as a Quality Improvement Strategy

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Structured Abstract

Objectives. The goal of this review was to evaluate the effectiveness of public reporting of health care quality information as a quality improvement strategy. We sought to determine if public reporting results in improvements in health care delivery and patient outcomes. We also considered whether public reporting affects the behavior of patients or of health care providers. Finally we assessed whether the characteristics of the public reports and the context affect the impact of public reports.

Data Sources. Articles available between 1980 and 2011 were identified through searches of the following bibliographical databases: MEDLINE[®], Embase, EconLit, PsychINFO, Business Source Premier, CINAHL, PAIS, Cochrane Database of Systematic Reviews, EPOC Register of Studies, DARE, NHS EED, HEED, NYAM Grey Literature Report database, and other sources (experts, reference lists, and gray literature).

Review Methods. We screened citations based on inclusion and exclusion criteria developed based on our definition of public reporting. We initially did not exclude any studies based on study design. Of the 11,809 citations identified through title and abstract triage, we screened and reviewed 1,632 articles. A total of 97 quantitative and 101 qualitative studies were included, abstracted, entered into tables, and evaluated. The heterogeneity of outcomes as well as methods prohibited formal quantitative synthesis. Systematic reviews were used to identify studies, but their conclusions were not incorporated into this review.

Results. For most of the outcomes, the strength of the evidence available to assess the impact of public reporting was moderate. This was due in part to the methodological challenges researchers face in designing and conducting research on the impact of population-level interventions. Public reporting is associated with improvement in health care performance measures such as those included in Nursing Home Compare. Almost all identified studies found no evidence or only weak evidence that public reporting affects the selection of health care providers by patients or their representatives. Studies of health care providers' response to public reports suggest they engage in activities to improve quality when performance data are made public. Characteristics of public reports and the context, which are likely to be important when considering the diffusion of quality improvement activities, were rarely studied or even described.

Conclusions. The heterogeneity of the outcomes and the moderate strength of evidence for most outcomes make it difficult to draw definitive conclusions. However, some observations were supported by existing research. Public reporting is more likely to be associated with changes in health care provider behaviors than with selection of health services providers by patients or families. Quality measures that are publicly reported improve over time. Although the potential for harms is frequently cited by commentators and critics of public reporting, the amount of research on harms is limited and most studies do not confirm the potential harm.

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Executive Summary

Introduction

A substantial amount of research exists demonstrating that health care frequently fails to meet the current standards of quality care.^{1,2} Errors, suboptimal management or control of disease, and overutilization or underutilization of services are more likely to occur when high-quality evidence-based health care is not provided.

In a quality improvement framework that includes measuring, influencing, and improving quality, public reporting (making quality, safety, or performance data publicly available) is categorized as a means of influencing quality by providing incentives for change.^{3,4} This report focuses on how the public reporting of health care quality information may provide incentives for quality improvement that ultimately produce higher quality care. It is part of the Closing the Quality Gap: Revisiting the State of the Science series, which examines the role of several interventions in promoting quality health care.

Quality might be influenced by the different incentives public reports create for different people and organizations. The incentives may be for the consumers of health care, including patients, families, or advocates who act on the behalf of patients, or for other purchasers of health care services, such as employers, who select the options available to their employees. Public reporting can also provide incentives for the individuals and organizations that provide or arrange care, including individual clinicians, hospitals, long-term facilities or services, and health plans. Patients are motivated by the desire to maximize the benefits they derive from health care by obtaining the highest quality of care available. Individual clinicians, hospitals, and other organizations that provide or arrange health care want to attract new patients or members and avoid losing existing ones. They may also be motivated by concern about their reputation among their peers or by professional and organizational commitments to providing high-quality care.

Federal and State government agencies, community quality collaboratives, and other organizations are investing resources in public reporting as one possible intervention to bridge the gap between current and high-quality practice in health care. The Agency for Healthcare Research and Quality (AHRQ) and the Robert Wood Johnson Foundation have supported public reporting through AHRQ's Chartered Value Exchange (CVE) program (www.ahrq.gov/qual/value/Incveover.htm) and Robert Wood Johnson's Aligning Forces for Quality (www.rwjf.org/qualityequality/af4q/) program. The CVEs, also known as community quality collaboratives, are committed to public reporting and transparency as part of their mission to promote quality improvement. They involve more than 600 health care leaders and cover more than one-third of the U.S. population. Public reporting is also a component of the transparency initiatives of several government agencies that include more explicit decisionmaking procedures and open meetings, in addition to the routine release of documents and data.

As part of their efforts to promote public reporting, government agencies are making technical assistance resources available. The CVEs have a learning network (www.ahrq.gov/qual/value/Incveover.htm). An AHRQ Web site (www.talkingquality.ahrq.gov/) is devoted to public reporting resources, including a recent series of reports on best practices in public reporting.⁵⁻⁷ Also, AHRQ convened a National Summit on the Future of Public Reporting for Consumers in March 2011. (A subset of the commissioned papers were published in a leading health policy journal.⁸⁻¹⁰) These programs, along with other conferences about creating

and using reports and other decision-support tools to engage consumers and providers, demonstrate the continued interest in public reporting as a quality improvement strategy for a variety of types of health care organizations and individual providers.

This report was designed to update the last published systematic review,¹¹ given the significant changes that have occurred in the scope and nature of public reporting. Medicare has substantially expanded its public reporting program, health data from many more sources are now available with minimal restrictions, new technologies allow aggregating data from consumer feedback sites, and applications have been built to help customize and simplify the combination of data from multiple sources.¹² These trends and continuing commitments to transparency and patient-centered health care are likely to contribute to substantial increases in the amount of publicly available data on health care quality.

Scope and Key Questions

The scope of this review was determined by a definition designed to situate public reporting in the context of quality improvement, the theme of the Closing the Quality Gap: Revisiting the State of the Science series. An initial draft definition was developed and refined based on input from the Technical Expert Panel.

Definition:

Public reporting is data, publicly available or available to a broad audience free of charge or at a nominal cost, about a health care structure, process, or outcome at any provider level (individual clinician, group, or organizations [e.g., hospitals, nursing facilities]) or at the health plan level. While public reporting is generally understood to involve comparative data across providers, for purposes of this review we are adopting a broader approach to include findings in which one provider is compared to a national/regional data report on performance for which there are accepted standards or best practices.

Given the resources devoted to public reporting and the desire to synthesize existing research knowledge to inform future public reporting efforts, the objectives of this systematic review were:

- To determine the effectiveness of public reporting as a quality improvement strategy by evaluating the evidence available about whether public reporting results in improvements in health care delivery and patient outcomes (Key Question 1) and evidence of harms resulting from public reporting (Key Question 2).
- To determine whether public reporting leads to changes in health care delivery or changes in patients' or purchasers' behaviors (intermediate outcomes) that may contribute to improved quality of care (Key Questions 3 and 4).
- To identify characteristics of public reports and contextual factors that can increase or decrease the impact of public reporting (Key Questions 5 and 6).

The Key Questions correspond to these objectives. The Key Questions were reviewed and refined in consultation with the Technical Expert Panel as well as the AHRQ staff coordinating this report and the series.

Objective 1

Key Question 1

Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes, or patient outcomes)?

Key Question 2

What harms result from public reporting?

Objective 2

Key Question 3

Does public reporting lead to change in health care delivery structures or processes (at levels of individual providers, groups, or organizations [e.g., health plans, hospitals, nursing facilities])?

Key Question 4

Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

Objective 3

Key Question 5

What characteristics of public reporting increase its impact on quality of care?

Key Question 6

What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Specifying the Populations, Intervention, Comparators, Outcomes, Timing, and Settings (PICOTS) for a systematic review is an approach used to generate answerable research questions, to structure literature searches, to determine inclusion/exclusion criteria, and to organize reports. For our review of public reporting as a quality improvement strategy, the PICOTS are as follows:

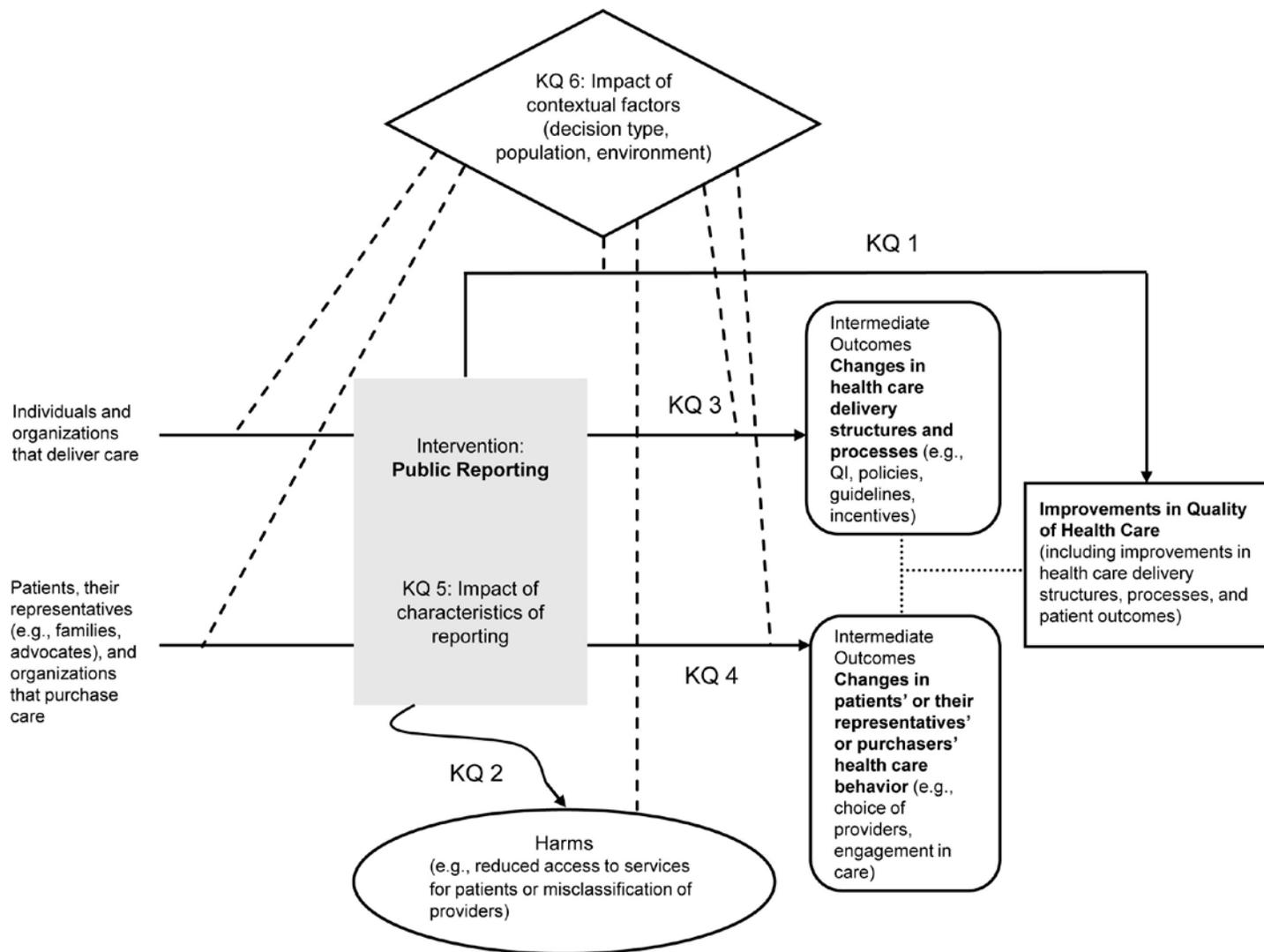
- **Populations**
 - Individuals or organizations that provide health care and make decisions about how to deliver care.
 - Patients (or their representatives) making health care decisions and organizations that purchase health care services.
- **Intervention**
 - Public reporting of performance data on patient outcomes or health care delivery.
- **Comparators**
 - Situations in which data are not available or not publicly reported, akin to “usual care“ in clinical studies.
 - Comparisons of one type of public reporting intervention with another (e.g., different reports, different contexts for public reports, or differences in content and formats of reports).

- **Outcomes (specified for each Key Question)**
 - **Key Question 1.** Improvements in quality of health care, including improvements in health care delivery structure or processes or patient outcomes.
 - **Key Question 2.** Harms, including any unintended negative consequence or adverse events for both populations (patients and providers).
 - **Key Question 3.** Changes in health care delivery structures and processes, including quality improvement activities.
 - **Key Question 4.** Changes in the behavior of patients or their representatives, or purchasers of health care, particularly selection of an individual clinician or organization for health care.
 - **Key Questions 5 and 6.** Evidence that the outcomes listed above are affected by characteristics of the reports and contextual factors.
- **Timing**
 - No minimum duration of followup time from the availability of the public report to the measurement of the intermediate or ultimate outcome.
- **Settings**
 - Studies of public reporting in any level or setting for health care delivery, including health plans, health systems, hospitals, outpatient services or practices, individual clinicians, hospice, home health care, or nursing facilities.

Analytic Framework

The analytic framework in Figure A represents relationships among the populations, intervention, and outcomes that are the focus of this systematic review and illustrates how these relationships translate into the Key Questions. The relationships between the intervention (public reporting) and intermediate outcomes (Key Questions 3 and 4), as well as the relationship between the intermediate outcomes and ultimate improvement in the quality of health care (Key Question 1), are included. Harms are another potential consequence of public reporting (Key Question 2). The relationships between the intermediate outcomes and ultimate improvement in the quality of care are represented with dotted lines and do not have corresponding Key Questions because this review does not explicitly evaluate evidence about these relationships. Rather, this framework shows key pathways by which public reporting may lead to harms, intermediate outcomes, and ultimate improvements in the quality of health care.

Figure A. Analytic framework



Note: Dotted lines indicate relationships between intermediate outcomes and ultimate improvement in the quality of care. KQ = Key Question; QI = quality improvement.

Methods

A Technical Expert Panel for this evidence report was involved in refining the definition of public reporting to be used for this review, and also contributed to developing and finalizing the Key Questions and the analytic framework. This group included clinicians, researchers, producers of public reports, and consumer advocates. Experts in public reporting and decisionmaking and individuals representing stakeholder and user communities were invited to provide external peer review of this review; AHRQ and an associate editor also provided comments. The draft report was posted for public comment for 28 days.

We conducted literature searches for both prior reviews and individual studies in MEDLINE[®], Embase[®], EconLit, PsychINFO[®], Business Source[®] Premier, CINAHL[®] (Cumulative Index of Nursing and Allied Health Literature), PAIS (Public Affairs Information Services), The Cochrane Database of Systematic Reviews, Database of Abstracts of Reviews of Effects (DARE), National Health Service Economic Evaluation Database (NHS EED), and Health Economic Evaluations Database (HEED). The Grey Literature Report database maintained by the New York Academy of Medicine and AARP Ageline were searched for additional studies and reports. The searches included studies published or reported between January 1980 and December 2011. Research studies were included if they conformed to the definition of public reporting (see above) and PICOTS and addressed at least one of the Key Questions. Studies were excluded if an English abstract was not available for a non-English-language article.

At the title and abstract triage phase, we did not exclude any study based solely on study design if it met other inclusion criteria. At the full-text review stage, we identified the designs of the studies that met all other criteria, and trials and observational studies that contained empirical data on an outcome that corresponded to a stated Key Question were retained for both abstraction and quality assessment. Qualitative studies, descriptive surveys, and lab-type experiments were also retained for abstraction if they addressed a Key Question or reported outcomes that were necessary but not sufficient precursors to the outcomes in the stated Key Questions (e.g., awareness of reports; comprehension of content; attitudes toward public reporting, including specific types of presentation; and intention to use). However, these studies were not assessed for quality and their abstraction was abbreviated. Qualitative studies are reported in separate evidence tables and are summarized separately at the end of each results section for each health care setting in the full report. Since they did not measure the outcomes in the Key Questions, they are also not included in the strength-of-evidence assessments.

A subset of titles and abstracts were triaged by all reviewers to confirm consistency. The remainder were divided among the reviewers and triaged, with a followup review of all exclusions. At the full-text stage, all articles were reviewed by two of the three principal reviewers and inclusion/exclusion conflicts were resolved through discussion and consensus. Following full-text review, we extracted data from all included studies.

Our assessments of the quality of individual studies are based on the recommendations in the chapter titled “Assessing the Risk of Bias of Individual Studies When Comparing Medical Interventions” in the AHRQ Methods Guide for Effectiveness and Comparative Effectiveness Reviews (hereafter, Methods Guide).^{13,14} We selected criteria for quality assessment of individual included studies that were appropriate for this topic. These criteria were used by two raters, who independently rated each article on these six criteria and made an overall assessment of good, fair, or poor based on definitions from the Methods Guide. After the ratings were

completed independently, they were compared and differences reconciled through discussion and input of a third rater when needed.

For initial data synthesis, we separated studies into four groups by the health care settings that were the subject of the public reports of quality. These four settings are hospitals, individual clinicians and outpatient group practices, health plans, and long-term care services (predominately nursing homes).

The strength of the body of evidence for each outcome and Key Question in the identified quantitative studies was rated according to the AHRQ Methods Guide^{13,14} based on judgments about risk of bias, consistency, directness, and precision of the evidence. The evidence for outcomes across the included studies was graded as high (high confidence that the evidence reflects the true effect; further research is unlikely to change our confidence or the estimate of the effect); moderate (moderate confidence that the evidence reflects the true effect; further research may change our confidence or the estimate of the effect); low (low confidence that the evidence reflects the true effect; further research is likely to change our confidence and the estimate of the effect); or insufficient (evidence is unavailable or does not permit a conclusion). Assessments were performed for each Key Question by two raters independently and then reconciled.

The applicability of the group of studies included in this review about public reporting depends on the user and the intended use of the report. Applicability was assessed, rather than scored or rated, and may vary according to the characteristics of the population studied and with the characteristics of the public reports.¹⁵ Applicability for this review also included considering the extent to which the literature identified can answer the question posed in the review.

Results

Database searches returned 11,809 citations for abstract and title review after duplicates were removed. From these, reviewers identified 1,632 articles that were possibly relevant and were reviewed by two of three reviewers in order to determine inclusion for data abstraction. Ultimately, 198 articles were included for abstraction, of which 97 were quantitative articles and 101 were qualitative. Four quantitative articles reported separate outcomes for both individual clinicians and hospitals and therefore appear in counts for both categories. Two studies were reported in multiple articles and are combined in the discussion of the results. Seven of the quantitative studies and 24 of the qualitative studies were conducted in countries other than the United States.

Early public reports on hospital mortality in the United States and hospital-level, and then surgeon-specific, cardiac surgery outcomes generated a significant amount of controversy and research. Studies of reports on health plans came after the public reports were created based on Healthcare Effectiveness Data and Information Set (HEDIS) and Consumer Assessment of Healthcare Providers and Systems (CAHPS) data. Through the Medicare.gov Web site the Centers for Medicare & Medicaid Services (CMS) provides information on a variety of health services and reports on additional services that are being added to Medicare Compare as data and measures are available. These public reports are the subject of the bulk of public reporting research, and the volume of research has increased as these public reports have become available.

The results of this review are presented by Key Question and then by outcome across health care settings in Table A, which includes the main conclusion, the number of studies (total and by

setting), and the strength of the body of evidence for each Key Question and outcome. The conclusions are summarized in the text below.

Key Question 1. Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes, or patient outcomes)?

Mortality was often the focus in studies of hospitals and was also the primary outcome in one study of individual providers. Most of the studies found a decrease in mortality, although these results are not uniformly consistent and many questions about the appropriateness of the comparisons (both groups and risk-adjustment methods) are an ongoing subject of debate. In studies of health plans and long-term care, the outcomes studied most often were quality measures for more specific outcomes, such as pain, pressure ulcers, and satisfaction with care. In general, these studies found that public reporting has a positive impact on the quality measures, although some studies found that this varies across plans or subgroups of the patient population (e.g., short- vs. long-stay nursing home residents).

Key Question 2. What harms result from public reporting?

Studies that examined harms found more evidence of no harm than evidence of harm. Research on harms or unintended negative effects related to the impact on access (e.g., selection of patients at low risk of negative outcomes or expected to do well, which is referred to as “cream skimming“ and “cherry picking,” or other actions by providers to change ratings by manipulating their patient populations) had mixed findings. However, some studies in long-term care have found that public reporting can create incentives that lead to unintended negative behavior by providers.

Key Question 3. Does public reporting lead to change in health care delivery structures or processes?

In identified studies, providers, both individual clinicians and organizations, responded to public reports by making positive changes in their behavior. Studies found that hospitals were more likely to offer new services, policies were changed, surgeons with worse outcomes left surgical practice, and quality improvement activities increased. However, data are not available for all settings, and for others data are based on a small number of studies.

Key Question 4. Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

For this Key Question more than any other, there is agreement across settings. Public reports seemed to have little to no impact on selection of providers by patients and families or their representatives. When an effect was found, it was for a subgroup of patients (e.g., younger, more educated patients). The qualitative research provided insights into why this might be. The primary reasons public reports did not influence selection were that people were not aware that the quality information was available, the information provided in public reports was not what they needed or valued, the information was not always available when they needed it to make a decision, or the information was not presented in a comprehensible way.

Key Question 5. What characteristics of public reporting increase its impact on quality of care?

Almost no quantitative studies examined whether report characteristics affected the impact of public reporting on any outcome. Two studies of public reporting on individual clinicians were identified that assessed the impact of two different characteristics, but none were found for other settings, making it impossible to draw conclusions about the strength of evidence. The majority of evidence available about the characteristics of public reports comes from qualitative studies that document the importance of relevance, readability, and clarity of presentation.

Key Question 6. What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Relatively consistent findings showed that public reports have more of an impact in competitive markets and that improvements are more likely in the subgroup of providers with lower scores in initial public reports. While several contextual factors were identified, they do not seem to represent the complexity of the environment.

Discussion

Findings

The main findings from this review are summarized in Table A. For most of the outcomes, the strength of the evidence available to assess the impact of public reporting was moderate. This was due in part to the methodological challenges researchers face in designing and conducting research on the impact of population-level interventions.

Table A. Summary evidence table: effectiveness of public reporting of health care quality as a quality improvement strategy

Key Question	Outcome: Conclusion	Total Studies, ^a Settings (Number of Studies)	Strength of Evidence
Key Question 1 Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes, or patient outcomes)?	Reduction in mortality: Public reporting was associated with a small decline in mortality after controlling for trends in reductions in mortality.	19 Hospitals (18) Individual clinicians (1)	Moderate
	Quality and process indicators (e.g., CAHPS, HEDIS, Nursing Home Compare): Most studies found that public reporting is associated with improvement in quality and process indicators, although this varies across specific measures.	19 Hospitals (5) Health plans (5) Long-term care (9)	High

Table A. Summary evidence table: effectiveness of public reporting of health care quality as a quality improvement strategy (continued)

Key Question	Outcome: Conclusion	Total Studies,^a Settings (Number of Studies)	Strength of Evidence
Key Question 2 What harms result from public reporting?	Increase in mortality: In one study, an increase in mortality was attributed to public reporting.	1 Hospitals	Insufficient
	Inappropriate diagnosis and treatment: In one study, the hypothesis that a publicly reported measure would lead to overdiagnosis and overprescribing was not supported.	1 Hospitals	Insufficient
	Access restrictions: Most studies concluded that public reporting does not contribute to reduced access for patients (e.g., avoiding high-risk patients, referring high-risk patients out of State). Fewer studies have identified instances of reduced access, suggesting this conclusion could be changed based on future research.	13 Hospitals (8) Individual clinicians (2) Long-term care (3)	Low
	Unintended provider behavior: There was some evidence from LTC that public reporting motivates NHs to change coding and readmit patients to the hospital. No evidence supported a link with surgeons or organizations withdrawing from the market or with declines in quality for items not measured (crowding out).	5 Individual clinicians (1) Health plans (2) Long-term care (2)	Moderate
Key Question 3 Does public reporting lead to change in health care delivery structures or processes?	Provider actions: The evidence suggested that individual clinicians and organizations respond to public reporting in positive ways, including adding services, changing policy, and increasing focus on clinical care. One study found that low-quality surgeons leave practice (considered a positive action). A study of vaccination rates was the only one that found no effect.	10 Hospitals (4) Individual clinicians (1) Long-term care (5)	Moderate
Key Question 4 Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?	Selection (market share/volume): Studies found no or minimal impact of public reporting on selection as measured by market share or volume. Contracting patterns suggested purchasers give only minimal consideration to publicly reported quality when selecting providers.	47 Hospitals (15) Individual clinicians (9) Health plans (17) Long-term care (6)	Moderate

Table A. Summary evidence table: effectiveness of public reporting of health care quality as a quality improvement strategy (continued)

Key Question	Outcome: Conclusion	Total Studies, ^a Settings (Number of Studies)	Strength of Evidence
Key Question 5 What characteristics of public reporting increase its impact on quality of care?	Mode and tone of message: One study found that mode (email vs. mail) affects use of public reports, while tone of the message (risks vs. benefits) does not.	1 Individual clinicians	Insufficient
	Accuracy and usefulness: One study found that the quality information contained in public reports is accurate and useful for patient selection, even if there is a substantial delay between data collection and publication.	1 Individual clinicians	Insufficient
Key Question 6 What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?	Competitive market: Studies have found that public reporting is more likely to result in improvements in quality if the clinician or provider is in a competitive market.	7 Hospitals (2) Long-term care (5)	High
	Baseline performance: The likelihood of improvement after public reporting was greater for entities with lower quality before or at the first instance of reporting.	5 Health plans (2) Long-term care (3)	High
	Nursing home characteristics: Characteristics (e.g., ownership) did not reliably predict how NHs reacted to public reporting. Studies found no consistent difference across characteristics.	6 Long-term care (6)	Low
	Patient characteristics/subgroups: Different patient characteristics, such as age, specific health care needs, and insurance coverage, may have increased the likelihood that publicly reported data affected choice.	3 Health plans (1) Individual clinicians (2)	Low
	Variation in quality: Public reporting was more likely to influence quality if the level of quality varied across plans in the market.	1 Health plans	Insufficient

^aConclusions and strength of evidence are based on the 97 included quantitative studies. Studies that examined more than one outcome are included separately for each outcome.

Abbreviations: CAHPS = Consumer Assessment of Healthcare Providers and Systems; HEDIS = Healthcare Effectiveness Data and Information Set; LTC = long-term care; NH = nursing home

Limitations and Research Needs

The major limitations of this review are related to the nature of public reporting as an intervention and affect both what studies were included and how they were summarized.

- While our search was not limited to only biomedical databases, it is likely there is literature from some relevant disciplines in the social sciences and the humanities indexed in discipline-specific databases that we did not search. Also, we believe, but cannot prove, that there are studies of public reporting that exist but that have not been published in peer-reviewed journals or distributed through the gray literature sources that we were able to access. Additionally, our conclusions are based on public reporting as it

was at the time the included studies were conducted. If the field has evolved so that public reporting today is materially different from what was studied, the review may not represent current state-of-the-art public reporting, and it is unlikely to include cutting-edge innovations.

- Our conclusions about public reporting are based on evidence from across different health care settings, different geographic areas, and different time periods. This limits the applicability of our results, as not all of our overarching conclusions would be applicable to a present-day public reporting effort for one health care setting in a specific geographic area. In the sections of the full report that present the results by settings and when study results are presented in detail, we included dates and geographic information (whether the public reporting was national or for a specific area, in the United States or in other countries) in the description of studies in order to make this as transparent as possible.
- The research on public reporting also has limitations. Public reporting makes information available to anyone who wants it and may involve marketing and dissemination, but it is difficult to identify exactly who is poised to make a health care decision, and we rarely know who actually receives and uses the information. This makes designing studies and conducting research challenging because there are almost always many potential sources of confounding.
- Studies rarely reported enough (if anything at all) about the public report itself or the context. Without this information, it was impossible to compare and contrast studies in which public reporting had an impact to those in which it did not and to hypothesize if the difference was due to specifics of the nature of the public reports or the context. This leaves several important questions unanswered. The diversity of public reports is not reflected in the research literature. Public reports on cardiac surgery outcomes in three States (New York State, Pennsylvania, and California) and Nursing Home Compare are the subject of just under half of the all quantitative studies included in this report.

Future research on public reporting could address these limitations and be more relevant and useful if it were to:

- *Include studies that reflect the diversity in public reporting.* Both the public reporting initiatives studied and the criteria used to evaluate public reports should reflect the wide range of motivations and goals for the public reports, the scale of the public reporting enterprise, its connection with other initiatives, and innovations in the field.
- *Develop a coordinated agenda for future research.* Future research needs to build on what came before, with an eye toward advancing understanding and a focus on developing the science rather than repeating past approaches that have had a relatively low yield. Stakeholders, including producers of public reports, researchers, and funding agencies, need to identify key issues for the field, and then develop and conduct research targeted to these issues.
- *Focus attention on public reporting interventions and the context.* We do not just want to know if public reporting works (efficacy); we want to know who it works for and in what situations (effectiveness). Most articles provided very little or no information about the content or format of the public report that was the subject of study or about the context in which the intervention was implemented and studied. This lack of specification of the characteristics and components of public reports and the context makes it difficult to

think about how to apply the research results in the future or move from experimentation to effective implementation on a larger scale.

- *Include a systematic approach to the study of harms/unintended consequences.* Potentially harmful effects, such as increasing disparities or the use of more health services (e.g., more hospital readmissions from long-term care), require more study to identify the extent of the harms and how they can be avoided. Rigorous studies that focus on perverse incentives and unintended consequences are needed.
- *Contribute to development of methods.* Study designs and approaches to analyses for individual studies and systematic reviews are needed that are appropriate for health services, public health, or quality improvement research.

Conclusion

Based on the studies identified in this review, we can conclude:

- Public reporting is associated with improvement in health care performance measures, such as those included in Nursing Home Compare.
- Quality measures that are publicly reported improve over time.
- Almost all identified studies found no evidence or only weak evidence that public reporting affects the selection of health care providers by patients or their representatives.
- Studies of health care providers' response to public reports suggest they engage in activities to improve quality when performance data are made public.
- Characteristics of the intervention and the context, which are likely to be important when considering the diffusion of quality improvement activities, were rarely studied or even described.
- Although the potential for harms is frequently cited by commentators, the amount of research on harms is limited and most studies do not confirm the potential harm.

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Introduction

A substantial amount of research exists demonstrating that health care frequently fails to meet the current standards of quality care.^{1,2} Errors, suboptimal management or control of disease, and overutilization or underutilization of services are more likely to occur when high-quality, evidence-based health care is not provided. The potentially serious consequences for patients and their families include higher mortality, increased morbidity, decreased quality of life, and higher cost of care. Additionally, low-quality care and inconsistencies in quality are linked to health care disparities.^{3,4}

Three general approaches are hypothesized to address quality gaps in a quality improvement framework: measuring quality, influencing quality, and improving quality.^{5,6} In this quality improvement framework, making quality, safety, or performance data publicly available is categorized as a means of influencing quality. Public reporting may influence quality by providing incentives for change.

This report focuses on how the public reporting of health care quality information may provide incentives for quality improvement that ultimately produce higher quality care. It is one in a series of reports titled *Closing the Quality Gap: Revisiting the State of the Science (CQG series)* that examines the role of several interventions in promoting quality health care. This focus is not meant to suggest that quality improvement is the only goal of public reporting or that public reporting does not play other roles in health care and health policy. Public reporting can be an important element in transparency, accountability, patient engagement, community support, and trust in addition to its impact on selection by patients, provider behavior, and independent of its potential impact on quality of care.

Applying the quality improvement framework to public reporting led us to consider how quality might be influenced based on the different incentives public reports create for different people and organizations. The incentives may be for the “consumers” of health care including patients, families, or advocates who act on the behalf of patients, or other purchasers of health care services such as employers, who select the options available to their employees. Public reporting could also provide incentives for the individuals and organizations that provide or arrange care including individual clinicians, hospitals, long-term facilities or services, and health plans. The ways these two populations could respond to public reporting constitute the various ways public reporting can lead to improved quality of care. Underlying these are two major assumptions: (1) given choices and information, patients and purchasers will choose higher-quality providers; and (2) health care providers (both individual clinicians and organizations) and groups or plans that arrange health care services will strive to provide high-quality care when information about their performance is publicly available to patients, health plan members, their peers, policymakers, and the media. It is assumed that patients are motivated by the desire to maximize the benefits they derive from health care by obtaining the highest quality of care available. Individual clinicians, hospitals, and other organizations that provide or arrange health care want to attract new patients or members and avoid losing existing ones. They may also be motivated by concern about their reputation among their peers or by professional and organizational commitments to providing high quality care.

These assumptions provided the rationale for considering public reporting as a quality improvement strategy. Historically, these assumptions have been partially based on theories from economics^{7,8} and behavior change.⁹ According to economic theory, public reporting corrects asymmetries in information. Public reporting accomplishes this by making previously unobservable quality of health care more transparent so everyone involved in a transaction has

access to essential information and can use this information in making choices. Behavior change models and quality improvement theories stress the importance of accessible information on measurable, actionable processes and outcomes as motivation for practice improvement. Public reporting in this context can provide data that translates to goals or targets for practice change and incentives to improve.

While these theories may help understand how public reporting is expected to work, they do not completely explain patients or providers behaviors nor do they necessarily require that public reporting be the sole motivator for behaviors that impact quality of care directly or indirectly. They also do not address the challenges inherent in producing and transmitting information to multiple audiences with different expectations and skills. As is the case with other social interventions, the impact of public reporting is mitigated by many factors such as the extent to which patients have choices, the competing demands on individual clinicians or provider organizations, the relevance, timeliness, and accessibility of the reported information, and the different uses of quality measures in health care delivery and policy. These are only a few examples of the several factors operating in the complex realm of health care and decisions in which public reporting occurs.

The modern history of public reporting dates to over 25 years ago when the Health Care Financing Administration (HCFA) in the United States released hospital mortality data in 1986. Dubbed the “death list,” this received media and public attention. Critiques in the health care community focused on both issues with the quality of the data and the appropriateness of public reporting overall, and in 1992 the program was suspended. Some other public reports have shared this fate and are no longer produced (e.g., the hospital report created by the Cleveland Health Quality Choice program) while others now have almost a 2-decade history (e.g., the New York and Pennsylvania Coronary Artery Bypass Graft [CABG] reports and the Healthcare Effectiveness Data and Information Set [HEDIS]).

The relatively long history of public reporting in health care has provided numerous opportunities for the impact of public reporting on quality to be studied in a variety of settings and levels including health plans, hospitals,^{10,11} individual clinicians, nursing homes,¹² postacute care,¹³ and home care.¹⁴ However, the results of these studies have been inconsistent. For example, some studies have reported improvements in specific health services, while other studies have documented unintended negative consequences, including motivating providers to select lower-risk patients in order to improve their quality score. A review published in 2008 (including studies of health plans, hospitals and individual clinicians through 2006) concluded that although there is scant evidence that publishing performance data improves quality of care and that evaluation of public reporting systems is needed, some evidence suggests that public reports stimulate quality improvement activities at the hospital level.¹⁵

Today, Federal and State government agencies, community quality collaboratives, and other organizations are continuing to invest resources in public reporting as one possible intervention to bridge the gap between current and high-quality practice in health care. The Agency for Healthcare Research and Quality (AHRQ) and the Robert Wood Johnson Foundation has supported public reporting through their Chartered Value Exchange (CVE) (www.ahrq.gov/qual/value/Incveover.htm) and Aligning Forces for Quality (www.rwjf.org/qualityequality/af4q/) programs. The CVEs, also known as community quality collaboratives, are committed to public reporting and transparency as part of their mission to promote quality improvement. They involve more than 600 health care leaders and cover more than one-third of the U.S. population. Public reporting is also a component of the transparency

initiatives of several government agencies that include more explicit decisionmaking procedures and open meetings, in addition to the routine release of documents and data.

As part of their efforts to promote public reporting, government agencies are making technical assistance resources available. The CVEs have a learning network (www.ahrq.gov/qual/value/Incveover.htm); an AHRQ Web site (www.talkingquality.ahrq.gov/) is devoted to public reporting resources including a recent series of reports on best practices in public reporting,¹⁶⁻¹⁸ and a National Summit on the Future of Public Reporting for Consumers was convened by AHRQ in March 2011 (a subset of the commissioned papers were published in a leading health policy journal¹⁹⁻²¹). These programs, along with other conferences about creating and using reports and other decision-support tools to engage consumers and providers, demonstrate the continued interest in public reporting as a quality improvement strategy for a variety of types of health care organizations and individual providers.

This report was designed to be timely, given the significant changes that have occurred in the scope and nature of public reporting since the last published systematic review¹⁵ and the questions that remain regarding the extent to which public reports result in quality improvements and higher-quality health care. Medicare has substantially expanded its public reporting program and now provides quality data via sections of the Medicare.gov Web site that include Medicare Plan Ratings, Hospital Compare, Nursing Home Compare, Home Health Compare, and Dialysis Facility Compare. Physician Compare will soon be available. Additionally, health data from many more sources are now available with minimal restrictions to patients, health care providers, and purchasers. New technologies allow for innovative data collection (e.g., Global Positioning System tracking of asthma inhaler use), aggregating data from consumer feedback sites, customization of data with apps that simplify the combination of data from multiple sources, and accessing more data available in real time.²² These efforts and continuing commitments to transparency and patient-centered health care are likely to contribute to substantial increases in the amount of publicly available health care-quality data. Changes under the 2010 Affordable Care Act (Public Law 111-48) may also increase the availability of data and the number of people making decisions about health care services. These new programs and trends suggest that public reporting may be undergoing a transformation. The caveat to this, however, is that as a systematic review this report is limited to an assessment of the public reporting that has been the subject of research and evaluation studies.

Definition of Public Reporting and Scope

Our definition of public reporting was designed to situate public reporting in the context of quality improvement in health care as that is the theme of the CQG series. We developed the definition based on the history of public reporting, prior reviews, our preliminary review of the literature, our initial research on current health care public reports, and our understanding of other transparency-driven initiatives in health care. An initial draft definition was refined based on input from the Technical Expert Panel (TEP). The result of this process was the following definition that shaped the scope of this review. Additional detail is provided in the Methods section about how this definition shaped our inclusion and exclusion criteria.

Public reporting is data, publicly available or available to a broad audience free of charge or at a nominal cost, about a health care structure, process, or outcome at any provider level (individual clinician, group, or organizations [e.g., hospitals, nursing facilities]) or at the health plan level. While public reporting is generally understood to involve comparative data across

providers, for purposes of this review we are adopting a broader approach to include findings in which one provider is compared to a national/regional data report on performance for which there are accepted standards or best practices.

The potential contribution of this review to the consideration of public reporting as a quality improvement strategy is that identified studies may offer insights not only into the effectiveness of public reporting for quality improvement, but also into such issues as when information is needed,²³ how it is best formatted and presented, and what is perceived as useful by different audiences.²⁴ Our synthesis attempted to include these considerations and other characteristics of reports and contextual factors in order to inform decisions about the use and development of public reporting as a more effective quality improvement strategy. However the extent to which this is possible is limited by whether studies of public reporting provide this type of information.

Objectives and Key Questions

Given the resources devoted to public reporting and the desire to synthesize existing research knowledge to inform future public reporting efforts, the objectives of this systematic review were:

To determine the effectiveness of public reporting as a quality improvement strategy by evaluating the evidence available about whether public reporting results in improvements in health care delivery and patient outcomes (Key Question 1) and evidence of harms resulting from public reporting (Key Question 2).

To determine whether public reporting leads to changes in health care delivery or changes in patients' or purchasers' behaviors (intermediate outcomes) that may contribute to improved quality of care (Key Questions 3 and 4).

To identify characteristics of public reports and contextual factors that can increase or decrease the impact of public reporting (Key Questions 5 and 6).

The Key Questions correspond to these objectives. The Key Questions were reviewed and refined in consultation with TEP as well as the researchers and the AHRQ staff coordinating the series. The Key Questions are first listed divided by the objective they address and then each question is repeated with additional description and clarification:

Objective 1

Key Question 1

Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes, or patient outcomes)?

Key Question 2

What harms result from public reporting?

Objective 2

Key Question 3

Does public reporting lead to change in health care delivery structures or processes (at levels of individual providers, groups, or organizations [e.g., health plans, hospitals, nursing facilities])?

Key Question 4

Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

Objective 3

Key Question 5

What characteristics of public reporting increase its impact on quality of care?

Key Question 6

What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Key Question 1: Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes, or patient outcomes)?

Improvements in care and patient outcomes may be combined in some studies and reviews under the heading of “clinical outcomes.” For this Key Question the focus is on improvement. Examples of potential outcomes in this category include decline in mortality for cardiac surgery patients, an increase in actual implementation of a guideline, or greater availability of service with known value. The actual improvements in care delivery and patient outcomes are the goals of quality improvement and public reporting when it is used as a quality improvement strategy.

Change in provider behavior or policy is an intermediate outcome included in Key Question 3. This is separate because it is not a given that all change will lead to improvement; furthermore, some studies may only measure the change in care processes or providers’ behaviors that are expected to lead to better quality and may not measure the ultimate health care outcome.

Key Question 2: What harms result from public reporting?

Harms include any unintended negative consequence or adverse events resulting from public reporting. Harms could affect patients and purchasers, or the individuals and organizations that provide care. Examples of harms include:

- Reduced access to services if providers select patients or offer services in a different way (e.g., treat only low-risk patients or pull out of a home care market) in order to improve their publically reported quality ranking or score.
- Reduced patient engagement and/or negative outcomes if patients believe, based on a report, that they are receiving services from a high-quality provider and therefore do not need to be vigilant and involved in their own care; a report provides too much

information and reduces comprehension; or the meaning of the data is not understood and therefore not used.

- Increased anxiety due to understanding that health care is not perfect and increased worry about one's own health condition or care.
- Misclassification of providers by the public reports resulting in declines in market share, contracting arrangements, or reputation.
- Compromised data quality and reduced confidence in data if people attempt to manipulate the publically reported data.
- Public reporting that results in no improvement or worsening of quality for any reason.

Key Question 3: Does public reporting lead to change in health care delivery structures or processes (at levels of individual providers, groups, or organizations [e.g., health plans, hospitals, nursing facilities])?

This intermediate outcome, changes in health care delivery, may be of particular interest in this review. Individual providers or organizations might change processes (e.g., adopt guidelines, change policies, increase quality improvement efforts) or structures (e.g., electronic ordering, automated reminders, staff capacity) in an effort to improve their performance on the outcomes or indicators that are publically reported, maintain their reputation, attract more patients, or secure more contracts. However, this change in delivery may or may not necessarily lead to improvement in quality of care—the ultimate outcome of interest. Changes could result in improvement, no improvement, or worsening of outcomes, or the study design may not include measures of the ultimate impact on quality of care.

Key Question 4: Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

Patients' and purchasers' behaviors include but are not limited to their selection of health care providers or use of health services. Their behaviors may also include more general advocacy for higher quality of care and for better information and decision support. Patient behaviors are limited to those related to the reporting of quality data in this review and do not include responses to health care education materials. Purchasers may change their contracting practices based on public quality information. Changes can be negative as well as positive. An example of a positive change would be increased comprehension of health information by patients. Negative changes could include patients becoming overwhelmed by data and dismissing all reports, relying too much on a rating and not becoming engaged in their own care, or not understanding reports and relying on less reputable sources of information. These negative changes could result in harms. Change in behaviors can also include information seeking and developing the ability to retrieve the information desired.

Key Question 5: What characteristics of public reporting increase its impact on quality of care?

The way in which health care data are publicly reported may affect the impact they have on intermediate and ultimate outcomes. Specific examples of important report characteristics are:

- **Acceptable/Appropriate.** Patients and health care providers find the data believable and have confidence in data quality/accuracy, and the data are applicable to their situation, including whether reports are general, disease specific, or specific to

subgroups of the population.

- **Accessible.** The reports can be understood by people in the populations. The format, language, and graphics can be understood by the target audiences. The target population can understand the meaning of the report. Accessibility also includes how reports are publicized and promoted.
- **Actionable.** *Patients:* Reports are available when and where a decision needs to be made. *Individuals or organizations that provide care:* Reports are related to practices they can, or perceive they can, change, or reports are related to other factors they can influence.

Key Question 6: What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Contextual factors that could make a health care decision more or less amenable to influence from public reports include three nested levels. First, there are the characteristics of the specific decision to be made (e.g., what type of care is needed, how many health care options are available, how much time before the decision needs to be made, and what a provider can influence). Second, a person or organization makes each specific decision, and the characteristics of the decisionmaker (patient/patient representative/purchaser or individuals/health care organizations that deliver care) may be important. For example, patient literacy is assumed to affect the impact of public reports or the importance of peer approval to a provider may motivate change. Third, the decision and the decisionmaker exist in an environment that includes factors such as market characteristics, public policies (e.g., other incentive programs), and organizational requirements, all of which may enhance or diminish the impact of public reporting.

Methods

Topic Nomination and Development

This evidence review about public reporting as a quality improvement strategy is one of eight reviews in the Closing the Quality Gap: Revisiting the State of the Science series (CQG series). The CQG series aims to assemble the evidence about effective strategies to close the “quality gap”—the difference between what is expected to work well for patients based on known evidence and what actually happens in day-to-day clinical practice across populations of patients.

The CQG series focuses on improving the quality of health care through critical assessment of relevant evidence for selected settings, interventions, and incentives. Topics for the eight CQG reviews were solicited from the portfolio leads at Agency for Healthcare Research and Quality (AHRQ). The nominations included a brief background and context; the importance and/or rationale for the topic; the focus or population of interest; relevant outcomes; and references to recent or ongoing work. Among the topics that were nominated, the following considerations were made in selection for inclusion in the series: the ability to focus and clarify the topic area appropriately; relevance to quality improvement and a systems approach; applicability to the Evidence-based Practice Center (EPC) program/amenable to systematic review; the potential for duplication and/or overlap with other known or ongoing work; relevance and potential impact in improving care; and fit of the topics as a whole in reflecting the AHRQ portfolios.

Topic development occurred during preliminary work with the lead EPC that is coordinating the series, the AHRQ Task Order Officer (TOO) for the series, and the investigators at the EPCs working on the other topics in order to assure that the objectives and methodology conformed to the goals of the series. Topic development then continued with the TOOs and a Technical Expert Panel (TEP) specific to this review. The TEP included clinicians, researchers, producers of public reports, as well as consumer advocates. This second phase included refining the definition of public reporting to be used for this review and developing and refining the Key Questions in order to make the review feasible and relevant, while maintaining the focus on quality improvement, as this is the topic for the series. Both the definition and the Key Questions are presented in the prior section. Topic development also involved developing the analytic framework (see Figure 1) and setting the parameters for what studies were to be included in the review.

Search Strategy

Research on the public reporting of health care quality information spans multiple disciplines. For this reason we searched bibliographic databases covering psychology, economics, and public policy as well as health care. We conducted searches for both reviews and individual studies in MEDLINE[®], Embase[®], EconLit, PsychINFO[®], Business Source[®] Premier, CINAHL[®] (Cumulative Index of Nursing and Allied Health Literature), and PAIS (Public Affairs Information Services). We also searched for systematic reviews, studies and evaluations in The Cochrane Database of Systematic Reviews, The Cochrane Effective Practice and Organization of Care Group (EPOC) Register of Studies, Database of Abstracts of Reviews of Effects (DARE), National Health Service Economic Evaluation Database (NHS EED), and Health Economic Evaluations Database (HEED). The Grey Literature Report database maintained by the New York Academy of Medicine and AARP Ageline were searched for additional studies and reports.

Additionally in order to supplement our search for grey literature, we contacted known public report producers through the Scientific Resource Center (SRC) of the EPC program. Individuals in organizations that had contributed reports to a clearing house or participated in community quality collaboratives were sent an email explaining the review and asking for any published or unpublished evaluations or data related to their public reports.

The initial searches included studies published or reported between January 1980 and May 2011. Two of the earliest public reports in the United States were the data on hospital mortality rates issued by the Health Care Financing Administration in 1986 and the mortality reports issued by the New York Cardiac Surgery Reporting System in 1989. Starting from January 1980 ensured that the entire contemporary history of public reporting was represented. In January 2012 the search was updated to include citations through December 31, 2011 and additional studies were added. In a few cases studies were identified through conference abstracts and online advance publication, and were included if the final manuscript was available even though the publication date was in 2012.

Key word and index term searches were based on strategies used in previous systematic reviews and on words and terms used in selected recent articles. Public reporting does not map to standardized index terms in citation databases, so terms related to key concepts were used to identify search strings that were then combined to identify articles. These concepts and terms are listed in Table 1. The list of search terms was developed based on the index terms used for seminal articles supplemented by review and input from the TEP and AHRQ TOOs. The search term lists were reviewed and refined by librarians with expertise in both biomedical and social science literature searching. We also tested the search against the studies identified in prior systematic reviews and asked experts in the field to review the citation list resulting from these searches. The actual search strings are included in Appendix A.

The search resulted in the identification of 13,318 citations and 11,809 articles after duplicates were removed. All citations were initially imported into an electronic database, EndNote X3[®], and then uploaded to Distiller[®], a specialized application for systematic reviews, for title and abstract triage, full text review, and abstraction. Twenty-five new studies were added to the review based on the updated search as well as recommendations from peer reviewers and public comments.

Table 1. Public reporting concepts and corresponding search terms

Concept	Search Terms
Information dissemination and quality	Benchmarking/ or Information Services/ or Information Dissemination/ or Disclosure/ or Access to Information/ or Mandatory Reporting/ or Quality indicators, health care/ or Quality assurance, health care/ or Quality improvement/ or "process assessment (health care)"/ or "outcome assessment (health care)"/ or (quality adj2 indicator\$).ti,ab
Health care settings	exp Hospitals/ or exp Physicians/ or Nursing Homes/ or Home Care Services/ or Competitive Medical Plans/ or Health Maintenance Organizations/ or Managed Care Programs/ or Insurance, Health/ or Medicare/ or Medicaid/ or Hospices/ or Ambulatory Care/ or Skilled Nursing Facilities/ or Group Practice/ or exp Primary Health Care/ or Institutional Practice/ or Private Practice/ or Family Practice/ or Physicians, Family/ or Professional Practice/ or Allied Health Personnel/ or Outpatient clinics, hospital/ or Academic Medical Center/ or Health Care Sector/ or Hospital Administration/ or Public Health Administration/ or Long Term Care Facilit\$.ti,ab. or health care cent\$3.ti,ab. or health care provider\$.ti,ab. or (coronary or cardiac or cardiolog\$).ti,ab.
Patient/consumer and provider behavior	Consumer Participation/ or Consumer Advocacy/ or Consumer Satisfaction/ or Patient Satisfaction/ or Decision Making/ or Choice Behavior/ or Attitude of Health Personnel/ or Physician's Practice Patterns/ or Nurse's Practice Patterns/ or Professional Practice/ or Guideline Adherence/ or Patient Selection/ or Patient Participation/ or Hospital Mortality/ or (decision\$ or choice\$ or choos\$ or behav\$ or patient outcome\$).ti,ab.
Title abstract adjacency	((Dissem\$ or Disclos\$ or Profil\$ or Inform\$ or Indicator\$ or Metric\$ or Rank\$ or Compar\$ or Score\$ or Rating\$ or Rate\$ or data or measure\$ or criteria or standard\$ or account\$ or report\$ or release\$ or initiative\$ or Star) adj5 (Performan\$ or assessment\$ or evaluat\$ or quality or public\$ or consumer\$ or patient\$ or transparen\$ or provider\$)) or score card\$ or (quality adj2 report\$) or report card\$ or league table\$ or (star adj2 rating) or (Star adj2 performance)).ti,ab.
Known public reports	(Medicare Compare or nursing home compare or Calhospital Compare or California State Report Card or California Hospital Outcomes or myhealthcareadvisor or Massachusetts Health Quality or (Pennsylvania adj3 coronary) or (Hospital Quality adj2 Safety Survey) or Home health Compare or Physician Compare or (New York adj2 Cardiac adj2 Report\$) or (New York adj5 surg\$) or Cleveland Health Quality Choice or (HCFA adj5 mortality) or (HCFA adj5 death) or Federal employee health benefit guide or QualityCounts or CAHPS or HEDIS).ti,ab.

Study Selection

Studies were selected from the identified citations through title and abstract triage followed by full text review. Research studies were included if they conformed to the definition of public reporting and objectives (see above) as well as the Population, Intervention, Comparators, Outcomes, Timing, and Settings PICOTS (see below) and addressed at least one of the stated Key Questions for this review. A variety of study designs were included, such as trials/experiments, nonrandomized experiments, observational studies, systematic reviews, and evaluation case studies. Studies were not excluded based on study design. The inclusion and exclusion criteria lists are included in Appendix B.

Title and abstracts were triaged by five reviewers, including the Lead Investigator and Co-Investigator (Ph.D. research faculty) and three Research Associates/Assistants (masters-level research staff trained in systematic review methods) for the first 300 articles then discrepancies and differences were discussed and reconciled. Another 200 titles and abstracts were submitted to dual review to confirm consistency. Once an acceptable level of agreement was reached, the remainder were divided among the reviewers and triaged. A second review of all excluded abstracts was conducted during the time period when the report was undergoing peer review.

Articles identified as potential inclusions for the review based on title and abstract were then advanced to full text review. In the full text review two reviewers classified all articles and

inclusion/exclusion conflicts were resolved through discussion and consensus. Decisions made by reviewers were documented at each stage. We retained data on excluded studies and documented the reasons for their exclusion (Appendix C).

At the title and abstract triage stage, most studies that were excluded were dropped because they were not about the right topic. Given our search strategy and the lack of precise terms, many of the retrieved titles and abstracts were not about public reporting of health care quality data. These studies were about some other aspect of health care quality or about measures not publicly reported. Other studies did not meet our definition of public reporting and were excluded. Specifically, studies were excluded if:

- The quality data were not clearly publicly available or were unavailable to a large group such as all members of a health plan. Following the advice of our TEP we included studies of the impact of employer-provided data to employees about health plans because these data were made available to a large group even if they were not available to the general public. Studies in which the data were available to a limited number of stakeholders or to a certain type of stakeholder for feedback, quality improvement, benchmarking, or internal organization operations were not included as these data were not publicly available.
- The data were available but had to be purchased for more than a nominal subscription fee (e.g., a nominal fee would be a subscription to *Consumer Reports* or a similar publication or Web site).
- Data on individual clinicians was not about physicians or nurses. This exclusion was developed in consultation with the TEP and AHRQ. Other providers such as dentists and therapists were excluded in order to keep the review manageable and focused on quality rating of general health care services.
- Data included in the report were only for one organization or individual and were not comparative, meaning the single organization or individual could not be compared to others directly or to data for a national, State, or regional group of organizations or individuals.

Other studies that were excluded were articles about research that involved publicly reported health care quality data but did not correspond to our Key Questions. There were two main categories of these studies. One category included studies in which publicly reported data were used as the outcome measure in an evaluation of a different health care intervention. In these cases the public reports were not interventions that affect actions by health care providers or patients and lead to better outcomes. Instead they were an easily accessible source of data to use in the evaluation of other interventions after a problem was identified and an intervention executed.

Another category of studies excluded were articles that considered methodological issues related to the creation of the public report or the specific quality measures included in the reports. Many of these studies analyzed the validity of the measures that were reported or the risk adjustment scheme used to facilitate comparisons. Other studies described the development of the surveys used to collect the data that were ultimately publicly reported. While it is important that quality measures that are publicly reported are credible, evaluating the quality measures directly or the research evidence about the measures were deemed separate tasks that would require significant resources and expertise that were outside the scope of this review.

The remaining criteria used to exclude articles were:

- The public reporting was only about services that are not medical or directly health-related (e.g., food service, room décor).
- The study population was not human.
- The study had no original data or was a commentary, an editorial, or a nonsystematic review.
- The study was published before 1980.
- No English abstract was available for a non-English language article.

If an English abstract was available for non-English language article, it was evaluated according to the same criteria as English language articles at title and abstract triage. At full text review, English articles were reviewed first and then a judgment was made as to whether any non-English articles were likely to add significantly to the literature based on the English abstract, any data available in tables, and preliminary translations of section headings and titles of tables or figures. Articles that were likely to make a significant contribution to the results were then considered for full translation in accordance with current practice and standards for the conduct of systematic reviews. This resulted in the translation of one article for inclusion in this review.

PICOTS Framework

This review is about the public reporting of quality information as a quality improvement strategy in health care. It focuses on the impact of public reporting on quality of care as the ultimate outcome of interest and the behaviors of two populations: patients, families, and purchaser of care and organizations and individuals who provide or facilitate the provision of health services as intermediate outcomes.

Specifying the Population, Intervention, Comparators, Outcomes, Timing, and Settings (PICOTS) for a systematic review is an approach used to generate answerable research questions, to structure the literature search, to determine inclusion/exclusion criteria, and to organize reports.

For our review of public reporting as a quality improvement strategy, the PICOTS are as follows:

Populations

- Individuals or organizations that deliver health care and make decisions about how to deliver care.

These included health care providers in all settings (inpatient, outpatient, nursing facility, home care, etc.) and at all levels (health plan, facility, group practice, individual clinician, etc.) unless specifically excluded in the scope or exclusion-inclusion criteria (e.g., individual clinicians included nurses and physicians in any specialty while other individuals such as dentists were excluded). Organizations such as hospitals and health plans have been the subject of many public reports as how they organize care and their policies have an impact on quality of care even though all care is ultimately delivered by individuals.
- Patients (or their representatives) making health care decisions and organizations that purchase health care services.

Patients included any person seeking or receiving health care services. Patients may also be represented by family or designated guardians in specific decisions or by advocacy groups that call for changes in care delivery. Purchasers or organizations that purchase care for patients were included in this population as they make choices concerning which individuals and organizations that provide care are available to patients or they promote the use of certain providers. Advocacy groups may act for patients when they use their influence to promote improvements in the quality of care.

Intervention

The intervention is public reporting of performance data on patient outcomes or health care delivery. Public reporting for this review is defined in detail in the Scope and Key Questions in the Introduction section.

Comparators

In most studies, public reporting of quality data is compared with situations in which the data are not available or not publicly reported. Occasionally comparisons are made across different reports, different contexts for public reports, or differences in content and formats of reports. This detail is provided in the Evidence Tables and the study descriptions included in summary tables and the narrative.

Outcomes (Specified for Each Key Question)

- **Key Question 1.** Improvements in quality of health care.

Improvements in care and patient outcomes may be combined in some studies and reviews under the heading of “clinical outcomes.” For this Key Question the focus was on improvement. Examples of potential outcomes in this category included decline in mortality for cardiac surgery patients, an increase in actual implementation of a guideline, or greater provision of a service known to provide value. The actual improvements in care delivery and patient outcomes were the goals of quality improvement and public reporting when it was used as a quality improvement strategy.

Change in intermediate outcomes were included in Key Question 3, as it was not a given that all change will lead to improvement; furthermore, some studies may only measure the change in care processes, organizational performance, or clinician behaviors and not have sufficient data to determine the impact of that change.

Quality improvement in health care was the focus of the CQG series, and this review conforms to the definition for the series, which states that the “series aims to assemble the evidence about effective strategies to close the ‘quality gap,’” which simply refers to the difference between what is expected to work well for patients based on known evidence and what actually happens in day-to-day clinical practice across populations of patients. In this statement the implied definition of quality is “what is expected to work well,” which is similar to the Institute of Medicine definition, “the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge.”²⁵ We applied this broad definition when determining if the public reporting in studies to be included were aimed at improving quality of care.

- **Key Question 2.** Harms included any unintended negative consequence or adverse events for any members of the populations listed above that resulted from public reporting. Harms are outcomes that can result in a reduction in quality of care.

Harms could occur for either patients and purchasers, or the individuals and organizations that provide care. Examples of harms could include:

Potential harms to patients

1. Reduced access to services if providers select patients or offer services in a different way (e.g., pull out of a market) in order to improve their publically reported quality ranking or score.
2. Compromised data quality and reduced confidence in data if people attempt to manipulate the publicly reported data.
3. Reduced patient engagement and/or negative outcomes if patients believe, based on a report, that they are receiving services from a high-quality provider and therefore do not need to be vigilant and involved in their own care; a report provides too much information and reduces comprehension; or the meaning of the data is not understood and therefore not used.
4. Increased anxiety due to understanding that health care is not perfect and worrying about one's own health condition or care.

Potential harms to providers

5. Misclassification of providers by the reporting, resulting in negative impacts on their market share, contracting arrangements, or reputation.

Potential harms to patients or providers

6. Public reporting that results in worsening of quality for any reason (including those listed above).

- **Key Question 3.** Changes in health care delivery structures and processes.

This intermediate outcome, changes in health care delivery, may be of particular interest in this review. Individual providers or organizations might change processes (e.g., adopt guidelines, change policies, increase quality improvement efforts, or monitor individual providers) or structures (e.g., electronic ordering, automated reminders, and staff capacity) in an effort to improve their performance on the outcomes or indicators that are publically reported. However, this change in delivery may or may not necessarily lead to improvement in quality of care—the ultimate outcome of interest. Changes could result in improvement, no improvement, or worsening of outcomes, or the study design may not include measures of the ultimate impact on quality of care.

- **Key Question 4.** Changes in patient, or their representative, or purchaser health care behavior.

Patient and purchaser behaviors include but are not limited to their selection of health care providers or use of health services. Their behaviors may also include more general advocacy for higher quality of care and for better information and decision support. Patient behaviors are limited to those related to the reporting of quality data. Changes can be negative as well as positive. An example of a positive change would be increased comprehension of health information by patients. Negative changes could include patients becoming overwhelmed by data and dismissing all reports, relying too much on a rating and not becoming engaged in their own care, or not understanding reports and relying on less reputable sources of information. These negative changes could result in

harms. Change in behaviors can also include information seeking and developing the ability to retrieve the information desired.

- **Key Questions 5 and 6.**

These Key Questions focus on evidence that the outcomes listed above are affected by characteristics of the reports and contextual factors. This is particularly important given the quality improvement focus of this review, which makes the emphasis different from other reviews. Quality improvement requires consideration not just of what works but also of what works for whom and when. Understanding if the literature can tell us more about how the impact of public reporting varies across report characteristics (Key Question 5) and different contexts (Key Question 6) is important if the results of our review are to help inform future public reporting efforts. Particular attention was paid to these characteristics and factors as we abstracted information from the identified articles.

Timing

No minimum duration of followup time from the availability of the public report to the measurement of the intermediate or ultimate outcome was required.

Settings

Studies of public reporting in any level or setting for health care delivery including health plans, health systems, hospitals, outpatient services or practices, individual clinicians, hospice, home health care, or nursing facilities were included in this review.

Types of Studies

At the title and abstract triage phase we did not exclude any study based on study design if it would have been included based on the other inclusion and exclusion criteria. Public reporting is a public health, public policy, or educational intervention rather than a strictly clinical intervention. We wanted to identify and consider all types of evidence available as we proceeded with the review.

At the full-text review stage, we identified the designs of the studies that met all other criteria and we refined our approach. Trials and observational studies that contained empirical data on an outcome that corresponded to a stated Key Question were retained for both abstraction and quality assessment. This included the rare randomized trials in this field. Most studies in this category are observational and differed predominately by whether there was a non public reporting group or time period for comparison. Many of the studies were time series, either interrupted time series or multiple measures post public reporting only. For the study design terminology used in this review see Appendix D.

The search identified many qualitative studies, including interviews, focus groups, and descriptive surveys that reported outcomes that were necessary but not sufficient precursors to the outcomes in the stated Key Questions (e.g., awareness of reports, comprehension of content, attitudes toward public reporting including specific presentations, and intention to use). Also we identified results from lab-type experiments that involved hypothetical choices or decisions tasks that usually used mock reports based on some actual data. Both of these types of studies may be particularly relevant to the Key Questions 5 and 6 about how the characteristics of the public reports and contextual factors affect the impact of public reporting on quality of care and they may add to our understand of the impact of public reporting on outcomes. For this reason they

were retained, but they were not assessed for quality and their abstraction was abbreviated. In order to maintain the distinction between these two groups of studies, they are reported in separate evidence tables and the qualitative studies, descriptive surveys, and lab-type experiments are summarized separately at the end of each results section for each health care setting. Since they did not measure the outcomes stated in the Key Questions they are also not included in the strength of evidence assessments.

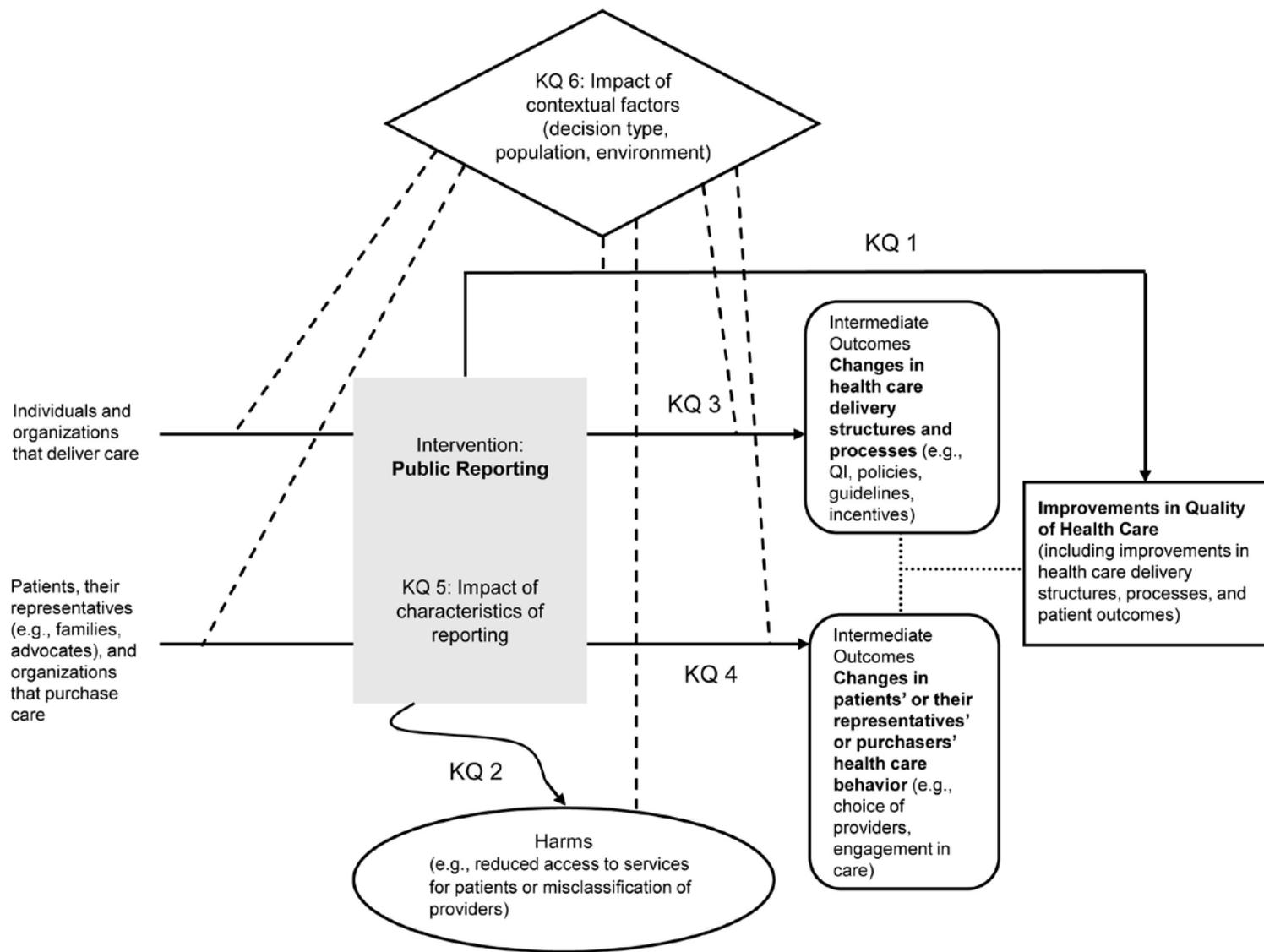
When study types were excluded at this stage this was because based on the full text review they did not meet our original inclusion/exclusion criteria. For example:

1. The single case studies we excluded did not have comparators.
2. Descriptive studies of implementation of public reports were excluded for lack of included outcomes.
3. Descriptive surveys or other qualitative studies that were predominately about another subject (not about public reporting) but contained one item or question about the public disclosure of some type of data were excluded for not being studies of public reporting.

Analytic Framework

The analytic framework in Figure 1 represents relationships among the Populations, Intervention, and Outcomes that are the focus of this systematic review and illustrates how these relationships translate into the Key Questions. The relationships between the intervention (public reporting) and intermediate outcomes (Key Questions 3 & 4), as well as the relationship between the intermediate outcomes and the ultimate improvement in the quality of health care (Key Question 1), are included. Harms are another potential consequence of public reporting (Key Question 2). The relationship between the intermediate outcomes and ultimate improvement is represented with dashed lines and do not have corresponding Key Questions because this review does not explicitly evaluate evidence about these relationships. Rather this framework shows key pathways by which public reporting may lead to harms, intermediate outcomes and ultimate improvements in quality of health care.

Figure 1. Analytic framework



Note: Dotted lines indicate relationships between intermediate outcomes and ultimate improvement in the quality of care. KQ = Key Question; QI = quality improvement.

Data Extraction

Following full text review, we extracted the following data from all included studies:

- Type of health care setting or provider
- Study objective
- Geographic location
- Sample and groups or time period used for comparisons
- Study design
- Name and any descriptive information about the public report (format, content and availability, etc.)
- Reported contextual factors (environmental characteristics and characteristics of the decisionmaker)
- Outcomes measured
- Findings for each Key Question
- The sponsors of the research or article

All study data are presented by health care setting in the Evidence Tables in the Appendixes. These data were then used to generate the summary tables and narratives in the text. A number of public reports have been the subject of multiple studies. Descriptive information about the reports that were the subject of multiple studies is included in Appendix E. Ongoing accuracy of extraction was monitored by randomly selecting articles abstracted by one abstractor to be checked by a second reviewer.

Quality Assessment of Individual Included Studies

Our assessments of the quality of individual studies are based on the recommendations in chapter titled “Assessing the Risk of Bias of Individual Studies when Comparing Medical Interventions” in the AHRQ Methods Guide for Effectiveness and Comparative Effectiveness Reviews (hereafter, Methods Guide).^{25,26} Our approach is summarized below and more detail is provided in Appendix F.

We pre specified six key criteria that could be applied to the various types of observational studies as well as the few studies that use random assignment to evaluate public reporting. We did not use evaluation tools that are study design-specific. We reviewed the types of bias and the corresponding suggested criteria discussed in the Methods Guide chapter and followed the recommendation that those most relevant to the topic and appropriate for the study designs be employed.

Based on this evaluation we selected six criteria for this review:

1. How adequate was randomization (for randomized studies) or how appropriate was selection of comparison group or time (for observational studies)?
2. How similar are groups at baseline (or time periods) or how well did the analysis control for differences?
3. How well does the design or analyses account for important potential confounding and modifying variables?
4. How well does the study rule out any impact from an unintended exposure or a concurrent intervention that might bias results?

5. How well are all potential outcomes prespecified, and are the prespecified outcomes reported?
6. How well are primary outcomes assessed? Were valid and reliable measures used and implemented consistently across all study participants/groups?

Criteria 1, 2, and 3 concern selection bias; criteria 4, performance bias; criteria 5, reporting bias; and criteria 6, detection bias. Applying these criteria consistently across raters for an intervention like public reporting required that we specify the definitions of different types of bias and explicitly state how they were applied in our assessment of studies of public reporting. This detail is provided in Appendix F.

These six criteria were used by two raters who independently rated each article on these six criteria and made an overall assessment of “good”, “fair”, or “poor” quality based on definitions from the Methods Guide cited above. These definitions apply to all the included quantitative studies and are:

Good quality/low risk of bias implies confidence on the part of the reviewers that results represent the true treatment effects (study results are considered valid). In the case of this review “treatment effects” is interpreted as the impact of the intervention and public reporting on any of the specified outcomes regardless of the study design. The study reporting is adequate to judge that no major or minor sources of bias are likely to influence results.

Fair quality/medium risk of bias implies some confidence that the results represent true treatment effect. The study is susceptible to some bias and the problems are not sufficient to invalidate the results (i.e., no flaw is likely to cause major bias). The study may be missing information, making it difficult to assess limitations and potential problems.

Poor quality/high risk of bias implies low confidence that results represent true treatment effect. The study has significant flaws that imply biases of various types that may invalidate its results; these may arise from serious errors in conduct, analysis, or reporting, large amounts of missing information, or discrepancies in reporting.

The overall assessment was not derived from a direct linear combination of the six criteria. Given the nature of public reporting as an intervention, the criteria corresponding to selection bias (criteria 1, 2, and 3 listed above), specifically how the comparison was structured, the degree of similarity at baseline and possible confounding, were of greatest concern when determining the level of confidence we could have in the result of each study. For this reason it is possible for a study to be given an overall assessment of “poor” even if some individual criteria were rated as “good”.

After completing the ratings independently, ratings were compared and differences reconciled through discussion and input of a third rater when needed. The quality assessment rating for all included quantitative studies are included in Appendix G. We did not assess the quality of the qualitative and lab-type experiments with hypothetical public reports. While there are tools available to rate the quality of qualitative research, none have been recommended in guidance to the EPCs, used consistently in AHRQ-sponsored reviews, nor is one going to be used in the CQG series. We also did not assess the quality of identified systematic reviews as they were used only to identify studies for inclusion and their results were not incorporated into this review.

Data Synthesis

We separated studies into four groups by the health care settings that were the subject of the public reports of quality. These four settings are hospitals, individual clinicians and outpatient group practices, health plans, and long-term care services (predominately nursing homes). Public reporting has a different history in each of these settings and the public reports are different in terms of content and presentation. Abstracting the studies and synthesizing the evidence first by setting allowed patterns of evidence within setting to then be summarized by the Key Questions across all four settings.

Summary tables are included at the end of the sections on results by settings. These are the source of the results by Key Question across settings presented at the beginning of the result sections. The heterogeneity of outcomes precluded formal quantitative meta-analysis.

Rating the Body of Evidence for Each Key Question

The strength of the body of evidence for each Key Question was rated according to the recommendations in the chapter “Grading the Strength of a Body of Evidence When Comparing Medical Interventions” in the AHRQ Methods Guide.^{25,26} This approach includes assessing groups of studies that address the same Key Question and the same outcome on four criteria: quality of the studies, consistency of the results, directness, and precision. Based on these and the nature of studies (number of studies, number of subjects, and study designs) the strength of a body of evidence available to answer the questions that are the subject of the systematic review is given an overall rating of high, moderate, or low. This is an adaptation of the GRADE approach developed and endorsed by the EPCs.

These assessments were based on the results of the quantitative studies. Ratings were made for each Key Question by two raters and then were presented and discussed by the entire study team in order to reach consensus and assure consistency in the ratings.

The evidence for outcomes across the included studies was graded as high (high confidence that the evidence reflects the true effect; further research is unlikely to change our confidence or the estimate of the effect), moderate (moderate confidence that the evidence reflects the true effect; further research may change our confidence or the estimate of the effect), low (low confidence that the evidence reflects the true effect; further research is likely to change our confidence and the estimate of the effect), or insufficient (evidence is unavailable or does not permit a conclusion). When only one or two studies were available for a specific outcome they were labeled insufficient unless the studies were large or had particularly strong designs in terms of reducing risk of bias.

Applicability

Applicability involves “judgments about whether the available research evidence reflects ‘real world’ practice” and whether it is “clear for which patients and which circumstances the review’s conclusions can be used to make clinical or policy decisions.”²⁷ Applicability for a review includes assessing the extent to which the literature identified can answer the question posed in the review.

The applicability of the group of studies included in this review about public reporting depends on the user and the intended use of the report. Applicability is assessed, rather than scored or rated, and may vary according to the characteristics of the population studied and to the characteristics of the public reports. For example, national studies may be more generally

applicable, whereas studies conducted in one geographic area may or may not be applicable to other geographic areas because of differences in their health care markets, particularly with regard to the availability of health care providers or health plans. Alternatively, national studies conducted in one country may be more or less applicable to other countries depending on whether the health care systems differ significantly. Characteristics of the specific populations studied (e.g., high education and health literacy, older age, etc.) may also limit the generalization of research findings to expected results in populations with very different characteristics. Differences in the data included in the public reports, their formatting, and their mode of delivery (e.g., paper, Web, apps, etc.) may limit the applicability of findings from studies of specific types of public reports to expected results from reports that are substantially different in form and content. For these reasons, we abstracted data about the reports and the context when it was reported in the articles and provided these to allow an assessment of applicability to different situations.

An additional issue related to applicability concerns differences in health care decisions. Public reporting has been, and continues to be, used for a variety of settings and levels. As was done in prior reviews, we have included all studies we could locate regardless of setting or level. However, to combine all studies would be implying that selecting a cardiac surgeon is the same as selecting a nursing home is the same as selecting a health plan for multiple types of needed care in the future. For this reason our first level of analyses and the reporting of our results are by four types of settings (Hospitals, Individual Clinicians, Health Plans, and Long-Term Care). Then in the results summary, overview, and discussion we attempt to look for lessons across settings. However, we are cognizant of the fact that such an approach may have limitations and mask the very real differences among health care decisions and the potential differential impact public reporting could have on specific types of health care decisions.

Peer Review and Public Commentary

Experts in public reporting and decisionmaking and individuals representing stakeholder and user communities were invited to provide external peer review of this Comparative Effectiveness Review (CER); AHRQ and an associate editor also provided comments. The draft report was posted on the AHRQ website for 4 weeks to elicit public comment. We addressed all reviewer and public comments, revised the text as appropriate, and documented disposition of comments in a report that will be made available 3 months after the Agency posts the final CER on the AHRQ Web site.

Results

Organization

The results of this review are presented in this section. First the literature search results are summarized in the study flow diagram (Figure 2). This diagram shows how many citations were located and their disposition at each stage of the review.

Following this figure the results of this review are presented in two ways. First they are summarized by Key Question across all the health care settings and then separately by health care setting. The Summary of Results by Key Questions section repeats the results reported in more detail in the section titled Effectiveness of Public Reporting by Health Care Setting. The Results by Health Care Setting section is divided into studies of public reporting about hospitals, individual clinicians, health plans, and long-term care services.

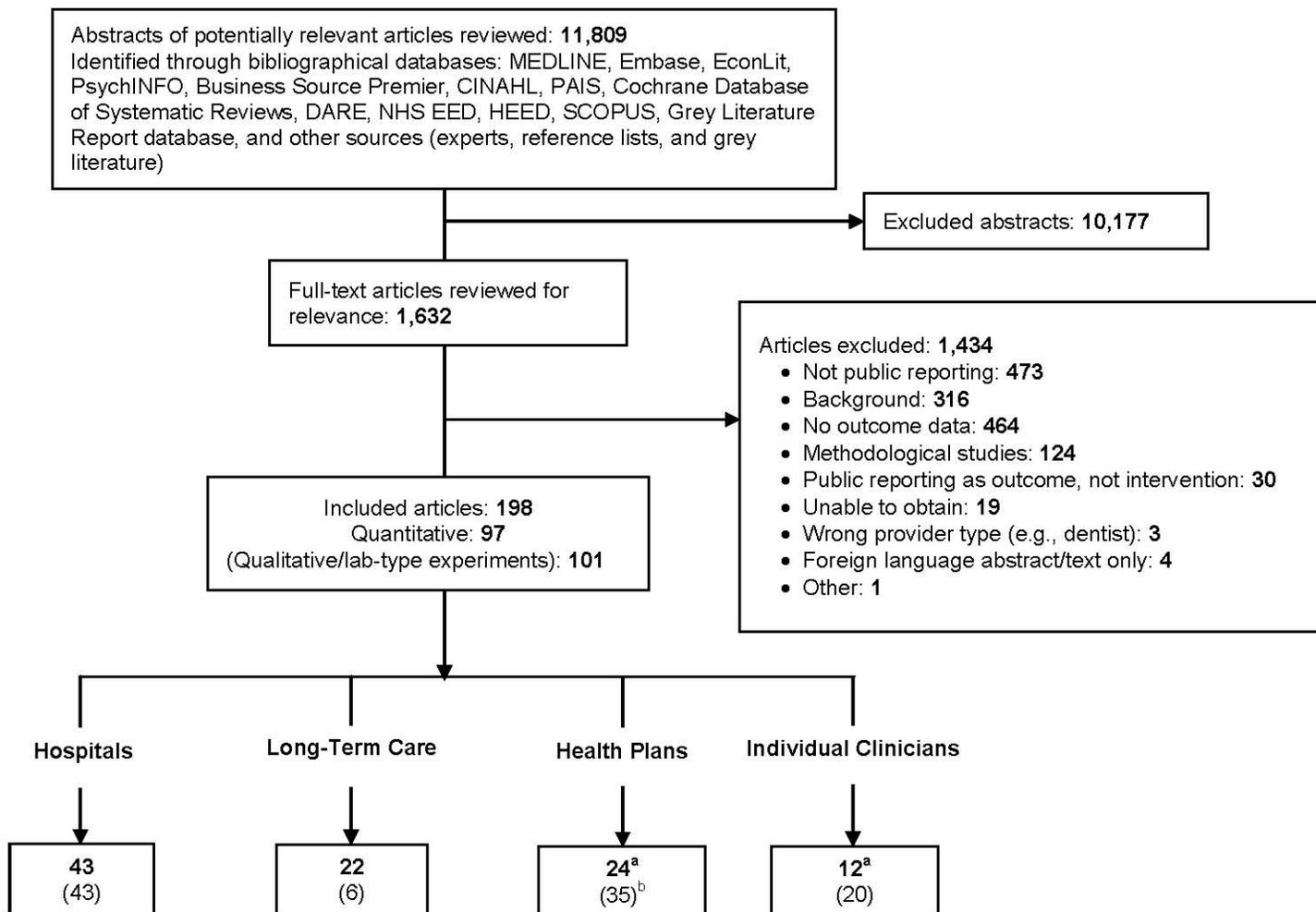
The section on each health care setting contains the following:

- **Introduction**
- **Overview of the Findings.** This is a summary of the major finding from the analyses of the quantitative studies;
- **Description of the Quantitative Studies.** Here the populations, interventions, comparators and outcomes included in the identified studies are described.
- **Detailed Analysis of Quantitative Studies.** The results of quantitative studies are then discussed in detail. This text is based on the Summary of Evidence provided at the end of the section as well as the full Evidence Table provided in the Appendixes.
- **Description and Summary of Qualitative Studies.** The included qualitative studies are described briefly and their results are presented in a narrative and bulleted list organized by type of study and presented in chronological order. All abstracted information from qualitative studies is included in the Evidence Tables in the appendixes.

Search Results

A summary of the search results is presented in Figure 2. Database searches returned 13,318 articles. In addition, 129 articles were selected for review based on expert recommendations and checking reference lists. After identifying duplicates, a total of 11,809 citations remained for abstract and title review. From these reviewers identified 1,632 articles that were possibly relevant. Full-text articles were retrieved, and each was reviewed by two of three reviewers in order to determine inclusion for data abstraction. Any discrepancies were resolved using a third reviewer and consensus. Ultimately, 198 articles were included for abstraction; 97 of which were quantitative articles and 101 were qualitative. Four quantitative articles reported separate outcomes for both individual clinicians and hospitals and therefore appear in counts for both categories. Two studies were reported in multiple articles and are combined in the discussion of the results. Seven of the quantitative studies and twenty-four of the qualitative studies were conducted in countries other than the United States.

Figure 2. Study flow diagram



^a Four quantitative studies report results about individual clinicians and hospitals and therefore appear in both categories here.

^b Three articles included in this count reported the results of one qualitative study; two articles reported results of one other study.

Overview of Effectiveness of Public Reporting as a Quality Improvement Strategy

The following summary of the results is organized by Key Question and seeks to identify cross cutting trends and implications. These are also included in the Discussion section and the summary table at the end of the document. However this does not reflect how the analyses were originally compiled. Research studies of public reporting concern reports and the resulting changes in behavior and outcomes for a specific health care setting. Our analyses followed the literature and presents the results by setting, but the other reason we organized the detailed reporting of the results in later sections by setting was because we believe that the inherent differences in the nature of the decisions (e.g., selecting a cardiac surgeon vs. selecting a nursing home) merit careful consideration when attempting to judge effectiveness.

Overall we found that both the amount of evidence and the results varied by Key Questions and outcome as well as by setting. Here we provide our conclusions as well as the strength of evidence assessment for that conclusion followed by general comments and the relevant key points for each setting. These key points are repeated in the results section for each setting. The key points for hospitals are also divided into those resulting from studies of cardiac care and those from non cardiac care (that is any hospital care that is not cardiac surgery or care for a cardiac condition) as this is the structure we used to organize the large number of articles about hospitals. The strength of evidence assessments are not repeated in the sections by health care setting, they are presented only here and in the summary table in the Discussion section. This is because this assessment was made only across settings.

Summary of Results by Key Question

Key Question 1

Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes or patient outcomes)?

Overall Findings

Mortality. Public Reporting was associated with a small decline in mortality after controlling for trends in reductions in mortality (19 studies, moderate strength of evidence).

Quality and process indicators (e.g. Consumer Assessment of Healthcare Providers and Systems [CAHPS], Healthcare Effectiveness Data and Information Set [HEDIS], and Nursing Home [NH] Compare). Most studies found that public reporting is associated with improvement in quality and process indicators, though this varies across specific measures (19 studies, high strength of evidence).

Mortality was often the focus in studies of hospitals and was also the primary outcome in one study of individual providers. Most of the studies find a decrease in mortality, though these results are not uniformly consistent and many questions about the appropriateness of the comparisons (both groups and risk adjustment methods) are an ongoing subject of debate. In studies of health plans and long term care, the outcomes studied most often were the quality measures for more specific outcomes such as pain, pressure ulcers, and satisfaction with care. In general these studies find that public reporting has a positive impact on the quality measures

although some studies find that this varies across plans or subgroups of the patient population (e.g., short- vs. long-stay nursing home residents).

Key Points by Health Care Setting

Hospital cardiac

- While eight studies found that mortality tended to improve (decrease) over time with public reporting about cardiac procedures (eight studies),²⁸⁻³⁵ this finding was not consistent with four other studies finding no difference in mortality associated with public reporting (four studies).³⁶⁻³⁹
- Seven studies evaluated the effect of regional public reporting efforts on hospital quality.
 - One⁴⁰ earlier study of the Cleveland Health Quality Choice Program showed an effect of public reporting but the other four⁴¹⁻⁴⁴ did not.
- Two evaluations of QualityCounts^{10,45} in Wisconsin found significant effect on quality.
- Four⁴⁶⁻⁴⁹ studies evaluated State level public reporting efforts. They all showed slight improvement in quality in hospitals.
- Three⁵⁰⁻⁵² studies were about national level public reports and they all reported slight improvement in quality in hospitals.

Individual clinicians

- Surgeon-specific mortality rates for coronary artery bypass graft (CABG) in New York State declined after rates were publicly reported (one study).²⁸

Health plans

- Quality measures improved for almost all HEDIS and CAHPS domains studied after public reporting (5 studies).⁵³⁻⁵⁷
- During the time period in which HEDIS measures were publicly reported by some plans while others submitted data but did not allow it to be released, plans that voluntarily reported quality data had higher-quality scores (two studies)^{54,55} even after controlling for differences in plans (one study).⁵⁵

Long-term care

- Some quality measures (QMs), but not all, improved after public reporting (7 studies).
 - Measures for short-stay residents of nursing homes showed improvement across studies (2 studies).^{13,58}
 - For long-stay residents the measures that improved across multiple studies were physical restraints and pain while the rest of the measures had no improvement or mixed results (5 studies).⁵⁹⁻⁶³

Key Question 2

What harms result from public reporting?

Overall Findings

Mortality. In one study an increase in mortality was attributed to public reporting, limiting clinicians' willingness to perform a procedure in high-risk patients.⁶⁴

Inappropriate diagnosis and treatment. In one study the hypothesis that a publicly reported measure would lead to overdiagnosis and prescribing was not supported.

Access restrictions. It was unclear whether public reporting contributes to reduced access for patients (e.g., avoiding high-risk patients, referring high-risk patients out of State). Studies results are inconsistent (13 studies, low strength of evidence).

Unintended provider behavior. There was some evidence from long-term care (LTC) that public reporting motivates changing coding and readmitting patients to the hospital. No evidence supported a link with surgeons or organizations withdrawing from the market or with declines in quality for items not measured (crowding out) (5 studies, moderate strength of evidence).

Harms are an important concern when studying an intervention and they have been the subject of many commentaries about public reporting. In fact, the volume of editorials and discussion is greater than the volume of research. Of the studies that examined harms, more find no evidence of the harm than evidence of harm. Research on harms related to the impact on access (e.g., selection of patients at low risk negative outcomes or expected to do well, which is referred to as cream skinning and cherry picking, or other actions by providers to change ratings by manipulating their patient populations) has mixed findings. However, some studies in LTC have found that public reporting can create incentives that lead to unintended, negative behavior by providers.

Key Points by Health Care Setting

Hospital cardiac

- Eight studies investigated the possibility of harms or unintended consequences from public reporting on hospital cardiac care. Results of four^{36,64-66} include data that suggested a negative impact while four^{32,34,35,37} did not.
 - One study⁶⁴ found substantially higher hospital mortality rates for patients in New York compared with other States, but the sample size was small and consisted of a specific subgroup of cardiac patients, making it less applicable to public reporting in general.

Hospital noncardiac

- Two^{52,67} studies examined potential harms including inappropriate diagnosis and prescribing or increased cost (and reduced access for high-risk procedures). Neither study found evidence of these harms.

Individual clinicians

- Evidence about harms varied by the harm studied (three studies) with one finding that public reporting adversely affected access while two report that the expected negative impact on access was not supported by the data.
 - Public reporting appeared to increase disparities between whites and blacks or Hispanics in the receipt of CABG for 9 years after public reporting began.⁶⁸ High-risk patients were more likely to have high-quality surgeons, which is counter to the hypothesis that public reporting might cause adverse selection.⁶⁹
 - Few physicians reported leaving practice due to the impact of the public reports.³¹

Health plans

- Potential harms were examined in two of the included studies: “crowding out” of quality of care in areas not measured by focusing of the aspects of care that are measured⁷⁰ and

withdrawal of high-quality plans from the market.⁷¹ Neither study found evidence of these harms.

Long-term care

- Four studies examined different harms (selection/cream skimming, crowd out, rehospitalization, and down coding) that correspond to actions NHs may take to improve NH Compare ratings rather than actually improve the quality of care.
 - One study found some evidence that the number of patients admitted with pain declined among NHs that had low reported quality scores for pain and among for-profit and nonprofit NHs compared with government NHs, which the authors conclude indicates some cream skimming.⁷² Another study that looked at patient sorting among NHs for postacute care⁷³ found no cream skimming. Rather, high-risk patients were more likely to be admitted to high-quality facilities after public reporting.
 - No evidence was found that quality in other areas was “crowded out” by NH focus on the publicly reported measures (one study).⁷⁴
 - Indications of “down coding,” that is changing the coding of assessments in order to improve NH Compare scores were found in a study of postacute care, but for only one (pain) out of three quality measures (one study).⁷³
 - The most serious harm identified to date is that NHs may readmit postacute care patients to the hospital before they are assessed for NH Compare in order to improve their performance (one study).⁷⁵

Key Question 3

Does public reporting lead to change in health care delivery structures or processes?

Overall Findings

Provider actions. The evidence suggests that individual clinicians and organizations respond to public reporting in positive ways including adding services, changing policy and increasing focus on clinical care (10 studies, moderate strength of evidence).

Providers, both individuals and organizations respond to public reports in identified studies by making positive changes in their behavior. Studies found that hospitals were more likely to offer new services, policies were changed, surgeons with worse outcomes left surgical practice, and quality improvement activities increased. However, data are not available for all settings and for others it is based on a small number of studies.

Key Points by Health Care Setting

Hospital cardiac

- No studies were identified.

Hospital noncardiac

- Three^{10,46,76} studies that analyzed the impact of public reports on care processes reported increases in quality initiatives.
 - One⁷⁷ recent study showed little to no effect of public reports on quality initiatives by providers.

- The results of two studies suggested that hospitals change their practice patterns related to cesarean sections when comparative data on the rates are publicly available.^{76,77}

Individual clinicians

- Surgeons who stopped performing CABG surgeries after surgeon-level data were made public were more likely to be poor performers (bottom quartile) (one study).³¹

Health plans

- No studies were identified.

Long-term care

- NH administrators reported in surveys that they were taking action in response to NH Compare (three studies).^{63,78,79}
 - Actions appeared to be motivated more by the administrators' belief that public reporting influences referral from professionals and the State survey process than by patient and family use of NH Compare in their selection of NHs.
 - Nursing homes that reported taking actions experienced improvements in quality measures.⁶³
 - An additional study documented that NH administrators invested more resources in clinical care after public reporting.⁸⁰
 - Improvement in one QM (influenza vaccination rates) improved after public reporting, but it increased even more among community dwelling elderly, supporting the idea that factors other than public reporting may be driving change (one study).⁸¹

Key Question 4

Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

Overall Findings

Selection (market share/volume). Studies found no or minimal impact of public reporting on selection as measured by market share or volume. Contracting patterns suggest purchasers give only minimal consideration to publicly reported quality when selecting providers (47 studies, moderate strength of evidence).

For this Key Question more than any other, there is more agreement across settings. Public reports seem to have little to no impact on selection of providers by patients and families or their representatives. When an effect was found it is for a subgroup of patients (e.g., younger more educated patients).

Key Points by Health Care Setting

Hospital cardiac

- Public reporting had no impact on hospital volume or market share (four studies).^{28,31,82,83}
- In studies where there was some impact on market share, the effect was small or did not persist over time (five studies).^{30,37,84-86}

Hospital noncardiac

- Three⁸⁷⁻⁸⁹ of the six studies on patient behavior reported on patient choice. Two^{87,89} studies reported little to no effect whereas one⁸⁸ reported increased discharge rates in public reporting hospitals.

- The other three^{43,90,91} studies reported on market share and volume as measures that represent patient choice. All three studies reported small decreases in market share for lower rated hospitals or hospitals that did not participate in public reporting.

Individual clinicians

- Results varied across studies.
 - Three studies reported no effect of reporting on referral patterns, market share, or surgeon volume.^{28,31,92}
 - Three studies reported that market share or probability of selection increased for higher-quality clinicians or clinics after the data were publicly reported.^{84,93,94}
 - One study found that public reports led to decreases in volume for poor performing and unrated surgeons, but that there was no corresponding increase for high performing surgeons.⁸³

Health plans

- Publicly reported or widely distributed quality information had little impact on the selection of health plans by individuals based on the results of studies of different populations.
 - Quality information had no consistent or significant effect on the health plan choices made by employees of private firms (five studies).^{71,95-98}
 - Four studies of public employees had mixed findings.^{23,99-101}
 - Two reported limited or no impact on the choice of health plan made by State employees in Minnesota⁹⁹ and Federal employees in 86 counties.²³
 - Two additional studies of Federal employees reported that public reports lead to an increase in the use of quality information¹⁰¹ and switching out of plans with low scores.¹⁰⁰
 - In studies that used random assignment to distribute quality rating materials to some beneficiaries of public insurance programs and not others, the quality information had no impact on plan selection (three studies).¹⁰²⁻¹⁰⁴
- Employers were more likely to select health plans to offer to employees that had higher HEDIS and CAHPS ratings (one study).¹⁰⁵

Long-term care

- Six studies attempted to determine if public reporting influenced the selection of NHs.
 - One study looked at patient selection and used a problematic outcome measure (occupancy rate) that may have limited variation or be caused by factors other than patient selection.¹⁰⁶
 - Two studies used market share to measure NH selection, with one finding no impact from the reporting of five indicators for long-stay residents on market share⁶¹ and one finding small increase in market share for postacute care associated with higher NH Compare ratings.¹⁰⁷
 - Patient matching, meaning higher-risk patients selected higher quality NHs, was found to increase after public reporting (one study).⁷³
 - Increase in selection of NHs with better performance on NH Compare by Medicare patients was demonstrated to be the link between higher-quality and better financial performance and this relationship was stronger after NH Compare was made public (two studies).^{108,109}

Key Question 5

What characteristics of public reporting increase its impact on quality of care?

Overall Findings

Mode and tone of message. One study found that mode (email vs. mail) affects use of public reports, while tone of the message (risks vs. benefits) does not.

Accuracy and usefulness. One study found that the quality information contained in public reports is accurate and useful for patient selection even if there is a substantial delay between data collection and publication.

Almost no quantitative studies examined whether report characteristics affected the impact of public reporting on any outcome. Two studies were identified for public reporting on individual clinicians, but none for other settings, making it impossible to draw conclusions about the strength of evidence.

Key Points by Health Care Setting

Hospital cardiac

- No studies were identified.

Hospital noncardiac

- No studies were identified.

Individual clinicians

- Different report characteristics were examined in two studies that identified variation in what makes reports useful and useable for patients.
 - The mode (email vs. mail) and the tone of messages used to inform patients about the availability of physician performance data affected whether patients accessed it or not (one study).¹¹⁰
- Publicly reported data was still accurate and therefore likely to be useful to patients even when there was a substantial delay between data collection and when it was made available to the public (one study).³¹

Health plans

- No studies were identified.

Long-term care

- No studies were identified.

Key Question 6

What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Competitive market. Studies have found that public reporting is more likely to result in improvements in quality in if the clinician or provider is in a competitive market (seven studies, high strength of evidence).

Baseline performance. The likelihood of improvement after public reporting is greater for entities with lower quality before or at the first instance of reporting. (five studies, high strength of evidence).

Nursing home characteristics. Characteristics (e.g., ownership) do not reliably predict how NHs react to public reporting. Studies find no consistent difference across characteristics (six studies, low strength of evidence).

Patient characteristics/subgroups. Different patient characteristics such as age, specific health care needs, and insurance coverage may increase the likelihood that publicly reported data affects choice (3 studies, low strength of evidence).

Variation in quality. Public reporting is more likely to influence quality if the level of quality varies across plans in market (one study).

Relatively consistent findings include that public reports have more of an impact in competitive markets and add that improvements are more likely to occur in the subgroup of providers with lower scores in initial public reports. While several contextual factors were identified, they do not seem to represent the complexity of the environment.

Key Points by Health Care Setting

Hospital cardiac

- No studies were identified.

Hospital noncardiac

- Subgroup analyses demonstrated that hospitals that are not the only facility in a market or are in a competitive market were more likely to improve quality (two studies).^{46,111}
 - One of these studies also examined the financial position of the hospital and found that hospitals that were in worse financial situations were less likely to improve).¹¹¹

Individual clinicians

- Employment status/tenure, which the researchers suggested served as a proxy for age, affected the likelihood that people would access comparative information about physicians (one study).¹¹⁰
- The impact of public reports was affected by insurance coverage—when care was covered the public reports were more likely to influence selection (one study).⁹³

Health plans

- Contextual factors were not frequently studied in research on health plans, limiting what conclusions can be drawn from the literature.
 - The only study of environmental characteristics found quality information was more likely to be used in plan choice in markets that included plans of varying quality.¹¹²
 - Some variation in the importance of quality information to different subgroups of consumers was identified (two studies).^{113,114}
 - Plans that started with lower ratings were more likely to improve their performance after public reporting (two studies).^{53,57}

Long-term care

- Studies that examined the impact of two market characteristics, competition and occupancy rates (characteristics of the environment), found that publicly reported quality measures are more likely to improve in competitive markets and in markets with low occupancy rates (suggesting there are choices and providers must compete to fill beds).^{60,61,115}
 - These findings supported the idea that public reporting provides information that influences market-based behavior.
- Ownership characteristics of NHs (e.g., for profit/nonprofit, government, chain affiliation, hospital-based) did not have a consistent effect on the impact of public reporting (two studies).^{59,62}
- One study found that NHs with higher percentages of black residents had smaller changes in quality after public reporting, but that for some indicators they started with better QMs than NHs with fewer black residents.⁶²
- NHs and home health agencies that started with lower publicly reported quality ratings were more likely to improve their ratings than those that started with higher scores.^{14,78,81}
- Only one study included any analyses by patient characteristics other than their baseline risk on the QMs. A study of patient selection for postacute care found that patients with higher levels of education were slightly more responsive to public reporting.¹⁰⁷

Effectiveness of Public Reporting by Health Care Setting

Hospitals

Modern public reporting started when the Health Care Financing Administration (HCFA), now Centers for Medicare and Medicaid Services (CMS), released mortality statistics for United States hospitals 25 years ago. The HCFA report and other early efforts such as New York State Cardiac Surgery Reporting System (NYS CSRS) as well as the Cleveland Health Quality Choice (CHQC) program encountered resistance, and both the HCFA report and CHQC were short lived. However, these efforts drove improvements in approaches to quality measurement and risk adjustment, establishing the foundation for many current public reports as well as larger transparency initiatives in health and hospital care.

We identified 43 quantitative studies and 43 qualitative studies that met our inclusion criteria and corresponded to our Key Questions. The quantitative studies are described and analyzed first. This is followed by a summary of the qualitative studies. Given the number of studies related to hospitals, this section differs from the others in that it is further subdivided into public reporting about cardiac care and other, noncardiac hospital care. We chose to divide the studies of public reporting on hospitals in this way to make a large number of studies easier to synthesize. This division also mirrors the development of the field. Public reports on cardiac surgery have been the focus of more research than any other type of public reporting to date. While this may be simply the result of the fact that cardiac public reports have been continuously produced for over two decades, it is important to understand and acknowledge the influence that cardiac public reports have had not just on public reporting about hospitals, but on public reporting and quality improvement across all health care settings.

Information abstracted from the articles is included in the Evidence Tables in Appendix H and Appendix I.

Overview of Findings

Cardiac Public Reports

Quality of Care (Key Question 1)

- While eight studies found that mortality tended to improve (decrease) over time with public reporting about cardiac procedures (eight studies),²⁸⁻³⁵ this finding was not consistent with four other studies finding no difference in mortality associated with public reporting (four studies).³⁶⁻³⁹

Harms (Key Question 2)

- Eight studies investigated the possibility of harms or unintended consequences from public reporting on hospital cardiac care. Results of four^{36,64-66} include data that suggested a negative impact while four^{32,34,35,37} did not.
 - One study⁶⁴ found substantially higher hospital mortality rates for patients in New York compared with other States, but the sample size was small and consisted of a specific subgroup of cardiac patients, making it less applicable to public reporting in general.
 - Differences in populations and time periods may explain conflicting conclusions about whether access to care is adversely affected by public reporting.

Impact on Providers (Key Question 3)

- No studies were identified.

Impact on Patients or Purchasers (Key Question 4)

- Public reporting had no impact on hospital volume or market share (four studies).^{28,31,82,83}
- In studies where there was some impact on market share, the effect was small or did not persist over time (five studies).^{30,37,84-86}

Public Report Characteristics (Key Question 5)

- No studies were identified.

Context (Key Question 6)

- No studies were identified.

Noncardiac Public Reports

Quality of Care (Key Question 1)

- Seven studies evaluated the effect of regional public reporting efforts on hospital quality.
 - One⁴⁰ earlier study of the Cleveland Health Quality Choice Program showed an effect of public reporting but the other four⁴¹⁻⁴⁴ did not.
 - Two evaluations of QualityCounts^{10,45} in Wisconsin found significant effect on quality.
- Four^{46,47,49,111} studies evaluated State level public reporting efforts. They all showed slight improvement in quality in hospitals.
- Three⁵⁰⁻⁵² studies were about national level public reports and they all reported slight improvement in quality in hospitals.

Harms (Key Question 2)

- Two^{52,67} studies examined potential harms including inappropriate diagnosis and prescribing or increased cost (and reduced access for high risk procedures). Neither study's results found evidence of these harms.

Impact on Providers (Key Question 3)

- Three^{10,46,76} studies that analyzed the impact of public reports on care processes reported increases in quality initiatives.
- The results of two studies suggested that hospitals change their practice patterns related to cesarean sections when comparative data on the rates are publicly available.^{76,77}

Impact on Patients or Purchasers (Key Question 4)

- Three⁸⁷⁻⁸⁹ of the six studies on patient behavior reported on patient choice. Two^{87,89} studies reported little to no effect whereas one⁸⁸ reported increased discharge rates in public reporting hospitals.
- The other three^{43,90,91} studies reported on market share and volume as measures that represent patient choice. All three studies reported decreased market share for lower rated hospitals or hospitals that did not participate in public reporting.

Public Report Characteristics (Key Question 5)

- No studies were identified.

Context (Key Question 6)

- Subgroup analyses demonstrated that hospitals that are not the only facility in a market or are in a competitive market were more likely to improve quality (two studies).^{46,111}
 - One of these studies also examined the financial position of the hospital and found that hospitals that were in worse financial situations were less likely to improve.¹¹¹

Description of Quantitative Studies

The 43 studies of public reporting and hospitals were published between 1988 and 2011. Thirty-seven were about hospitals in the United States, two were about Canadian hospitals,^{38,116} one was about hospitals in Northern England,³⁴ two were in Korea^{52,77} and one⁹⁰ studied hospitals in two regions in Germany. Twenty-one of these studies were about public reporting related to outcomes of cardiac care in hospitals, predominately cardiac surgery. The other twenty-two reported on public reporting initiatives concerning other hospital services or general/overall hospital quality. The cardiac and noncardiac public reports are named in the intervention description below and the public reports are described in Appendix E. In describing and summarizing the studies, the cardiac and noncardiac studies are addressed separately in this report for ease of comprehension and synthesis.

The *populations* in the included studies were most frequently hospitals as providers of health care services that were the subject of the public report. It was their response to public reporting that was expected to result in improved quality of care. An important related topic in the studies of hospital and public reporting is whether public reports create incentives for hospitals to change the type of patients they treat resulting in reduced access to appropriate services for patients. Patients and their representatives were included as the population in some studies, as their selections from available hospitals were measured in terms of changes in volume or market share expected to be gained or lost when information about quality was made available through

public reports. The measures and outcomes that correspond to these populations are discussed in more detail in the “outcomes” description.

In the cardiac studies, 10 of the studies evaluated public reports about hospitals in New York State^{28-32,36,64,65,84,86} and two compared New York State with Pennsylvania⁶⁶ or California.⁸⁵ One study evaluated hospital performance in Massachusetts, a State without public reporting at the time, by comparing it to New York State and Northern New England, regions that had public reporting about hospital cardiac care,³⁹ and another study made comparisons across several States and regions,³⁵ comparing New York State, Pennsylvania, New Jersey, and Ohio, all States with cardiac public reports, with the rest of the country. The seven studies that did not involve New York State concerned hospitals in Pennsylvania,^{82,83} California,^{33,37} Northern England,³⁴ and two studies about Ontario, Canada.^{38,116}

The 22 studies of hospital quality reporting on noncardiac services included regional, State, and national public reports. Six studies assessed the impact of the CHQC program.^{40-44,76} Three studies were of hospitals in Wisconsin,^{10,45,47} one of Missouri hospitals,⁴⁶ and two in Pennsylvania.^{49,111} The remaining seven studies were of national public reporting initiatives in the United States,^{50,51,67,87-89,91} one regional effort in Germany,⁹⁰ and national reports on hip replacement outcomes⁵² and cesarean rates⁷⁷ in Korea.

The public reporting *interventions* were dominated by public reports generated and distributed by State health departments or other government entities. All of the previously mentioned studies of hospital cardiac care in New York State^{28-32,36,64,65,84,86} concerned the NYS CSRS produced by the New York State Department of Health. The NYS CSRS began reporting mortality rates for coronary artery bypass graft surgery (CABG) and later expanded to cover other cardiac interventions (see Appendix E).

The studies that concurrently evaluated reports from other States examined Pennsylvania’s State mandated report on cardiac surgery outcomes⁶⁶ that was later expanded to include outcomes for patients with acute myocardial infarction (AMI), California’s Hospital Outcomes Project (CHOP) was a State sponsored program that reported mortality for AMI and complication rates for cervical and lumbar discectomy and was the subject of one study.⁸⁵ A public report on coronary artery bypass graft surgery (CABG) outcomes in California was published by the Office of Statewide Health Planning and Development and evaluated in two identified studies.^{33,37} Pennsylvania also developed a CABG hospital report,^{82,83} as did the Canadian Province of Ontario,³⁸ which expanded its efforts to include process of care indicators for AMI and congestive heart failure (CHF).¹¹⁶ In England, public reporting by the National Health Service was preceded by reports produced by a commercial company (Dr. Foster), and commercial reports were the subject of one study.³⁴ State involvement in public reports about other types of care that have been studied include a Missouri State report on hospital obstetrics,⁴⁶ a program of the Pennsylvania Health Care Cost Containment Council that began reporting AMI and CABG outcomes but quickly expanded to include multiple diagnoses and procedures.^{49,111}

The remaining studies involved public reports or public reports created by regional or national entities with one exception (one study is of a ranking published in a popular magazine⁹¹). Regional efforts included the CHQC reports which were part of a program of a voluntarily coalition of hospitals, physicians, and employers in Northern Ohio designed to promote selective contracting and quality improvement. These were the most frequently studied noncardiac reports.^{40-44,76} In Wisconsin the Hospital Association launched a Web site called CheckPoint that included several quality and safety measures⁴⁷ for hospitals in the State, while a

report known as QualityCounts was produced by a large employer purchasing cooperative in Madison, Wisconsin.^{10,45}

National efforts comprised both the earliest and the most recent public reports. The HCFA created the first modern public report when it released hospital mortality data from 1986 through 1992. Dubbed the “death list”, this report was the subject of two of the included studies.^{87,88} A long-standing program of registry-based reports on results of kidney transplantation dating from 1991 was revamped and starting in 2001 a university-based center with a U.S. government contract released reports every 6 months via the internet.⁸⁹ One study⁶⁷ examined the impact of one of several measures of the national Hospital Quality Alliance (HQA), which included 98 percent of U.S. hospitals, and collected and publicly disseminated hospital performance measures. The two most recent studies of public reporting on hospitals assessed the impact of U.S. government sponsored and directed efforts to make information public on patient experience through the hospital version of the Consumer Assessment of Healthcare Providers and Systems (HCAHPS) report⁵¹ and the ongoing provision of process measure through Hospital Compare on a CMS Web site made possible by the HQA coalition.⁵⁰ Studies of public reporting in other countries included a voluntary private program in Germany,⁹⁰ the national release of data on cesarean rates,⁷⁷ and hip replacement⁵² in Korea.

The most common *comparator* in the studies of cardiac public reports is a time period prior to public reporting. Seven studies were interrupted time series^{a 28,29,32,34,38,66} using multiple measures before and/or after the public reports made data available, while one study compared single pre and post test time periods.³³ Several studies relied on data available only after public reporting was initiated including four “post only” time series^{30,31,83,85} and two single group post only studies.^{82,84} Comparison groups were less common, however one study compared patients from New York State to patients from States in a registry⁶⁴ and another compared all New York State hospitals to eight hospitals in Michigan.³⁶ Four studies compared multiple groups over time. One compared hospitals that did and did not participate in reporting over a period during which three reports were issued³⁷ while another compared several States with public reports to the rest of the country.³⁵ Two studies employed designs that deviated from usual multiple group time series. One compared groups of patients treated at the Cleveland Clinic defined by place of residence in order to determine if the types of patients from New York State changed after public reporting.⁶⁵ The other study compared trends in Massachusetts, a State without public reporting about cardiac services at the time, with trends in New York State and Northern New England after public reporting.³⁹ One randomized trial of public reporting for hospitals was conducted in Ontario, Canada and hospitals were assigned to receive publicly released data on their performance on AMI and CHF process measures either early or delayed (21 months later).¹¹⁶

A time without public reporting was the most common comparator in the noncardiac hospital studies as well. Six studies were interrupted time series^{40,42,43,67,77,88} and four were time series post public reporting only.^{50,76,89,91} Five studies analyzed pre and post reporting data for one group,^{47,51,52,87,117} while two reported post public report information for one group.^{44,111} Three studies (four out of the 17 articles) involved a comparison group: one comparison group interrupted time series tracked mortality over time and compared one area of Ohio to the rest of State⁴¹ and another compared pre- and postreporting outcomes for patients in Pennsylvania to patients in other States. In one study reported in two articles^{10,45} a group of hospitals that

^aFor definitions of study design types used in this report, see Appendix D.

voluntarily participated in public reporting were compared to the remainder of the hospitals in the State which were randomly assigned to receive either confidential feedback or no data.

The quality assessment of these studies was not based solely on study design, but was heavily weighted toward the consideration of the appropriateness of the comparison across groups and time periods and the ability of the study to address confounding. (For a description of the quality assessment criteria see Appendix F, for the ratings of studies see Appendix G). Sixteen studies were rated as good, 22 as fair, and five as poor.

The *outcomes* in the studies of hospital public reports about cardiac surgery and services have included mortality, volume or market share, and adverse selection or access, and studies often included more than one outcome. Mortality, usually in hospital though occasionally 30-day, was the subject of many of the public reports and studies examining whether hospitals responded to public reporting by changing practices that resulted in lowering mortality (Key Question 1). This outcome was the focus in 13 of the 21 studies of cardiac public reports.^{28-39,64} The next most frequent outcomes were changes in volume of discharges or market share, both intended to measure the impact of public reports on the selection or choice of hospitals. Volume or market share was the outcome in nine cardiac studies.^{28,30,31,37,82-86} Eight studies evaluated adverse selection and reductions in access which are frequently cited as possible harms associated with public reporting (Key Question 2). These studies examined whether hospitals changed their treatment patterns in order to improve their rating by not treating patients with higher risks of negative outcomes.^{32,34-37,64-66}

Mortality was the most frequent outcome in the noncardiac hospital studies as well. In 12 of the 16 studies that examined the impact of hospital public reports on quality of care (Key Question 1), six focused on mortality^{40-43,49,111} and two examined mortality as well as other outcomes.^{44,45} Other studies reported on changes in the rate of obstetrics procedures,^{46,76,77} outcomes from specific procedures,⁵² patient experience,⁵¹ or process of care measures.^{47,50} Two studies addressed potential harms (Key Question 2) and in these case the outcomes were rates of pneumonia diagnosis and antibiotic administration⁶⁷ and increase in cost of hip surgery following public reports.⁵² Provider behaviors (Key Question 3) were outcomes in four studies including changes in services offered by hospital, policies, and practices related to cesarean section^{46,76,77} and quality improvement activity.¹⁰ Six studies looked for public report impact on choice of hospital (Key Question 4) through occupancy rates,⁸⁷ volume of discharges,^{88,91} or market share.^{43,89,90} Two noncardiac studies also analyzed whether outcomes varied by market characteristics^{46,111} (Key Question 6).

Effectiveness by Outcome/Key Question: Detailed Analysis of Quantitative Studies

Cardiac Public Reports

The findings from 20 of the 21 studies of public reporting about hospital cardiac programs are presented in Table 2. The one study that does not fit in the structure of the table is discussed separately under Key Question 1. The studies are listed in chronological order by year of publication and the results are presented in a reduced form to provide an overview. More details about the primary results can be found in the Hospital Summary Table (Table 3) at the end of this section, and in the Evidence Table in Appendix H.

Table 1. Study findings: hospital cardiac public reports

Author, Year	Report	Study Design	Mortality (KQ 1)	Volume - Market Share (KQ 4)	Access-Adverse Selection (KQ 2)
Hannan, 1994 ²⁸	NYS CSRS	Interrupted time series	↑	↔	NS
Hannan, 1994 ²⁹	NYS CSRS	Interrupted time series	↑	NS	NS
Foreman, 1995 ⁸²	PA HER & CABG	One group post only	NS	↔	NS
Omoigui, 1996 ⁶⁵	NYS CSRS	Multiple group time series	NS	NS	↓
Ghali ³⁹	MA with none, NYS CSRS, and Northern NE	Comparison group(s) time series post only	↔	NS	NS
Mukamel, 1998 ⁸⁴	NYS CSRS	One group post only	NS	↑	NS
Peterson, 1998 ³²	NYS CSRS	Interrupted time series	↑	NS	↑
Hannan, 2003 ³⁵	NYS CSRS; PA HC4; NJ Department of Health and Senior Services Registry; CHQC; Northern New England Cardiovascular Study Group (not public)	Multiple group time series	↑	NS	↔
Dranove, 2003 ⁶⁶	NYS CSRS and PA	Interrupted time series	NS	NS	↓
Cutler, 2004 ³⁰	NYS CSRS	Time series post only	↑	↑	NS
Romano, 2004 ⁶⁵	NYS CSRS and CA CHOP	Time series post only	NS	↔ in CA ↑ in NY State limited time	NS
Moscussi, 2005 ³⁶	NYS CSRS	Comparison group(s) post only	↔	NS	↓
Jha, 2006 ³¹	NYS CSRS	Time series post only	↑	↔	NS
Carey, 2006 ³³	CA CABG Report	One group pretest post test	↑	NS	NS
Guru, 2006 ³⁸	Ontario, CA Cardiac Reports	Interrupted time series	↔	NS	NS
Bridgewater, 2007 ³⁴	UK Reports: Commercial	Interrupted time series	↑	NS	↑
Dranove, 2008 ⁶⁶	NYS CSRS	Interrupted time series	NS	↑	NS
Apolito, 2008 ⁶⁴	NYS CSRS	Comparison group(s) post only	↔ CABG and PCI	NS	↓
Romano, 2011 ³⁷	CCMRP	Multiple group time series	↔	↑	↔
Wang 2011 ⁸³	PA CABG Guide	Time series post only	NS	↑	NS

Notes: ↑ = improvement, higher quality, positive impact; ↔ = no difference, no impact; ↓ = worse, lower quality, negative impact. CABG = coronary artery bypass graft surgery; CCMRP = California CABG (Coronary Artery Bypass Graft) Mortality Reporting Program; HER = Hospital Effectiveness Report; NS = not significant; NYS CSRS = New York State Cardiac Surgery Reporting System; PA CABG = Pennsylvania Coronary Artery Bypass Graft [CABG] reports; PCI = percutaneous coronary intervention; UK = United Kingdom

Key Question 1. Quality of Health Care

The one randomized study was not included in Table 2 as it examined outcomes not included in any other study; Tu et al.¹¹⁶ evaluated the impact of public reporting on composite indicators of quality of care for AMI and CHF that were derived from selected process of care indicators. The study found that improvement was not significantly different in the group randomly assigned to early release of data and the group assigned to public reporting after the collection of followup data. However, in exploratory analyses they found slight declines in 30-day mortality

for subgroups of patients in the early reporting group that did not occur in the later reporting group. The conclusion of this randomized study that public reporting has a limited, if any, impact on health outcomes is echoed by the other quantitative studies of cardiac public reports. However, differences in comparisons, time periods, and populations make generalizations difficult.

Thirteen identified studies analyzed the impact of public reporting on mortality.

- Eight of these reported declines in mortality (improvement) although the declines were small or limited to a subgroup of patients in some studies:
 - Hannan et al. in two of the earliest studies^{28,29} found that hospitals with higher mortality rates prior to reporting improved over the 3 years after reporting and Cutler³⁰ also identified a trend toward improvement; Jha³¹ found that hospitals that performed well at baseline when reports were issued tended to have high performance in future years;
 - Peterson et al.³² found that mortality rates for Medicare patients in New York State were declining faster than the rest of the country; and Carey et al.³³ found a small decline for four cardiac procedures after reporting in California. Bridgewater³⁴ reported a substantial mortality decline for CABG in Northern England after public reporting and Hannan reported statistically significant larger declines in mortality from 1994 to 1999 in several States with cardiac report cards compared with the rest of the United States.³⁵
- Four studies found no change in mortality.
 - These included an assessment that a similar mortality decline occurred in Massachusetts without public reporting as was reported in New York State and Northern New England where CABG mortality rates for hospital were reported.³⁹ Similar declines were seen in Michigan hospitals (no reporting) compared with New York State.³⁶ A study of CABG reporting in California that compared participating and non participating hospitals as well as changes after three releases of the report card also showed similar results.³⁷ A study in Ontario, Canada found a significant drop in mortality after hospitals were given comparative information, but no further drop when the data was made public.³⁸
- Apolito et al.⁶⁴ compared patients from New York State with patients from the rest of the country that have AMI complicated by cardiogenic shock included in a registry. The mortality rates for patients who received either CABG or percutaneous coronary intervention (PCI) were not significantly different.

Key Question 2. Harms

Eight of the identified articles reported on studies that examined harms and four found evidence suggesting that harms were occurring. The harms studied were all variations on the idea that public reporting will lead providers (hospitals and surgeons) to avoid high risk patients (adverse selection) and thereby reduce access to needed services. However, as in the studies of improvement in mortality, these studies were of different population subgroups and often involved comparisons that are not the most rigorous, limiting confidence in the results and making it difficult to draw conclusions across studies.

- Five studies were about the risk of being referred out of State if the patient was high risk.

- One study found that patients treated at the Cleveland Clinic, who were referred from New York State, were at higher risk and had a higher mortality rate than patients from New York State before public reporting as well as patients from other locations.⁶⁵
- A study of Medicare beneficiaries in New York State³² and another study of cardiac patients in several States with public reporting³⁵ found that the number of CABG patients having surgery out of State declined, suggesting high risk patients were not being sent out of State. This second study of Medicare beneficiaries³² also looked at access to services and concluded that elderly New Yorkers were more rather than less likely to have surgery.
- A study in England also found that high-risk patients were more likely to have surgery after public reporting.³⁴
- A study in California found that patients treated at high mortality hospitals were less sick after public reporting, but concluded that this was due to a decline in key risk factors and not an unintended consequence of public reporting.³⁷
- Three studies were about reduction of illness severity in States with public reporting compared with the ones without.
 - Moscucci³⁶ found that New York State patients were at lower risk of negative outcomes than Michigan patients despite similar rates of heart disease in the two States, and Dranove et al.,⁶⁶ who compared New York State and Pennsylvania patients before and after public reporting, identified declining illness severity after public reporting.
 - Apolito et al.⁶⁴ reported that New York State patients with myocardial infarction and cardiogenic shock were half as likely to have procedures and waited longer for surgery, but more importantly were 2.5 times more likely to die in the hospital than similar patients in other States. Overall mortality rates were higher in New York State and the author suggested this means patients may not be receiving these interventions in New York State, which is one of the harms that could result from public reporting. While this was a study of a specific subgroup of patients and the number of patients studied was smaller (220 from New York State, 325 from other States) than the other studies, it suggests the potential for harm if public reporting creates incentives to avoid high-risk patients.

Key Question 3. Impact on Providers

We did not identify any studies that examined the impact of public reports on hospital cardiac services on provider behaviors.

Key Question 4. Impact on Patients or Purchasers

In nine studies of hospitals, market share or volume of discharges was used to indicate the selection of hospitals by patients or their representatives (e.g., referring physicians, health plans, employers, etc.). Market share can be defined differently in different studies, but is usually the number of admission or discharges for one hospital divided by all the admissions or discharges in defined geographic region. One of the primary theories underlying public reporting is the idea that given information about quality that was previously unavailable, consumers (patients) will choose higher quality providers. Therefore the expectation is that with public reporting hospitals with higher ratings will experience increases in market share, while those with lower rating should lose customers and see their market share decline.

The results of five studies support this hypothesis, while three found no difference, and one produced mixed results.

- The five studies that find no effect included an inquiry that found CABG volume across hospitals was stable during the early years of public reporting (1989–1992).²⁸ Other studies also of CABG volume found no change in Pennsylvania following public reports^{37,82,83} or in New York State.³¹
- One study with mixed results found no change in California for AMI while finding increases in CABG volume for low mortality hospitals 1 month after release of public reports and decreases in volume for high mortality hospitals after reports in New York State.⁸⁵
- The three studies that found public reports affected market share often cautioned that the impact was limited.
 - Mukamel et al.⁸⁴ found that reports of increased mortality led to a decrease in market share for hospitals in New York State, but that all of this was accounted for by a decline in Upstate New York, while there was no effect in New York City. Another study identified effects immediately after reporting but that did not persist over time in New York State.³⁰
 - The exception is one study of CA CABG reporting documented a statistically significant increase of 8.9 percent in market share in low-mortality hospitals in the 6 months after the publication of the data.³⁷ Analyses by Dranove and Sfekas found that public reports affected market share when they provided new information, but this was not symmetrical in that hospitals with lower than expected rankings experienced a significant decrease in demand but the market share of higher ranking hospitals did not change.⁸⁶

Hospital Public Reporting (Noncardiac)

Twenty-two studies were identified that evaluated public reporting about hospitals for either a wide range of services or for a specific noncardiac service. Like the cardiac public reports, most of these examined how public reporting influences quality of care (Key Question 1) with mortality, the most common measure that was publicly reported, and changes in mortality used to assess the impact of public reporting. Only one study in the group addressed harms and a small subset assessed the effect on providers or patients or the influence of context. These studies are listed and described below.

Key Question 1. Quality of Health Care

Fourteen overall studies addressed Key Question 1. There were seven studies that evaluated the effect of regional public reporting efforts on hospital. The most common of these were part of the CHQC program from 1993 to 1998. Five⁴⁰⁻⁴⁴ articles reported the results of research on the impact of CHQC on quality of care, out of which one also looked at the impact on market share (discussed in Key Question 4).

- One of the six studies showed an effect of CHQC on mortality rates.
 - In the study published in 1997, Rosenthal et al.⁴⁰ tracked mortality for eight diagnoses in 30 hospitals during the year prior to data collection for one period in which the data was provided confidentially to the hospitals, and for 2 years after it was public. Risk adjusted in hospital mortality for all eight conditions combined declined from 7.5 percent to 6.5 percent but was not significant ($p=0.06$), while the separate analyses by

- condition found declines for CHF (7.1 percent to 5.6 percent) and pneumonia (11.1 percent to 9.9 percent) were significant.
- Four later studies showed little or no significant effect. This was a result of a better understanding of mortality trends in this region and/or more sophisticated analysis measures.
 - Clough et al.⁴¹ compared the trends in the CHQC hospitals to those in the rest of Ohio and found the same trend of decline in mortality across the State, suggesting it was not result of this program.
 - Baker et al.⁴² used Medicare data to examine mortality in the CHQC hospitals from 1991 and 1997 and determined that while in-hospital mortality declined, mortality in the days following admission increased. The net result was that mortality, in or outside the hospital but within 30 days of admission, did not significantly decline for three of six conditions, declined for CHF and chronic obstructive pulmonary disorder (COPD), and increased for stroke.
 - In another study the same researchers used some of the same data but focused on individual market share and also reexamined trends in mortality.⁴³ In this analysis they found that only one hospital, identified as an outlier (with higher than expected mortality), improved and had lower mortality consistently for the rest of the study period.
 - One additional study of CHQC took a different approach and looked at whether outcomes for disparate but all publicly reported outcomes (mortality, length of stay, caesarean, and vaginal birth after cesarean [VBAC] delivery rates) improved as a group indicating a systems approach rather than a selective approach to quality improvement.⁴⁴ Their analyses suggested that hospitals that improve in one area tend to improve in others as well.
 - Out of the seven regional quality initiatives with a public reporting component, two studies by Hibbard et al. were about the Alliance, an employer purchasing cooperative in Madison, Wisconsin that produced a report, QualityCounts, that compared 24 hospitals in the region.
 - This report was evaluated by comparing the hospitals in the report to the remaining hospitals in the State. The remaining hospitals were further randomly assigned to either confidentially receive the same indicators as the report or not.⁴⁵ The results indicated that the quality of worse than expected hospitals improved in all groups but were statistically significantly higher in the hospitals that were a part of QualityCounts.
 - A later study compared performance across the three groups 2 years after QualityCounts was distributed.¹⁰ These analyses focused on two areas where there was variation in performance at baseline, obstetric and cardiac care, although the report covered several other domains. Comparisons of the number of hospitals that improved, as well as analyses that introduced more statistical controls, found a gradient across the groups with the public report group having the highest percentage of hospitals that improved, private reports in the middle, and the no report group having the fewest of hospitals that improved. This was significant for obstetrics and had the same trend in cardiac care though it was not significant.

Four identified studies of public reporting were evaluations of State-level public reporting efforts. State reports have been studied in Missouri, Wisconsin, and Pennsylvania.

- In 1993 the Missouri Department of Health issued a consumer guide to obstetrics services at hospitals in the State. Longo et al.⁴⁶ evaluated the impact of this guide on clinical outcomes by estimating trends based on years prior to the report and comparing the actual post guide results to estimated value and found significant changes in ultrasound and cesarean rates but no significant change in VBAC rates.
- The Wisconsin Hospital Association's public report, CheckPoint, was launched in March 2004 and a basic study of its influence cited high levels of compliance with recommended treatment measures at two points after it was made public.⁴⁷ Small amounts of improvement in care indicators for AMI, CHF, pneumonia, and error prevention occurred in the 2 years after reporting, but these differences were not subjected to any statistical tests or analyses.
- Two studies published a decade apart considered the relationship of the Annual Hospital Effectiveness Report publicly disseminated in Pennsylvania with health care outcomes.
 - In 1997 Evans et al. published a study that found that Pennsylvania hospitals improved (decreased mortality and morbidity) but that this was achieved by not reducing length of stay at the rate common during this period, an action that could have financial implications.¹¹¹
 - More than a decade later in 2008, Hollenbeck et al. evaluated the same reporting system by matching patients in Pennsylvania with patients in other parts of the country characterized by intense or limited public reporting using propensity matching.⁴⁹ Their analyses showed that patients in States or time periods with intense public reporting had significantly reduced odds of inpatient mortality compared with States or time periods with less public reporting. For example, for patients in Pennsylvania subject to intense public reporting in 2002 to 2003 compared with non Pennsylvania patients in States with limited reporting, the odds ratio for hospital mortality across six conditions ranged from 0.59 to 0.79 (all $p < 0.0001$).

Three recent studies reported the results of ongoing national initiatives in public reporting relative to hospitals.

- Two of these three studies were based on public reports in the United States while one was from Korea.
 - Hospital Compare was one component of a CMS initiative to disseminate information about the quality of health care services and promote quality improvement. Since 2005 CMS has made hospital performance rating and rankings available on a Web site. Werner and Bradlow⁵⁰ examined hospital performance in the 3 years following the initiation of Hospital Compare and found significant improvements ($p < 0.0001$) in individual and composite measures for AMI, heart failure, and pneumonia. They also demonstrated that improvement in these measures of process of care were associated with improvements in outcomes for AMI such as declines in mortality rates, length of stay, and readmission. Changes in outcomes for pneumonia and heart failure were smaller or not significant.
 - As a complement to clinical indicators and outcomes, CAHPS is an AHRQ project that has developed surveys and measures of patient experience that could be publicly reported. The first survey was developed for health plans, but a hospital version was

- developed (HCAHPS) and public reporting of results began in March 2008. Elliot et al.⁵¹ examined the HCAHPS data from March 2008 and March 2009 and found small, consistent, though not statistically significant improvements in eight of nine domains. The only domain with no improvement was doctor communication, while the largest improvement was in responsiveness of hospital staff (59.9 percent to 60.8 percent giving the most positive responses).
- While most of the general public reporting about hospitals included quality measures on several procedures, a study in Korea focused on hip replacement and documented that the length of stay and readmission rates declined significantly after these outcomes were routinely publicly reported.⁵²

Key Question 2. Harms

One of the two studies that addressed potential harms was designed to test concerns that publicly reporting a specific process measure, percentage of patients with pneumonia receiving antibiotics within 4 hours of arrival, would encourage premature diagnoses of pneumonia, overuse of antibiotics, and inappropriate prioritization of patients with respiratory symptoms in emergency departments (EDs). Analyses of data from a nationally representative sample of ED visits for 2001 through 2005 found no evidence of increase in any of these adverse outcomes after public reporting of the measure began in January 2004.⁶⁷

The study of hip surgery in Korea,⁵² mentioned earlier, included several outcomes including change in cost for high risk procedures and patient selection. The study concluded that none of these potential adverse effects occurred.

Key Question 3. Impact on Providers

Three of the four studies, which evaluated Key Question 3, reported improvements in the quality initiatives by providers in hospitals.

- In an evaluation of the 1993 Missouri Department of Health consumer guide for obstetrics services in addition to an examination of trends in outcomes, Longo et al.⁴⁶ surveyed hospitals about their services and policies and any changes they made in response to the guide. They found that 39 percent of hospitals that did not have obstetrician-related services had added them or were planning to add them and that hospitals varied in whether they reported changing policies in response to the report (from a high of 34 percent reporting changes related to cesarean delivery to 8 percent considering changes in policy related to ultrasound use).
- A study of the CHQC program determined that most participating hospitals both improved their rates on cesarean sections (16 hospitals) and VBAC (15 hospitals). Fifteen hospitals had initiatives designed to address the issues raised by public reporting and score high on an assessment that included organizational leadership and monitoring care.⁷⁶
- The evaluation of the QualityCounts public report on hospital performance included a survey of hospital executives in the three study groups (public report, confidential report, and no report).¹⁰ Respondents were asked about quality improvement activities and responses about priorities and strategies did not differ across the groups. However, the public report hospitals reported more quality improvement activities related to the measure in the QualityCounts report than the confidential or no report hospitals.

- One recent study by Jang et al. tracked the impact of the yearly release of data on the cesarean rates for all hospitals in Korea for 4 years. A significant decrease in cesareans occurred after the first report but then the rate remained at a level still higher than what is considered high quality care despite continued reporting.⁷⁷

Key Question 4. Impact on Patients or Purchasers

Three out of the six studies, which were about Key Question 4, reported results on impact of public reporting on patient choice of hospitals.

- Two of these studies were of the first modern public report, the HCFA hospital mortality report. They both analyzed the impact of this data on choice of hospital and found no evidence of the intended effect.
 - In 1988 Vladeck et al.⁸⁷ reported the earliest results identified in this systematic review. Their research examined trends in occupancy rates for five quarters before and three quarters after the HCFA report release and compared hospitals in New York City identified as having higher than expected death rates to those with lower than expected death rates, and found no significant differences.
 - Almost a decade later in 1997, a study analyzed number of hospital discharges for a 9-year period that included years prior to the HCFA report release and all the years in which the report was made public.⁸⁸ These researchers did find that hospitals experienced a very small decline in discharges after being cited as a higher mortality hospital. Their estimate of the size of the effect was that a hospital with double the expected mortality would have 46 fewer discharges a year as a result of the public release of the mortality information.
- One study of public reporting and patient choice sought to determine if five reports issued over a 2-year period influenced patient choices of hospitals for their kidney transplants.⁸⁹ The study included patients receiving living and deceased donor kidneys. The authors reported that most major cities now have at least two transplant centers and patients chose after diagnosis in consultation with their nephrologist, although the choice may be constrained by insurers. Analyses of hospital choice as a function of outcome reports found no effect overall but some effect among younger patients (age 18 to 40) and patients with college degrees.

Three studies examined the impact of different public reports on patient volume and market share.

- A study in Germany evaluated the difference in market share between voluntarily reporting hospitals and the ones that did not. The hospitals that did not report their outcomes were losing market share to the ones that voluntarily reported them. It was noticed that hospitals with lower ratings lost market share to the higher rated hospitals.⁹⁰
- Pope 2009⁹¹ modeled the impact of the U.S. News “America’s Best Hospitals” report and found that improvements in ranking lead to significant increases in the numbers of non emergency patients.
- One of the six studies about CHQC (the other four are described in Key Question 1 as they focus on mortality) examined discharges for six medical conditions as an indication of market share. The five worst hospitals (highest mortality) tended to lose market share but this was not significant and there was no relationship between when a hospital was identified as an outlier and subsequent market share.⁴³

Key Question 6. Context

Two studies considered characteristics of the hospital's market in addition to other outcomes. Longo et al.⁴⁶ in their study of the impact of an obstetrics public report in Missouri, found that hospitals in communities with multiple facilities were more likely to change their policies related to measures included in the report than hospitals that were the single facility in a community.

In a study of Pennsylvania hospital response to the Annual Hospital Effectiveness Report, Evans et al.¹¹¹ found that improvements in mortality were more likely in hospitals in competitive markets and less likely in hospitals reporting they were in worse financial condition.

Qualitative Studies

Description of Qualitative Studies

We identified 43 qualitative studies and lab-type experiments that focused on public reporting about hospitals and corresponded to at least one of this review's Key Questions. The studies were published between 1989 and 2010. Eighteen were conducted in countries other than the United States including five in Canada,¹¹⁸⁻¹²² four in England,¹²³⁻¹²⁶ three in The Netherlands,¹²⁷⁻¹²⁹ two in South Korea,^{130,131} and one each in Scotland,¹³² Germany,¹³³ France,¹³⁴ and Iran.¹³⁵

Most of these studies were surveys or interviews. Twenty-four were surveys, including 12 surveys of medical care providers and administrators (hereafter "professionals"),^{121,122,136-145} 11 surveys of patients/consumers,^{128-131,134,146-151} and one study that combined surveys of professionals and patients.¹³⁵ Ten studies were based on interviews. One used patient interviews,¹⁵² one interviewed patients and professionals,¹³³ and eight interviewed professionals^{120,124,126,153-157} including one that presented a series of case studies based on interviews and observations.¹⁵⁵

Four studies reported the content of focus group discussions, including three with patients^{123,125,158} and one with professionals.¹¹⁸ Three studies combined focus group methods and interviews, two of which were with patients^{119,127} and one included both patients and professionals.¹³² Two studies were lab-type experiments in which participants were asked to evaluate materials, take tests, or complete decision exercises.^{159,160}

Summary of Qualitative Studies

Qualitative studies of public reporting about hospitals tend to focus on certain topics across different time periods and populations. These are: (a) awareness, attitudes, and self-reported intention to use reports in the future; (b) importance or relevance of specific topics or measures to people using the public report; (c) reactions to format including comprehension; and (d) decision processes used to evaluate and ultimately select hospitals. It might be expected that these would change over time as public reporting became more common and evolved. Given the relatively large number of interview and survey studies identified by our search, we arranged the description of the studies by year of publication (included in parentheses below) both to impose an organizational framework and to allow an assessment of whether by looking across studies it is possible to determine how attitudes and use are changing since public reporting is no longer a new phenomenon.

Interviews and Descriptive Surveys

Professionals. Ten survey and interview studies of professionals assessed their awareness of or attitudes toward actual or planned public reports. These studies did not directly examine action by providers (Key Question 3), but as awareness and acceptance of reports is a precursor to action, we briefly summarize these studies here.

- A survey of executives selected to represent hospitals with different levels of mortality in the HCFA mortality report found the report was viewed very negatively regardless of the hospital's rating and that there was significant resistance to public reporting (1990).¹⁴²
- Cardiac surgeons and cardiologists were aware of the Pennsylvania cardiac report. Sixty-three percent of surgeons said they were less willing to operate and 59 percent of cardiologists said it was somewhat more difficult to find a surgeon for their patients due to the report (1996).¹⁴¹
- A survey of New York State cardiologists during the initial years of the NYS CSRS found that 93 percent had reservations about the accuracy of the data and 62 percent said it had not affected their choices at all when referring patients for surgery (1997).¹³⁹
- Thirty-nine hospital administrators were surveyed and three quarters reported finding some aspect of the CHOP public report useful and most stated that they disseminated it in their hospital [exact percentages not reported] (1998).¹⁵⁶
- New York State and California hospital administrators reported distributing State public reports and preferring those to the HCFA reports. Administrators at hospitals rated as "high mortality" in any public report remained critical of the public reports (1999).¹³⁸
- In response to a survey, Canadian cardiac surgeons endorsed the idea of publicly reporting mortality but also said they did not believe it influenced patients and reported no instances of patients asking about the rankings (2003).¹²¹
- Thirty-five percent of stroke and cardiac care managers surveyed in Ontario, Canada were not aware of the existing public report (2003).¹²²
- Interviews with professional stakeholders in Canada about cardiac public reports found that public reporting was supported in principle but there was concern about the accuracy and the public's ability understand the data (2004).¹²⁰
- Administrators (n=61) at six sites in England answered they did not feel the "star ratings" were relevant and although they provided a basis for benchmarking local performance they were more concerned about dysfunctional responses such exclusive focus on what is measured and pressure to make targets (2005).¹²⁶
- Guru et al. surveyed cardiac surgeons in Ontario, Canada and compared their results to previously published surveys of cardiologists and cardiac surgeons in Pennsylvania. The Ontario results were generally favorable: 51 percent supported hospital reporting, 26 percent supported surgeon-specific reporting, 84 percent believed it affected referrals, and 80 percent believed it affected patient choice. In contrast, the Pennsylvania results were negative (e.g. only 13 percent believed the public report affected referrals) (2009).¹⁴⁵

Ten studies focused on whether the information in public reports was used to inform practice and quality improvement. These studies correspond to Key Question 3 in that they assess changes in practice in response to public reporting.

- Seventeen public hospitals in California reported minimal use of the HCFA and CHOP report in a study published in 1996.¹⁴⁰

- Survey responses of hospitals in Pennsylvania and New Jersey (a State without public reporting) were compared and hospitals in Pennsylvania reported using performance information more frequently but the differences were not consistent across questions and public reporting was not well defined (1998).¹⁴³
- Interviews and observations were used for case studies that characterized the responses of four hospitals to CHQC. All created interdisciplinary work groups to review practice and develop practice change in response to the public report (1998).¹⁵⁵
- Chassin et al. found in interviews with key administrators and physicians at four hospitals identified as outliers (high mortality) that these hospitals took targeted actions and created quality improvement (QI) programs to address the underlying issues (2002).¹³⁷
- Two similar studies conducted in the same program but at different times reported somewhat different results.
 - Interviews reported by Mehrotra et al. with hospital executives and public report producers in 11 U.S. communities concluded most public reports were not successful in that they did not prompt or increase QI (2003).¹⁵⁴
 - Three years later, Pham et al. published the results of 111 interviews of hospital and association executives as well as public report producers in 12 U.S. cities in the same program and found: (1) hospitals participated in multiple reporting programs, and (2) although they did not believe these influenced patient choice, they believed they had led to improved quality by making physicians more open to performance measurement (2006).¹⁵⁷
- A national stratified random sample of QI directors (n=664) and senior executives (n=650) at short-term acute care general and critical access hospitals that submitted data for Hospital Compare during 2005 were surveyed to identify the barriers hospitals face in making quality improvements. The major barriers identified among hospitals with more than one measure that scored below the 50 percent benchmark were: (1) inaccurate documentation and missing data, (2) failure to involve physicians, (3) financial challenges, and (4) lack of QI staff. Ninety-five percent of the QI directors reported that their hospitals implemented new or enhanced QI programs in response to public reporting (2006).¹⁴⁴
- Interviews with hospital administrators in Rhode Island revealed that QI initiatives were started in response to a Statewide public report (no interviews with hospitals not subject to public reporting) in areas that both directly corresponded to reported measure as well as in other areas of clinical care and customer service (2006).¹⁵³
- The majority of 800 hospital executives surveyed in the United States answered that public reports lead to incorporation of QI in strategic planning (93.6 percent) and attention to quality by more staff (96.5 percent) (2007).¹³⁶
- Interviews with 24 National Health Service employees in England responsible for patient surveys at hospitals found that the survey results were generally well-received but were not informative for QI because they reported on the whole hospital and not on smaller units where changes could be implemented (2008).¹²⁴

Patients. One interview study and 11 surveys collected similar information on awareness of public reports and their impact on the decisions among patients or their representatives.

- A survey of 186 military health plan members and 200 non military respondents in New York State reported they would use government mortality data to judge hospital quality

(yes: 67 percent military; 59 percent non military), but a smaller percent responded that they were very likely to use this information in selecting a hospital for surgery (34 percent and 30 percent) when asked this in a separate question (1989).¹⁴⁹

- A survey of patients who had CABG surgery in the previous year (n=474) revealed that only 20 percent were aware of the Pennsylvania Consumers Guide at the time of their surgery and only 4 percent had seen the report. Twenty-eight percent were not interested in the report and the major reason was that distance was an important factor in choice (1998).¹⁴⁸
- Outpatients at University of Missouri Medical Center (n=935) were provided a hospital public report and completed a questionnaire indicating that most people found it an effective way to compare providers (59.9 percent), but very few were likely to change providers based on the information (2003).¹⁴⁶
- Randomly selected Medicare beneficiaries who had selected surgical procedures (n=510; 68 percent response rate) reported that decisions about where to have the surgery were largely influenced by doctors and family and only a few (11 percent) attempted to find comparative hospital information before their surgery. Forty-seven percent said they would use a list of best hospitals if this type of information was available in the future (2005).¹⁵¹
- Patients and physicians in Germany were asked to rank indicators currently included in a nationally mandated public report on hospitals as well and measures common in other hospital reports. The two groups agreed on the top 10, though the exact order differed. Both groups rated several indicators that reported on hospital structural characteristics such as ownership as unimportant to their decisions, which suggests they could be dropped in order to shorten the report (2007).¹³³
- Patients who had one of six selected procedures at three hospitals in The Netherlands were asked how they chose the hospital and what information they would use to choose if they needed similar care in the future. Hospital reputation was the primary reason for the past choice and previous experience was the most cited source of information for future choices (25.3 percent), while quality information was rarely cited as important (2008).¹²⁹
- Women in South Korea age 20 to 49 were surveyed by phone (n=505; 57.3 percent completed of 882 eligible after random sampling) to determine if they were aware of the public reporting of cesarean section rates for Korean hospitals. Two-hundred twenty eight reported being aware of the report, and younger women and those with higher levels of education were more likely to know about the report (2008).¹³¹
- Masor et al. showed 59 people a public report on health care acquired infection rates for hospitals and in interviews discovered that most people were not aware the hospital acquired infections (HAIs) existed. While the respondents were distressed to learn about them, they were unlikely to choose a hospital based on this alone (2009).¹⁵²
- Based on responses to a mail survey (n=201; 25 percent return rate), Masor et al. evaluated formats for a public report on HAIs and found reports were generally easy to understand with the exception of the section that explained risk adjustment and confidence intervals; however HAI rate was not cited as likely to influence choice of hospital (2009).¹⁵⁰
- Researchers surveyed a total 381 people including inpatients, recently discharged patients, and visitors to a hospital in France about their knowledge about infection control and whether a report like the French mandatory report on infection control

activity would influence hospital choice. Seventy-seven percent stated they were interested in the report and it was ranked as the 6th most important reason to choose a hospital, but most people would seek advice about admission from their physician rather than refuse admission based on this report (2009).¹³⁴

- Over 50 percent of outpatients surveyed at four general hospitals in South Korea (n=385) said they would use the hospital performance information from the National Health Evaluation Program but the average respondent rating of understanding the indicators was 3.15 (3=fair) (2009).¹³⁰
- A survey of 104 patients or family members and 104 physicians in Iran verified that few people (7.7 percent of patients and 11.7 percent of physicians) were aware of the grading system and public report that exists for Iranian hospitals, that patients relied on suggestions from relatives, and that physicians considered their patient's economic situation first when referring patients (2010).¹³⁵
- Three hundred thirty-seven patients undergoing surgery for the first time at three Dutch hospitals were surveyed regarding their use of public information to select their hospital. Patients were divided between those who had compared hospitals prior to their surgery (21 percent) and those who did not (79 percent). Most respondents indicated they chose their hospital deliberately, but the major factors in their decisions were previous experiences with the hospital and their acquaintances' previous experience; comparative information was the lowest ranked of four choices in this regard. Patients were also asked to choose factors important in future selections; public information of physician experience was most important, but other aspects, such as wait time and physician communication, had higher relative importance than other aspects included in public reports such as quality of nursing care (2011).¹²⁸

One study examined the use of hospital public reports by health plans for contracting decisions. It is included here as health plans are acting as representatives of patients in selecting the plans they offer.

- Health plan executives were surveyed and asked to rate the importance of factors that impact their contracting with hospitals. The top three factors were accreditation, location, and price while the average rating of the quality of care indicators ranged from 3.03 to 3.67 (where 5 is very important). Thirty-three percent reported conducting their own studies of comparative hospital quality (2003).¹⁴⁷

Focus Groups

Seven studies reported feedback obtained through either focus groups or a combination of focus groups and interviews. Two of these involved physicians and administrators while five focused on former or prospective patients.

- Professionals
 - Focus groups and interviews with hospital administrators, physicians, and health councils in Scotland found that public reporting of clinical indicators had raised awareness of issues but that reports were not disseminated within hospitals; that while over three-quarters of physicians knew about the reports, they could not recall seeing the most recent report and relied on other sources to assess hospitals; and that health councils had received no inquiries about the hospital reports.¹³²

- Another focus group study exclusively involved physicians and had them rate a long list or indicators for AMI (47 indicators) and CHF (34 indicators).¹¹⁸ More than half of the indicators were considered acceptable for public dissemination, and of the rest all but three were rated as reasonable but requiring caution in interpretation. The three were considered unacceptable because they differed too much based on the needs of patients.
- Patients
 - Focus groups of the general public were usually with people who had been in the hospital.
 - Cardiac patients (n=91) in seven Canadian cities participated in focus group discussions about hospital public reports on cardiac procedures.¹¹⁹ Participants agreed with the idea of public reporting but wanted reports that emphasized patient experience by including feedback from other cardiac patients, patient involvement in care, and communication as well as waiting times.
 - Moser et al. used two focus groups and interviews to ask 18 people in The Netherlands who had had total knee or hip replacement within five years what information they would use to choose a hospital if they needed a similar procedure in the future. A hospital public report was viewed as supplementary information that increased awareness of quality but that had to be interpreted in the context of personal, prior experience. The public report was viewed as too general and did not contain enough information that the participants considered important for it to play a larger role in the choice of a hospital.¹²⁷
 - Six focus groups of people with recent inpatient experience in England were conducted by Magee et al. just before the public release of National Health Services quality information.¹²⁵ One group was composed of family caregivers and another of ethnic minorities; however all the groups expressed suspicion of government ratings, did not like the idea of shopping around for health care, and preferred the format of a commercially produced report that had been publicly available.
 - Sofaer et al. used 16 focus groups that included people with similar health care coverage and hospital experience in the same group. In these groups first a general discussion of personal experience and then a review of a CAHPS report were used to identify important domains. Communication, responsiveness (e.g. responding to call buttons), and cleanliness were important to all participants regardless of background and the authors reported that participants viewed hospitals as responsible for the quality of services, in contrast with the author's prior experience with health plans, which were not held accountable.¹⁵⁸
 - One focus group study took advantage of this method to explore the decisionmaking process. Fasolo et al. conducted seven focus groups with 44 people in England. An open discussion of how a hospital would be selected for future care was followed by an exercise that involved sorting 16 indicators in order of importance and selecting the top three, and then selecting a hospital from among three on a mock public report. Each of these steps involved individual rankings followed by group discussion. They found that preferences for different indicators were influenced by new information and discussion, suggesting that values are not set.¹²³

Lab-Type Experiments

The two articles about lab-type experiments both examined the interrelationships among end-user skills, motivation, comprehension, and choice based on tests and questionnaires completed by the same 303 working age (18–64) adults.^{159,160} The participants were randomly assigned to receive different versions of actual and reformatted public reports and were asked complete comprehension questions and decision exercises, as well as measures of health literacy, numeracy, and patient activation, which was defined as taking an active role in managing one's own health and health care.

- The analysis presented in Peters et al.¹⁶⁰ concluded that formatting that reduces cognitive burden (ordered information, higher always better, and separation of types of information) increased the likelihood of choosing the higher-quality hospital and improved comprehension for people with lower levels of numeracy.
- Hibbard et al.¹⁵⁹ controlled for the variation in formatting, evaluated the impact of skills and activation on choices, and found that higher levels of activation had improved comprehension even with lower skill (numeracy and health literacy) levels, and higher activation increased willingness to trade other hospital characteristics for higher quality.

Table 3. Summary of evidence: public reporting on hospitals

Key Question 1: Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes, or patient outcomes)?

Key Question 2: What harms result from public reporting?

Key Question 3: Does public reporting lead to change in health care delivery structures or processes?

Key Question 4: Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

Key Question 5: What characteristics of public reporting increase its impact on quality of care?

Key Question 6: What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality

Author Year (QA)	Public Report	Study Overview	Key Question	Results (↑Improvement; ↓Worse; ↔No Difference)
Apolito 2008 ⁶⁴ (Good)	NYS CSRS	Compares management of patients with AMI complicated by cardiogenic shock using rates of cardiac catheterization and revascularization and in-hospital mortality in 11 NY State centers, where public reporting is present, to 12 non NY State centers where there is no public reporting to investigate potential negative influences of NYS CSRS. N=545 eligible patients in SHOCK registry (N=220 NY State; N=325 non NY State)	1	↓ NY State patients were more likely to die while in the hospital compared to propensity matched non NY State patients. ↔ but among those undergoing PCI/CABG, there was not a statistically significant relationship.
			2	↓ NY State patients were approximately half as likely as non NY State patients to undergo 3 of 4 cardiac procedures (angiography, PCI, or PCI and CABG). Odds ratios for CABG surgery alone were not statistically significant for NY State compared to non NY State patients. Among patients who were not revascularized (no PCI or CABG), NY State patients were 2.12 times more likely to die in hospital (p=0.01).
Baker 2002 ⁴² (Fair)	Cleveland Health Quality Choice (CHQC)	Examines temporal RAMR trends using in-hospital, 30-day, and early, post discharge mortality in Medicare patients between 1991 and 1997 in Northeastern Ohio hospitals for six medical conditions (AMI, CHF, gastrointestinal hemorrhage, COPD, pneumonia, and stroke)	1	↔ Overall: in hospital mortality declined, but early post discharge increased, resulting little impact on 30 mortality For six selected conditions In hospital mortality ↑4 of 6 decline in mortality Early Post Discharge ↓5 of 6 increase in mortality 30-day Mortality ↑ 2 of 6 decline in mortality CHF and COPD ↔ 3 of 6 no difference ↓1 of 6 increase in mortality for stroke

Table 3. Summary of evidence: public reporting on hospitals (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Baker 2003 ⁴³ (Fair)	Cleveland Health Quality Choice (CHQC)	Examines whether non Federal hospitals in Cleveland area participating in CHQC that were identified as mortality outliers were more likely to gain or lose market share between July 1991 and December 1997 compared to those with average mortality. Also examines whether hospitals with higher-than-expected mortality rates improved 30-day mortality more than hospitals with average mortality rates. N=30 Hospitals; N=17 Outliers	1	↔ Risk adjusted mortality did not significantly decline after reports for average or below average hospital. Only effect was one hospital had significant improvement after publication.
			4	↔ Market share did not significantly change for hospitals designated as outliers in terms of mortality.
Bridgewater 2007 (Good) ³⁴	Multiple Reports on named Surgeon and Hospital outcomes in UK	Examines changes in in-hospital mortality in Northwest England associated with coronary artery surgery and the number of very high risk patients undergoing coronary artery surgery in years before (April 1997-March 2001) and after publication (April 2001-March 2005) of cardiac surgery mortality data. N=25,730 patients	1	↑ Ratio of observed to expected mortality associated with coronary artery surgery decreased from 0.80 to 0.51 after public reporting.
			2	↑ Contrary finding to adverse selection, the number of high risk patients that underwent surgery increased after public reporting (14.1% vs. 16.8%) p<0.001.

Table 3. Summary of evidence: public reporting on hospitals (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Carey 2006 ³³ (Fair)	California Coronary Artery Bypass Graft Mortality Reporting Program	Assesses the impact of public reporting on changes in the incidence of PCI and CABG procedures and rates of in-hospital and 30-day mortality and readmission for repeat procedures in CA before and after public reporting. N=115 hospitals in both periods; Overall N~120 (6 stopped and 7 started performing at some point during study period)	1	↑ Observed to Expected mortality ratio declined after public reporting in all 4 procedures under (CABG, PCI, CABG+, Valve), but the effect was small (e.g. CABG mortality ORs were 1.17 pre vs. 0.97 post)--no test of significance
Caron 1999 ⁷⁶ (Poor)	Cleveland Health Quality Choice	Assesses whether hospitals in the Cleveland, Ohio area have responded to public concern about improving their cesarean section and VBAC rates. N=18 hospitals, and survey of quality management directors or personnel deemed appropriate by the director, obstetricians, or labor and delivery nurses.	3	↑15 of 18 hospitals indicated that they currently have an initiative in place to reduce their cesarean section rate. There was no significant correlation between organizational environment and predicted cesarean section rate.
Caron 2004 ⁴⁴ (Fair)	Cleveland Health Quality Choice (CHQC)	Assesses whether hospitals in the Greater Cleveland area that improved over time in one clinical area also improved in other areas across a 5 year time span. Uses non obstetric (AMI, CHF, and stroke LOS and mortality rates) and obstetric outcomes (total cesarean, primary cesarean, and vaginal birth after cesarean rates). N=27 hospitals for non obstetrics; N=20 hospitals for obstetrics.	1	↑ 9 outcomes all improved over the 5 year period (Mortality and LOS for AMI, CHF, Stroke, and caesarean, VBAC and total caesarean) ↑ Correlation suggest hospitals that improve in one area improve in others.

Table 3. Summary of evidence: public reporting on hospitals (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Clough 2002 ⁴¹ (Fair)	CHQC	Compares in-patient mortality rates from 1992-1995 in Cleveland area hospitals to hospitals in the rest of Ohio to determine whether the CHQC had an effect on inpatient mortality in Cleveland. N=30 hospitals in Cleveland	1	↔ after adjustments for differences in case mix, the rate of mortality decline in Cleveland (with reporting) did not differ from the rest of Ohio.
Cutler 2004 ³⁰ (Fair)	NYS CSRS	Examines CABG surgery cases and RAMR in NY State hospitals between 1991 and 1999 to determine whether the NYS CSRS affected where patients went for bypass surgery and whether it led to improvements in medical quality in hospitals identified as high or low mortality outliers.	1	↑ RAMRs at high-mortality hospitals dropped ~1.3% over 36 months. RAMRs at low-mortality hospitals rose slightly over 36 months.
			4	↑ In first year of being recognized as an outlier, high-mortality hospitals experienced reductions in CABG cases while in low-mortality hospitals CABG cases increased. After 12 months, growth and decline in CABG cases was not significant.
Dranove 2003 ⁶⁶ (Good)	NYS CSRS and PA CABG Guide	Analyzes patients in PA and NY State undergoing AMI and CABG procedures before and after the public release of information (1991 in NY State; 1993 in PA) to examine effects of public reporting in NY State and PA. Between 1987-94: N=1,770,452 AMI patients; N=967,882 CABG patients	2	↓Public reports led to selection by providers: Patients receiving CABG in States with reports had declining illness severity ↓Public reports increased sorting of patients with more seriously ill patients going to teaching hospitals These two results could explain increase in wait time as selection and sorting take time Increase in costs and adverse health outcomes in States with public reports.

Table 3. Summary of evidence: public reporting on hospitals (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Dranove 2008 ⁸⁶ (Good)	NYS CSRS	Assesses the effectiveness of the “news” that public reports provides to the market by analyzing hospital demand in 18 hospitals in the NYC metro area before (1989) and after public reporting (1990, 1991). N=23854 CABG patients from 1989-1991	4	<p>↑ Public reports have an effect on patient choice of hospital when they provide information that differs from prior beliefs, but this is not symmetrical</p> <p>↑ Hospitals with lower than expected rankings experience a statistically significant decrease in demand</p> <p>↔ Higher ranking hospitals: public reports have no significant effect on market share</p>
Elliott 2010 ⁵¹ (Good)	HCAHPS	Compares changes in patients’ experiences with inpatient care at American hospitals since public reporting of HCAHPS. Analyzes hospital scores based on when they began participating in public reporting (original vs newcomers) and how many beds they have (<100 beds vs. >100 beds). Also looks at change in hospitals that reported in both 2008 and 2009. N changes depending on group and year. Overall N=3863 Hospitals	1	<p>↔ Marginal increase between 2008 and 2009 in percent of positive responses on survey in 8 of 9 categories. None had decreases but all increases were 0.9% or less. Change in doctor communication was not significant.</p> <p>↑ Newcomers to public reporting outperformed hospitals originally participating in HCAHPS in 7 of 9 categories. 2 categories were not significant. More newcomers were smaller hospitals and smaller hospitals tend to perform better on CAHPS</p>
Evans 1997 ¹¹¹ (Fair)	PHC4: HER	Examines responses of PA hospitals between 1990 and 1992 to PHC4’s HER by analyzing changes in mortality, morbidity, length of stay, and charges. N=134 hospitals	1	↑ Mortality and Morbidity both had statistically significant declines after reporting in trend analyses that controlled for regression to the mean.
			6	<p>↑Hospitals that performed poorly at base line improved in mortality</p> <p>↔ Hospitals that performed poorly at base line had no improvement in morbidity</p> <p>↑Hospitals in competitive markets had more improvement in mortality</p> <p>↔ Financial position and competition had no impact on morbidity</p> <p>↓Hospitals in lower financial position had lower levels of improvement in mortality</p>

Table 3. Summary of evidence: public reporting on hospitals (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Foreman 1995 ⁸² (Poor)	Hospital Effective-ness Report (HER) Consumer Guide to Coronary Artery Bypass Graft Surgery (CABG Guide)	Uses two of PHC4's public reports (HER and CABG Consumer Guide) to examine whether PA hospitals that received high or low quality ratings in the first year of fully released data (1989 or 1990) experienced subsequent changes in patient admissions. N=156 Hospitals	4	↔ Identification of high and low quality hospitals in PA public reports did not lead to any significant change in patient growth in any of the 9 regions studied.
Friedberg 2009 ⁶⁷ (Good)	One of 10 Hospital-level performance measures reported by the Hospital Quality Alliance	Examines whether public reporting is associated with overdiagnosis of pneumonia, excessive antibiotic use, or inappropriate prioritization of patients with respiratory symptoms visiting EDs in the U.S. before and after public reporting (Jan 2004).	2	↔ No evidence that public reporting increased anti-biotic use or inappropriate ED diagnosis. Waiting times for patients with and without respiratory symptoms increased slightly after public reporting, but expected over prioritization of patients with respiratory symptoms not evident.
Ghali, 1997 ³⁹ (Fair)	NYS CSRS and Northern New England	Compares CABG surgery mortality trends during 1990, 1992 and 1994 in Massachusetts where there is no public reporting to the decreases in mortality in NY State and northern New England where there is public reporting and outcomes feedback programs, respectively. N=12 hospitals Massachusetts Isolated CABG Procedures: 1990 N=5395; 1992 N=5,818; 1994 N=5,915	1	↔ Adjusted mortality rates for CABG cases in Massachusetts where there is no public reporting fell from 1990-1994 ↔ Massachusetts experienced similar reductions in the percent of in-hospital mortality as northern New England where an outcomes feedback program was in place. ↑ New York, where public reporting was present, had slightly larger reductions in unadjusted in-hospital mortality than Massachusetts.

Table 3. Summary of evidence: public reporting on hospitals (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Guru 2006 ³⁸ (Fair)	Ontario Cardiac Reports	Evaluates differences in 30-day mortality rates for patients undergoing isolated CABG surgery at Ontario hospitals during a transition from no reporting to confidential reporting to public reporting of CABG surgery outcomes (Sept 1991-March 2002). N=9 Institutions (no report: N=12,691; confidential report: N=32,272; public report: N=22,730)	1	↓ 30-Day RAMR in Ontario dropped by 29% after confidential reporting, but there was no significant change after reporting was made public.
Hannan 1994 ²⁸ (Good)	NYS CSRS	Examines impact of CSRS on changes in RAMR over time by dividing participating hospitals and surgeons into three groups (high, middle, and low) based on RAMR prior to public reporting. Also analyzes hospitals and surgeons based on outlier status. N=30 Hospitals; N=95 Surgeons	1	↑ Compared to 1989 baseline outlier status, all outlier groups experienced improved RAMR over the following three years. Reduction in RAMR was most profound in hospitals with higher than expected rates in 1989.
			4	↔ CABG volume percentage by hospital groups based on mortality remained relatively stable between 1989-1992 while total overall volume increased.
Hannan 1994b ²⁹ (Good)	NYS CSRS	Assesses changes in the relationship between hospital RAMR and average patient severity of illness and actual, expected and risk-adjusted mortality rates, and volume among 30 NY State hospitals performing CABG surgery on 57,187 patients from 1989, when data were first publicly released, through 1992.	1	↑ Despite increases in expected mortality rates, actual and risk adjusted mortality rates fell overall during the study period. In addition, volume increased yearly.
Hannan 2003 ³⁵ (Good)	NYS CSRS; PA HC4; NJ Department of	Assessed in-hospital, 30-day, and risk adjusted in-hospital/30-day mortality,	1	↑ When compared to regions without public reports or similar QI efforts regions and States with public reports experienced lower RAMRs during the period of 1994-1999.

Table 3. Summary of evidence: public reporting on hospitals (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results
	Health and Senior Services Registry; CHQC; Northern New England Cardiovascular Study Group (not public)	changes in out-of-region CABG surgery in regions with quality improvement/public dissemination efforts with the rest of the country.	2	↔ No evidence of harm. Northern New England and New Jersey also experienced statistically significant decreases in the percent of patients going out of the region for CABG. Although not significant, OH and NY experienced slight increases while PA did not change. However there was a decrease in out of area surgeries for all regions from the pre to the post public reporting time period.
Hibbard 2003 ¹⁰ (Fair)	QualityCounts	Evaluates the impact of public reporting on quality improvement activities in obstetrics and cardiac care in Wisconsin hospitals by comparing QI activities in 24 hospitals with public reporting, and two groups of hospitals randomized to receive either private quality feedback reports (N=41) or no report (N=46). Total N=111 hospitals. Interviews were conducted with hospital CEOs, medical directors and/or quality improvement directors. (62% response rate).	3	<p>↑ Among hospitals identified as worse than expected in obstetrics, QualityCounts led to quality improvement activities in hospitals receiving public reporting more than 2x as much as hospitals with private reporting, which undertook QI activities slightly more than those with no reporting.</p> <p>↔ Public reporting was not associated with differences in cardiac QI activities among hospitals with worse-than-expected outcomes.</p> <p>↑ Hospitals participating in public reporting believed that public reporting would affect their image, with those with as expected and better-than-expected outcomes believing public reporting would enhance their hospital's image.</p> <p>↔ Similar beliefs among private and non reporting hospitals were not significant.</p>
Hibbard 2005 ⁴⁵ (Fair)	QualityCounts	Compares Wisconsin hospitals receiving public reporting, private reporting, and no reporting to assess hospitals' change in overall performance and clinical measures two years following the release of Wisconsin's QualityCounts report. N=111 hospitals (24 public reporting, 41 private reporting; 46 no reporting).	1	<p>↑ Differences between improvements and declines in obstetric performance after public reporting were greater in the public reporting group than in private reporting and non reporting hospitals with a third of public reporting hospitals making improvements.</p> <p>↑ Among hospitals with worse-than-expected baseline scores, public reporting hospitals improved more than other two groups.</p>

Table 3. Summary of evidence: public reporting on hospitals (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Hollenbeak 2008 ⁴⁹ (Good)	PA Hospital Effectiveness/ Performance Report	Compares associations between intensive public reporting and no reporting/limited reporting to in-hospital mortality in PA and other States with and without public reporting. N=168,104 Propensity-matched patient pairs	1	↑ During periods of intensive reporting, in-hospital mortality odds ratios for all 6 conditions studied were lower in PA than in States with limited or no public reporting.
Howard 2006 ⁸⁹ (Fair)	University Renal Research and Education Association semiannual reports on kidney transplant graph survival	Compares patient transplant registrations and live donor transplants at transplant centers in the United States over time (from Sept 1, 1999 to Oct 30, 2002) to assess the influence of URREA center-specific public reports. N=58,164 patients	4	↔ public reports had no effect on demand (choice) of transplant centers
Jha 2006 ³¹ (Good)	NYS CSRS	Examines whether NY State hospitals and surgeons identified as having high or low RAMR in one year of the CSRS predicts future performance. Also analyzes effects of hospital and surgeon performance on patient market share in the following year and whether surgeon performance is associated with likelihood of ceasing practice.	1	↑ Moderate correlation between top performing hospitals at baseline on CABG mortality and high performance in subsequent years.
			4	↑ Increase in demand for centers with better scores by younger patients and patients with college educations.

Table 3. Summary of evidence: public reporting on hospitals (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Jang 2010 ⁵² (Fair)	Not named, Presented on National Health Insurance Corporation website and in press	Assessed the impact of reporting performance information on the readmission rates, length of stay, change in cost, and patient selection of hip hemiarthroplasty in Korea from January 2006-April 2008 (n=22851 surgeries at 851 medical institutions).	1	↑ Public reporting in Korea on hip surgeries improved (decreased) length of stay by 10%, but when comparing high-volume hospitals after public reporting to pre reporting high-volume or low-volume hospitals, the results were not significant. Overall probability for readmission after public reporting was lower (OR+0.49) than before public reporting, although readmissions in sub-group analyses of high and low-volume institutions was not significant.
			2	There was not an associated change in cost for procedures.
			4	Patient selection of high-volume hospitals (serving as a proxy for higher quality) after public reporting was marginally insignificant (p=0.059).
Jang 2011 ⁷⁷ (Fair)	Not named, Presented on National Health Insurance Corporation website and in press	Assessed the effect of Repeated Public Releases for reducing adjusted cesarean section rates and to analyze the characteristics of responsive institutions to repeated public releases in Korean hospitals that provide cesarean sections (N=1194) from August 2004 to June 2007.	3	Repeated public reports were only mildly effective in decreasing the rates of cesarean section
Longo 1997 ⁴⁶ (Fair)	ShowMe Buyers Guide: Obstetrical Services	Examines the impact of an obstetrics consumer report in Missouri (1993 ShowMe Buyers Guide: Obstetrical Services) on hospital behavior during the year following dissemination. N=82 Hospitals (Response rate to telephone survey = 93%; 82 out of 88 hospitals)	1	↑ Improvement in ultrasound and cesarean ↔ No significant improvement in VBAC
			3	30-50% of facilities that did not offer services such as car seats and follow up began after the public report. Some, but now all facilities reported changing or planning to change policies.
			6	Facilities in communities with multiple facilities were more likely to say they were going to change policy.

Table 3. Summary of evidence: public reporting on hospitals (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Mennemeyer 1997 ⁸⁸ (Fair)	HCFA mortality report	Uses pre HCFA mortality report data (1983) as baseline to examine whether HCFA public reports led to changes in community hospital discharges in outlying hospitals (1 or more σ from mean) between 1984 and 1992. N=23,564 over 9 year period.	4	<p>↑Hospital discharges (used as measure of selection) declined in hospitals with higher mortality after reporting; however the effect was small: a hospital with double the expected mortality is predicted to have 46 few discharges a year.</p> <p>↓Another analysis found that media reporting of an untoward event had a much larger impact on discharges--a 9% reduction. This is based on a small number of incidents.</p>
Moscucci 2005 ³⁶ (Fair)	NYS CSRS	Compares in-hospital mortality among 11,374 patients in a multicenter PCI database in Michigan which has no public reporting to 69,048 patients in a Statewide New York PCI database where public reporting is present to determine the potential effect of public reporting on PCI case selection. N=34 NY State hospitals; 8 MI hospitals	1	<p>↔No difference in NY State vs. MI mortality when adjusted for comorbidities and volume</p> <p>↑Lower mortality in NY State with public reporting compared to MI for unadjusted and adjusted for age and gender.</p>
			2	<p>↓Difference in case mix in NY State vs. MI absent different levels of disease suggests New York is not treating higher risk patients.</p>
Mukamel, 1998 ⁸⁴ (Fair)	NYS CSRS	Examines whether NY State hospitals offering CABG surgery and surgeons with better RAMR in NYS CSRS experience increases in market shares and prices over time. N=30 Hospitals; N=114 Surgeons	4	<p>↑ Increases in RAMR on report led to a decrease in subsequent market share. In NYC change in market growth was not significantly associated with published RAMR, but published RAMR decreased growth in Upstate NY State by 8.8 percentage points.</p>

Table 3. Summary of evidence: public reporting on hospitals (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Omoigui 1996 ⁶⁵ (Poor)	NYS CSRS	Examines whether NY State's decrease in RAMR for CABG surgery was due to high-risk CABG surgery patients in NY State being referred out of State to the Cleveland Clinic in Cleveland, Ohio. N=9442 isolated CABG operations at the Cleveland Clinic between 1989 and 1993.	2	↓ increased mortality among NY State patients at Cleveland Clinic compared to patients from other locations and NY State patients in prior period suggests public reporting is increasing referral of high-risk patients out of NY State.
Peterson 1998 ³² (Good)	NYS CSRS	Analyzes the effects of NYS CSRS provider profiling on bypass surgery access and outcomes in elderly patients (Medicare) in NY State by examining data before and after public release in NY State to determine whether provider profiling increased the percentage of patients going out-of-State for bypass surgery, whether surgery following myocardial infarction (MI) changed, and whether bypass surgery outcomes improved more rapidly in NY State than in the rest of the nation between 1987 and 1992. N=39,396 NY State patients; N=662,675 non NY State patients	1	↑ Mortality rates fell significantly in NY State and faster than in the rest of the country post reporting.
			2	↔ No evidence of harm: percentage of NY State residents having surgery out of State declined, and elderly people in NY State were more, not less likely to receive bypass surgery.
Pope 2009 ⁹¹ (Fair)	America's Best Hospitals (Ranking in U.S. News and World Report	To estimate the impact of the ranking on hospital patient volume and revenues.	4	↑ Based on modeling, moving up one spot in this ranking is associated with a 0.7% increase in non emergency Medicare patient volume (p<0.05). Analysis using lagged variables confirms that the effect is not realized until sometime after release, suggesting the report provides new information to patients.

Table 3. Summary of evidence: public reporting on hospitals (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Romano 2004 ⁸⁵ (Good)	CHOP (CA) and CSRS (NY State)	Analyzes CHOP and NYS CSRS data from NY State and CA to determine whether hospitals identified as mortality outliers experienced volume changes after publication of CHOP and NYS CSRS.	4	In CA ↔ Low mortality and high mortality outliers experienced no significant changes in volume for AMI ↑ Slight increase in volume for low mortality outliers for lumbar discectomy Strongest effects among white patients and patients with HMO coverage In NY State ↑ Outliers experienced changes in CABG volume but for limited periods low mortality hospitals had increase in volume 1 month post publication high mortality hospitals had decrease in volume 2 months post publication Strongest among Medicare and white patients.
Romano, 2011 ³⁷ (Fair)	California CABG Mortality Reporting Program	Assessed impact of public reporting on hospital market share, hospital mortality, and patient selection for coronary artery bypass graft surgery in hospitals in California that perform CABG surgeries for three different CCMRP releases (2001: N=79 hospitals, 2003: N=70, 2005: N=77)	1	↔ There was no association between the release of the CCMRP reports and risk-adjusted hospital mortality for any of the groups.
			2	↔ After release of the CCMRP reports, high-mortality outlier hospitals tended to operate on less sick patients, as reflected by an adjusted reduction in expected mortality of 0.785% in absolute terms or 25% in relative terms (p=0.02). However this was attributable to reduction in risk factors and there was no difference in hospitals overall.
			4	↑ Hospitals labeled as low-mortality outliers experienced a statistically significant 8.9% relative increase in mean market share during the 6 months after publication of a report. Nonparticipating hospitals did not suffer a loss of market share.
Rosenthal 1997 ⁴⁰ (Good)	CHQC	Analyzes changes in hospital mortality rates associated with eight diagnoses (AMI, CHF, obstructive airway disease, gastrointestinal hemorrhage, pneumonia, stroke, CABG, and lower bowel resection) before and after publication of the CHQC in Northeast Ohio hospitals. N=30 Hospitals (N=101,060 consecutive eligible discharges)	1	↔ In 8 medical conditions combined together, there was no significant change in RAMR after public reporting. ↔ No significant change in RAMR after public reporting for 6 of 8 medical conditions. ↑ Public reporting associated with RAMR reductions over time in CHF and pneumonia. ↑ Risk of in-hospital death decreased after public reporting in 5 of 8 medical conditions.

Table 3. Summary of evidence: public reporting on hospitals (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Shabino 2006 ⁴⁷ (Poor)	Wisconsin CheckPoint	Reports changes in Wisconsin State hospital averages on various quality measures over a two year period since the introduction of public reporting in the State. N=115 December 2004; N=117 September 2006	1	<p>↑ All measures improved from Dec. 2004 (pre) to Sept. 2006 (post reporting). However some improvements were small (under 5 percentage points--no statistical test done, not listed below) Over 5 percentage point improvement ↑ AMI 1 of 6 ACEI/ARB Left Ventricular Smoking Counseling: 86% vs. 95%</p> <p>↑ CHF 2 of 4 Smoking Counseling: 64% vs. 86% Discharge instructions: 53% vs. 64%</p> <p>↑ Pneumonia 2 of 3 Pneumonia vaccine: 47% vs. 73% Smoking counseling: 61% vs. 83%</p>
Tu 2009 ¹¹⁶ (Fair)	AMI and CHF Process Measures for acute care hospital	Evaluates whether public release of cardiac quality data stimulated Ontario hospitals to improve performance on process of care indicators and mortality related to AMI and CHF by randomizing hospitals to receive either delayed feedback or early feedback of quality reports. N=81 hospitals (42 early feedback; 39 delayed)	1	<p>↔ Differences in AMI and CHF composite indicators between early and delayed feedback hospitals were not significant.</p> <p>↔ Of 8 exploratory sub-group categories, analysis found only 2 (STEMI 30-day mortality and CHF and LV dysfunction 1-year mortality) differences were significant and lower in early feedback hospitals than delayed feedback hospitals.</p>
Vladeck 1988 ⁸⁷ (Poor)	HCFA mortality report	Analyzes occupancy rates at NY State general acute care hospitals before and after release of HCFA mortality data. Splits hospitals into three groups based on mortality rate outlier status: Higher-than-expected (N=14), As-expected (N=47), and Lower-than-expected (N=9). Total N=70 Hospitals	4	<p>↔ Release of HCFA mortality data did not affect occupancy rates in NY State hospitals in any of the groups.</p>

Table 3. Summary of evidence: public reporting on hospitals (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results
Wang 2011 ⁸³ (Good)	PA CABG Guide	Examines the impact of CABG public reports on volume trends from 1998-2006 in PA n=114,039 patients n=59 hospitals (varies by year)	4	↔No statistically significant impact of the public report on hospital CABG volume over the study period. One year after being rated a high mortality hospital there was a significant drop in the volume of CABG cases of 15% on average due to a decrease in low severity cases, but the effect does not persist.
Werner 2010 ⁵⁰ (Good)	CMS Hospital Compare	Examines changes in hospital process performance on composite and individual measures in the first three years of Hospital Compare (2004 vs. 2006) and tests whether changes in process measures correlated to changes in hospital mortality rates, length of stay, and readmission rates. N=3476 acute care, non Federal U.S. hospitals	1	<p>↑ Mean performance score on composite measures for AMI, heart failure and pneumonia all improved from 2004 to 2006. All individual measures also improved.</p> <p>↑ 10 point improvement on performance scores were significantly related to reductions in mortality, length of stay and readmission rates for AMI, to reductions in readmission rates for heart failure and for length of stay in pneumonia.</p> <p>↑ Low ranking and low-middle ranking groups at baseline improved the most in all categories between 2004 and 2006.</p> <p>↑ Based on group rankings at baseline, a ten point change in performance predicted a decrease in AMI and pneumonia mortality in all but the highest performing hospitals. AMI length of stay was also reduced for all but the highest performers.</p> <p>↓ Based on same group rankings, a ten point increase in hospital performance was associated with longer length of stay for pneumonia.</p>
Wübker 2008 ⁹⁰ (Fair)	Klinikfuhrer Rhein-Ruhr (Clinic Guide), 74 hospitals in the Rhine-Ruhr	Assessed number of patients and market share before (2003-2005) and after public reporting (2005-2006) in 157 German hospitals in two regions, Rhine-Ruhr (study group) and Cologne-Bonn (control group)	4	Hospitals voluntarily publishing their quality data measured on the basis of case numbers and market shares are in stronger demand than those not publishing their quality data while competing with the publishing hospitals. The non publishing hospitals in the Rhine-Ruhr region lose relative case numbers and market shares to their publishing competitors. The publication of quality information results in hospitals with below average quality to be selected less often than hospitals with above-average quality

Notes: AHRQ = Agency for Healthcare Research and Quality; AMI = acute myocardial infarction; CA = California; CABG = coronary artery bypass graft surgery; CHF = congestive heart failure; CHQC = Cleveland Health Quality Choice; CMS = Centers for Medicare and Medicaid Services; COPD = chronic obstructive pulmonary disorder; CSRS = Cardiac Surgery Reporting System; ED = emergency department; HCAHPS = Consumer Assessment of Healthcare Providers and Systems Hospital version; HCFA = Health Care Finance Agency; HER = Hospital Effectiveness Report; MD = Maryland; MI = Michigan; NR = not reported; NS = not significant; NY = New York State; PA = Pennsylvania; PCI = percutaneous coronary intervention; RAMR = risk adjusted mortality rates; QI = quality improvement; U.S. = United States; VBAC = vaginal birth after cesarean

Individual Clinicians and Outpatient Clinics

This section reports on the identified studies of public reporting on individual clinicians and outpatient clinics. Outpatient clinics are practices included here primarily because only one study of fertility clinics was identified,⁹³ which was not enough information for a separate section. Fewer studies are available of public reporting about the quality of individual clinicians than about hospitals, health plans and long-term care. In part this is because public reporting of performance data at the individual level is controversial. The issues stem from both measurement concerns and different conceptualizations of health care, quality, and accountability. Accuracy of measurement and adequate risk adjustment are more difficult to obtain with the smaller number of cases available for individual clinicians as opposed to health plans, hospitals, or nursing homes that treat from hundreds to hundreds of thousands of patients per year. Approaches to health care that are anchored in teams and systems responses to assure safety are contrary to the idea that any one individual is solely responsible for outcomes, and individual providers resist public reporting about processes and outcomes they view as outside the scope of their control.

Studies of reporting on individual clinicians are dominated by those of the impact of the public reporting of mortality rates for cardiac surgeons in New York State. These data were collected to produce hospital public reports, but individual results were added to the NYS CSRS after a newspaper, *Newsday*, won a freedom of information lawsuit and obtained the individual data. Health plans, employers, and private entities have created public reports about individual physicians as well as medical groups, but these are less consistently available across the country and less studied. This may change in the near future as CMS adds individual physician performance data to its nationwide public reporting initiative and “Physician Compare” joins Medicare health plans, hospitals, nursing homes, home health care agencies, and dialysis facility versions of “Medicare Compare” now available via the CMS Web site.

We identified 12 quantitative and 20 qualitative studies that evaluated public reporting and addressed at least one of this review’s Key Questions.

Overview of Findings

Quality of Care (Key Question 1)

- Surgeon-specific mortality rates for CABG in New York State declined after rates were publicly reported (one study).²⁸

Harms (Key Question 2)

- Evidence about harms varied by the harm studied (three studies) with one finding that public reporting adversely affected access while two reporting that the expected negative impact on access was not supported by the data.
- Evidence of harm
 - Public reporting appeared to increase disparities between whites and blacks or Hispanics in the receipt of CABG for 9 years after public reporting began.⁶⁸
- No evidence of harm
 - High-risk patients were more likely to have high-quality surgeons, which is counter to the hypothesis that public reporting might cause adverse selection.⁶⁹
 - Few physicians reported leaving practice due to the impact of the public reports.³¹

Impact on Providers (Key Question 3)

- Surgeons who stopped performing CABG surgeries after surgeon-level data were made public were more likely to be poor performers (bottom quartile) (one study).³¹

Impact on Patients or Purchasers (Key Question 4)

- Results varied across studies (seven studies).
 - Three studies reported no effect of reporting on referral patterns, market share, or surgeon volume.^{28,31,92}
 - Three studies reported that market share or probability of selection increased for higher-quality clinicians or clinics after the data were publicly reported.^{84,93,94}
 - One study found that public reports led to decreases in volume for poor performing and unrated surgeons, but that there was no corresponding increase for high performing surgeons.⁸³

Public Report Characteristics (Key Question 5)

- Difference report characteristics were examined in two studies that identified variation in what makes reports useful and useable for patients.
 - The mode (email vs. mail) and the tone of messages used to inform patients about the availability of physician performance data affected whether patients accessed it or not (one study).¹¹⁰
 - Publicly reported data was still accurate and therefore likely to be useful to patients even when there was a substantial delay between data collection and when it was made available to the public (one study).³¹

Context (Key Question 6)

- Employment status/tenure, which the researchers suggested served as a proxy for age, affected the likelihood that people would access comparative information about physicians (one study).¹¹⁰
- The impact of public reports was affected by insurance coverage—when care was covered the public reports were more likely to influence selection of health care provider (in this a case fertility clinics) (one study).⁹³

Description of Quantitative Studies

We identified 12 quantitative studies about public reporting on individual providers. The studies were published between 1994 and 2011 and all were conducted in the United States. Ten of the 12 evaluated the impact of public reports about cardiac surgeons.^{28,31,68,69,83,84,92,94,161,162} The two studies about other services included ratings of fertility clinics⁹³ and individual physicians.¹¹⁰ Four of the studies about the impact of cardiac surgeon public reports also included outcomes at the hospital level.^{28,31,83,84} In these cases, the results have been separated and the hospital results are reported in the previous section while the results pertaining to individual clinicians are reported here.

The *populations* in most of the studies were patients, families, or payers who needed to select a health care provider. These included employees with health coverage, selecting physicians,¹¹⁰ and prospective patients selecting a fertility clinic⁹³ in the two noncardiac studies.

In the studies of the cardiac surgeons, the populations were the patients and/or referring physicians that selected surgeons for CABG.^{83,84,92,94} In two studies, the focus was on whether

public reports influenced the contracting decisions of Managed Care Organizations (MCOs),^{161,162} which function as patient representatives when they make contracting decisions which determine what surgeons are available to members. In one study with multiple analyses,³¹ patients and surgeons were the populations of interest for different hypotheses. In the case of studies that evaluated improvement in quality of care²⁸ or potential harms,^{68,69} the population was the cardiac surgeons who may change their practice in response to public reports.

The *interventions* were public reports of mortality data for cardiac surgeons in 10 of the 12 studies. Eight of the studies were about the NYS CSRS^{28,31,68,69,84,94,161,162} and two were about the Pennsylvania cardiac report, the Pennsylvania's Guide to Coronary Artery Bypass Graft Surgery.^{83,92}

The two studies not about cardiac surgeons included one study in which employees were referred to a Web site (Bridges to Excellence) maintained by a nonprofit organization that provided performance data about individual physicians.¹¹⁰ The other noncardiac public report was a Federally mandated report on success rates for assisted reproductive therapy (ART) provided by fertility clinics that is published by the Centers for Disease Control and Prevention.⁹³

As public reporting is about individual providers and is not pervasive, the *comparator* for studies of State reports on cardiac surgeons could be other States that did not produce these public reports. In one of two multi-group pretest post test studies, referral patterns to cardiac surgeons in Pennsylvania where there was public reporting were compared to those in Florida (no public reporting) for a time periods before and after reporting started in Pennsylvania.⁹² The other study of this type estimated the differences in use of several cardiac procedures by race for patients in New York State before and after public reporting and compared this to patients in other States without public reporting for the same periods of time.⁶⁸

However, most studies did not incorporate a comparison group that did not experience public reporting, rather they examined one group with public reporting and the difference in study designs were variations in the time periods included. Two studies used multiple years of data from the NYS CSRS and Medicare and were "time series post only" designs,^{31,84} in that they looked at trends in data after public reporting. Another included data that predates the public report and multiple periods after, making it a one group interrupted time series.²⁸ Four studies were "one group post only," including one study of patient volume and the Pennsylvania public report,⁸³ an assessment of a potential harm associated with New York State reporting,⁶⁹ and two studies of managed care organization contracting practices,^{161,162} all including only one data point after public reporting. Two studies were one group pretest-posttest designs with one data point before and after public reporting. The research about fertility clinics examined market share before and after public reporting, a one-group pretest-posttest study design.⁹³ The other study with this design was a study of the choice of cardiac surgeons.⁹⁴

The study of employee use of a Web site with physician performance data employed a randomized design. Employees were randomly assigned to receive information about physician ratings that differed in terms of form (email vs. mail) and tone (benefit vs. risk).¹¹⁰

See Appendix D for definitions of the study design terminology used in this report. The study design influenced the rating of the body of evidence but did not determine the quality assessment of individual studies. Confounding and similarity across compared groups or compared time periods were given more weight than other criteria (see Appendix G for the quality assessment for these studies and Appendix F for a description of the quality assessment criteria) when

assessing the quality of the individual studies. Of these 12 studies, six were assessed as good and six as fair.

The *outcomes* in the studies varied. The one study that assessed improvement in health care outcomes (Key Question 1) tracked risk adjusted mortality rates for surgeons as the *outcome*.²⁸ One study of potential harms (Key Question 2) estimated the likelihood that higher-risk patients have higher-quality surgeons for CABG.⁶⁹ The other study of harms compared percentages of patients undergoing the procedures by race across the time periods and States after adjusting for patient characteristics.⁶⁸ Another study³¹ examined patterns of surgeons discontinuing practice and their reasons for doing so as outcomes.

The most common outcome in these studies was selection of providers. In five studies the outcome was the selection of providers by patients (Key Question 4) which is defined as the probability of selection⁹⁴ or measured through market share^{31,84,93} or patient volume.^{28,83} One study took a slightly different approach and modeled the patient and referring physician possible surgeon choices defined by the regional market or surgeon affiliation with the hospital of admission.⁹² In two studies the outcome was selection of surgeons by MCOs for contracting^{161,162} and one of these¹⁶² also included interview responses by MCO executives to questions about the factors that influence their choices of surgeons when establishing contracts.

Two studies have outcomes that were not used in any other studies. In one study the outcome was an action that precedes the selection of the provider, in this case the use of a Web site with the physician ratings.¹¹⁰ Another study analyzed the relationship of surgeon quality at the time the data was collected to surgeon quality at the time it was made public (1 to 2 year delay). The ability of the earlier performance to predict future performance was used to determine if the data were likely to be valid in the time period they were most likely to be used by patients.³¹ This result is relevant to Key Question 5, as how old or current the report data are is a characteristic of the report (Key Question 5).³¹

Effectiveness by Outcome/Key Question: Detailed Analysis of Quantitative Studies

Table 4 at the end of this section provides an overview of each included quantitative study and a summary of the findings organized by the Key Question they address. The complete abstracted data for each study is in the Evidence Table in Appendix J.

Key Question 1: Quality of Health Care

Only one study of those identified addressed the impact of public reporting about individual providers on quality of care. Hannan et al. tracked risk adjusted mortality rates (RAMR) for surgeons and found that mortality declined after the NYS CSRS was made public. The RAMR declined 7.06 percent for high-mortality outliers but reductions were seen across all terciles defined by baseline mortality rates.²⁸

Key Question 2: Harms

Public reporting about individual providers was, and remains, controversial in part due to concerns that it may have unintended adverse effects, particularly that it may reduce access to care. Three studies addressed the potential for a negative impact on access differently.

Werner et al.⁶⁸ compared the percentages of white, black, and Hispanic patients that received CABG, percutaneous transluminal coronary angioplasty, and cardiac catheterization before and after the New York State CABG public report was available. They also compared the trends in

New York State to trends in other States for which discharge data were available that included race. Their findings identified increasing disparities with public reporting, counter to the assumption that public reporting may reduce disparities if availability of information helps to level of the playing field for diverse patient groups. They found that the disparity in the percentage of patients who received CABG by race increased in the periods after public reporting and that this disparity is greater in New York State than in 12 comparison States that had not released CABG public reports.

Use of other cardiac procedures did not increase to offset this difference. Nineteen percent fewer black and Hispanic patients than white patients had CABG after the public report and the disparity did not return to its pre public report level until 9 years after the first public report.

Glance et al. analyzed all CABG discharges for New York State in 1997 through 1999 (after public reporting of surgeon mortality rates) and found that high-risk patients were more likely to have had high-quality surgeons (the observed to expected mortality ratio declined by 0.034 points for a 10 percent increase in patient risk of death).⁶⁹ This counters the speculation that surgeons would avoid high-risk patients and by doing so improve their rating.

In one of several analyses of the NYS CSRS, the 31 physicians who discontinued performing CABG during the study period were identified and they were surveyed as to their reasons for leaving surgical practice. Two respondents out of 18 who completed survey said their decision was a reaction to pressure to reject high-risk patients; however 10 respondents said the CABG report had no influence on their decision.³¹

Key Question 3: Impact on Providers

A potential effect of public reporting is that poor performing providers may be encouraged to leave practice. A study that identified surgeons who stopped performing CABG after the NYS CSRS began reporting surgeon-specific mortality rates found that 10 percent of the bottom-quartile surgeons discontinued performing CABG compared with 5 percent in the top three quartiles.³¹

Key Question 4: Impact on Patients or Purchasers

The most frequently studied issue was whether public reports affected the selection of providers by patients or purchasers or others acting on behalf of patients. The results of analyses of selection in the research on public reporting about individual clinicians were not consistent across studies.

Three studies concluded that public reports have had no effect. Epstein⁹² studied the patterns of referrals to cardiac surgeons, an instance in which the referring physician is acting for the patient and potentially basing referrals to surgeons who are the subject of public reporting on the surgeon's report card scores. The study found that the public report publication did not influence CABG referral patterns based on analyses of models and patterns of referrals before and after public reporting in Pennsylvania, and compared these patterns to Florida, which did not have a public report. While there was a shift away from high-mortality surgeons and toward low-mortality surgeons in Pennsylvania after the report was released, a similar trend in Florida "cancels out" this change in a difference-in-difference analysis, suggesting it was a secular trend independent of public reporting. One explanation the author offered for this finding was that referring physicians already knew the relative performance of surgeons without the public report. In other studies, Jha and Epstein³¹ reported that the NYS CSRS had no significant impact on market share for surgeons and Hannan et al.²⁸ found no differences in surgeon volume in the first

4 years the NYS CSRS was available. In these studies market share and surgeon volume were used as measures of the numbers of patients selecting surgeons.

Two cardiac studies and one study of reproductive medicine clinics reported an effect that corresponded to the underlying theoretical model of public reporting: they found that information about quality led to an increase in selection of higher-quality providers. An evaluation of the early impact of NYS CSRS found that physicians with better outcomes had higher rates of growth in market share after public reporting.⁸⁴ In a later analyses of some of the same data, Mukamel et al. reported that lower quality (higher RAMR) lowered a surgeon's odds of being selected by 7 to 8 percent.⁹⁴ Additionally, once public report data were available, the importance of price and surgeon's years of experience on the decision declined. These researchers repeated their analysis with race as a variable and found that the disparity between white and black patients' selection of high-quality surgeons narrowed after the quality data was made public, which they interpreted as the public report helping to rectify a situation where white patients had more access to other sources of quality information. The public report did not affect the behavior of referring physicians who tended to select surgeons who practiced at the hospitals where they admitted patients across all time periods.

Higher birth rates were associated with larger market share after performance of clinics offering assisted reproductive therapies were made public, while birth rate was not significantly associated with market share in a period before public reporting, even after analyses that controlled for other sources of information.⁹³

Wang et al. authored the one study that reported mixed results for selection. They found that the Pennsylvania cardiac public report had a mixed effect on surgeons' volume. Reports led to a decrease in volume for unrated and poor performing surgeons, but the volume of high-performing surgeons did not increase and the researchers interpreted the results of modeling of matching between patients and surgeons as suggesting that poor performing and unrated surgeons were avoided due to public reporting.⁸³

Managed care organizations determine what surgeons are available to their enrollees. Two studies explored whether the NYS CSRS data on surgeon quality influenced contracting decisions. In the first study, interviews were combined with an analysis of provider lists to compare what MCOs say they do to their actual contracting patterns. While 60 percent of the plan representatives interviewed responded that quality was the most important consideration in selecting surgeons, analysis of actual contracting patterns showed weak and mixed effects. There was a statistically significant preference for high-volume and high-quality outlier surgeons, but there was no systematic selection based on RAMR or low-quality outlier status.¹⁶² Another analysis of the same contracting data¹⁶¹ modeled the likelihood of MCO-surgeon contract combinations and found that low volume status significantly reduced the likelihood of contracts (-35.3 percent in upstate New York and -13.6 percent downstate) while high-quality outlier status and excess RAMR only affected the probability of contracts in downstate New York. The authors concluded that regional and market differences are important in assessing the impact of public reporting.

Key Question 5: Public Report Characteristics

Quantitative analyses of the impact of specific characteristics of public reports were rarely identified for any of the health care setting included in this review. However, for this topic there were two studies that were unique in the issues they addressed.

One study evaluated use of a Web site with physician performance information provided by an employer to employees and retirees. Overall, 11.9 percent of the people given the information visited the site. Current employees who were randomly assigned to receive information about the site via email were 6.42 times more likely to register and use the site than those who received paper information by mail ($p < 0.001$). The difference in use by employees and retirees who received risk-focused compared with gain-focused was not statistically significant.¹¹⁰

In a study with multiple analyses related to the NYS CSRS, Jha and Epstein³¹ examined the impact of delay in release of data on relevance of report cards to potential users. They demonstrated that surgeons' performance in the year the data were collected was predictive of performance in the year it was released (2–3 year delay) and most likely to be used. Based on this they concluded that the information is therefore more likely to be used and still be useful to patients selecting surgeons despite the delay.

Key Question 6: Context

Two studies included some contextual feature, one focusing on a characteristic of the decisionmaker (employed vs. retired) and one focusing on a characteristic of the environment (whether insurance coverage was mandated). Retirees were more likely than employees to use a Web site with physician performance information, perhaps because this information was more important to older adults.¹¹⁰ Public reports had a greater impact on market share in States that mandated insurance coverage for ART, perhaps because the insurer directed beneficiaries to higher-quality providers or because with coverage people were less likely to trade quality for price.⁹³

Summary of Qualitative Studies

We identified 20 qualitative studies that focused on public reporting for individual physicians and one group practice. These studies were published between 1996 and 2011, and 15 were conducted in the United States, 2 in Taiwan,^{163,164} and 3 in England.¹⁶⁵⁻¹⁶⁷ Most of these studies were descriptive surveys including eight surveys of physicians^{139,141,164,167-171} and five surveys of patients.^{146,163,170,172,173} Other studies reported the themes from interviews,^{174,175} focus groups,^{165,176} and a 3-year program of focus groups, interviews, and observations.¹⁶⁶ Two studies used lab-type experiments in which people were asked to make a series of hypothetical choices between physicians based on public report ratings¹⁷⁷ and different formats of reports.¹⁷⁸

The results are briefly summarized below in chronological order by year of publication in order to allow the identification of changes in attitudes or trends over time.

Professionals. The surveys of providers clustered near the start of the Pennsylvania and NYS CSRS reporting on surgeons and documented physician concerns and generally negative perceptions of this public reporting.

- Schneider and Epstein surveyed a 50 percent random sample of all cardiologists and cardiac surgeons living in Pennsylvania in 1994 and asked their views on the Pennsylvania CAGB guide. Six-hundred ninety seven (64 percent) surgeons responded. Eighty-two percent of cardiologists and 100 percent of surgeons were aware of the guide; 63 percent of surgeons said they were less willing to operate on high-risk patients, and 59 percent of cardiologists reported it was harder to find a physician for their high-risk patients (1996).¹⁴¹

- A survey sent to all cardiologists (36 percent response rate) asked whether they discussed the NYS CSRS data on CABG with patients when referring them to surgeon (78 percent replied “no”). Responses to items about accuracy and format were generally critical (e.g., 33 percent replied that the report was not at all accurate, 37 percent said the report was very misleading, while 46 percent said “somewhat” misleading) (1997).¹³⁹
- In response to a survey fielded in 1996, 88 percent of 1,444 interventional cardiologists (28 percent response rate) said they would be somewhat or much less likely to treat high-risk patients if physician-level outcomes were publically reported (1999).¹⁶⁸
- All active cardiac surgeons were surveyed in New York State and 67 percent reported refusing treatment to at least one high-risk patient in the previous year. They also reported that their practice (30 percent) and the practice of their peers (37 percent) changed due to public reporting (1999).¹⁶⁹
- Narins et al. sent a mail survey to all interventional cardiologists included in a New York State public report about PCIs. Physician responses indicated that public reporting is perceived as influencing practice so that access to care is restricted: 83 percent agreed that patients who might benefit were not getting the procedure and 79 percent agreed or strongly agreed that knowing their data will be public had influenced their decisions about specific patients (2005).¹⁷⁰
- A survey explored the views of rank-and-file physicians about public reporting and financial incentives linked to quality measures.¹⁷¹ Five hundred fifty-six of 1,168 randomly selected general internists from the AMA master file practicing in one of 12 selected metro areas completed questionnaires (48 percent response rate). Thirty-two percent were in favor of releasing individual physician data and forty-two percent were in favor of releasing medical group data. Their reservations seemed to link to views that quality measures are not adequately adjusted for a) patients’ medical conditions (36 percent strongly agree, 52 percent somewhat agree) nor for b) patients’ socioeconomic status (38 percent strongly agree, 47 percent somewhat agree). Respondents also thought that measuring quality (to be used for public reports or financial incentives) will divert attention from important care that is not measured (22 percent strongly agree, 39 percent somewhat agree) and may lead physicians to avoid high-risk patients (40 percent strongly agree, 42 percent somewhat agree) (2007).
- The one provider survey with a different focus was a mail survey of 236 (29 percent response rate) Taiwanese health care providers that collected data on doctors’ preferences for public report content, format, and frequency. Respondents preferred reporting that was updated yearly, was risk adjusted, provided detailed scores, and labeled charts so ranges of value could be identified as good or bad (2010).¹⁶⁴
- A survey of cardiac surgeons in the United Kingdom was conducted in 2005 and repeated in 2009 in order to measure changes in attitudes toward public reporting of performance tables.¹⁶⁷ One hundred and nine out of 206 surgeons sent surveys responded (52.9 percent). The results documented that while many respondents still do not welcome public reporting of individual surgeon results (68.8 percent in 2005 and 43.3 percent in 2009), an increasing number believe the reporting improved standards (42.2 percent in 2005 and 64.9 percent in 2009, $p < 0.0001$) and increase patient confidence in their care (21 percent in 2005 and 39.6 percent in 2009, $p = 0.001$) (2011).

Patients. Patient reactions to public reporting was the subject of five studies that produced a range of results, potentially due to the fact that they surveyed very different populations.

- Schultz et al. conducted a phone survey of employees who had the opportunity to review a public report and select a “care system” group of practices. Forty-two percent of respondents with single coverage and 52 percent of respondents with family coverage recalled seeing the public report. Respondents found overall ratings most helpful and detailed ratings least helpful. Consumers who changed care systems were most likely to use the public report and found it useful while people happy with their current provider tended not to use the report (2001).¹⁷⁹
- A survey of outpatients at the University of Missouri Health Center asked for patient reactions to a report the medical center produced and distributed about its providers, and 59.9 percent said it was useful information but 30.2 percent thought it was hospital advertising. While few people were very or somewhat likely to change doctors or hospitals based on this data, more than half (21.9 very and 31.9 somewhat) were likely to use the information to decide where to have a procedure (2004).¹⁴⁶
- In response to a phone survey based on random digit dialing almost half (49.6 percent) of the adult respondents (20 years old or more) surveyed in Taiwan reported they had compared doctors based on quality of care and 76.7 percent said they would change physicians based on quality information if their physician’s score was low (2004).¹⁶³
- Patients likely to be looking for a primary care provider were provided access to web-based information about physicians and then asked about their physician choice and usefulness of the information. Seventeen percent visited the site (n=382) and of the 301 who completed the questionnaire, 51 percent said patient experience scores were the most important information and these respondents were more likely to pick a physician with high scores from the patient experience survey (2007).¹⁷²
- A survey of 467 people (66.8 percent response rate) conducted at outpatient clinics at a university medical center found that only 13 percent of respondents were aware of any Web sites on health care quality and only 2 percent reported the Web site was important in their choice of a provider. The most important factors in their choices were reputation and a trusted referral from another physician or family and friends (2011).¹⁷³

Interviews, focus groups, and studies that used multiple methods collected additional information on the perceptions and choices of physicians and patients.

- Marshall et al.¹⁶⁵ conducted 12 focus groups, four with patients, four with general practitioners, and four with clinical administrators in order to get their reaction to public reporting about general practice. Themes were similar across the groups with participants having an initial strong negative reaction to public reporting that became more positive over the course of the discussion. Patients felt “shopping around” was inappropriate for health care and were most concerned about location while providers and administrators worried that reports were politically motivated and that “good” practices would be swamped by new patients (2002).
- In a different study, Marshall et al.¹⁶⁶ used an action research-based approach and over 3 years conducted interviews, focus groups, observations, and presentations at four primary care organizations in order to develop an information source about primary care services. Participants included 104 members of the public, staff at 19 practices, and 4 managers. Their major findings were that the public wanted different information than

the staff; they viewed performance information as a supplement to information from other sources; they wanted narrative descriptions as well as numbers; they disliked league tables; and they were not confident about the source of quality information (2006).

- Barr and colleagues interviewed 56 physicians and during the interviews they presented scenarios that varied in terms of patient age and diagnosis in which patients asked questions about a referral based on information from a public report. They categorized physician responses into four major themes: (a) rely on existing physician-patient relationships; (b) acknowledge and consider patient perspectives; (c) take actions to follow up on patient concerns; and (d) provide their perspectives on quality reports, and also reported that physicians were concerned about the methodological rigor of reports (2008).¹⁷⁴
- In Massachusetts, researchers interviewed 72 leaders of physician group practices that provided primary care about their awareness and use of a new physician group report on patient experience. Seventeen percent were not aware of the report and 22 percent used the report to focus on low performers, while 61 percent reported instigating group-wide improvement activities based on the results. The most common QI activities concerned access (57 percent), communication with patients (48 percent), and customer service (45 percent) (2010).¹⁷⁵

Two lab-type experiments and one focus group study were used to determine patient preferences for different types of information and different formats.

- In an experiment that offered participants (n=301 adult volunteers) choices between two physicians and provided rating of technical and interpersonal quality, 66 percent of people selected the physician with higher technical quality three or more out of five possible times, leading the authors to conclude that technical quality is more important to potential patients (2005).¹⁷⁷
- Stein et al. conducted four focus groups in Pennsylvania with mental health care consumers who were Medicaid beneficiaries. Participants said they wanted information about providers, but specific items they valued such as flexibility in scheduling, ability to talk to the doctor, and shared decisionmaking were not the items available from public reports (2009).¹⁷⁶
- Donelan and colleagues¹⁷⁸ recruited 337 adults to review four different versions of records on CABG outcomes for fictional, individual surgeons. The versions varied in both format (text, charts, and graphical indicators) and the data presented. Participants were asked to select the surgeon with the lowest mortality rate and to rate different versions in terms of their usefulness. Participants viewed the type of data as important with 40 percent saying it was “absolutely essential” and 42 percent “very important.” The ability to correctly select the surgeon varied from 66 percent based on a version that included graphical indicators to 16 percent when using a text-table. However, the text-table that resulted in the lowest percentage of correct identifications of the lowest mortality surgeon was the one most frequently cited as the most useful (selected by 37 percent of participants) (2011).

Additional information extracted from these qualitative studies is included in the Evidence Tables in Appendix K.

Table 4. Summary of evidence: quality of individual clinicians and outpatient clinics

Key Question 1: Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes, or patient outcomes)?

Key Question 2: What harms result from public reporting?

Key Question 3: Does public reporting lead to change in health care delivery structures or processes?

Key Question 4: Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

Key Question 5: What characteristics of public reporting increase its impact on quality of care?

Key Question 6: What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Author Year (QA)	Public Report	Study Overview	Key Question	Results (↑Improvement; ↓Worse; ↔No Difference)
Outpatient Clinic				
Bundorf 2009 ⁹³ (Good)	Federally Mandated Report on success rates for fertility clinics maintain by the CDC.	Examines the effect of public reports on choice of fertility clinics before (1996- 98) and after (1998-2003) public release. N=411 fertility clinics.	4	↑The differential effect of birth rates post vs. pre public reports is positive and statistically significant, indicating that measured performance had larger, positive effect on choice when the information was publicly disseminated to consumers.
			6	↑The impact of public reporting was greater in States that mandate insurance coverage for ART than in States that do not.
Individual Clinicians				
Epstein 2010 ⁹² (Fair)	PA Cardiac	Examines the effect of public report on referral patterns to Cardiac surgeons in PA vs. FL before (2001-2002) and after (2002-2003) publication of the CABG public report in PA. n=23655 for PA and 38164 for FL	4	↔There was a marginal difference in the probability of selection of lower mortality surgeons in PA vs. FL in pre vs. post public reporting in the direction expected, but it was not significant.
Glance 2008 ⁶⁹ (Fair)	NYS CABG Surgery Reporting System	Investigates the potential negative effect of public reports on access for high- risk patients vs. low-risk patients between 1997 and 1999 in NYS. n=51750 CABG surgery discharges	2	↑For every 10% increase in patient risk of mortality, the surgeon's Observed to Expected mortality ratio (predictor of quality) is significantly reduced by 0.034 points. ↑After adjusting for race and other hospital characteristics, this relationship is weakened by still significant. No evidence that high quality surgeons are avoiding high-risk patients.

Table 4. Summary of evidence: Quality of individual clinicians and outpatient clinics (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results (↑Improvement; ↓Worse; ↔No Difference)
Hannan 1994 ²⁸ (Good)	NYS CSRS	Examines the outcomes and volume of CABG patients before (1989-1990) and after (1991-1992) public report among providers in NYS. N=32 providers in lower tercile, 32 in middle tercile, and 31 in lower tercile	1	↑All tercile groups experienced reductions in their RAMR, with the highest RAMR in 1989 being reduced from 5.90 to 3.26 in 1992. ↓Among outliers, only those who were the lowest outliers in 1989 (with an RAMR of 0.74) experienced a RAMR rise in 1992 (1.09). ↑The largest reduction in RAMR was among the high mortality outlying surgeons with 7.06% decrease between 1989-1990 and 1992.
			4	↔ No effect on surgeon volume
Jha 2006 ³¹ (Good)	NYS CSRS	Examines the effect of public reports on whether surgeons continue to practice and market share post release of the public report Includes all cardiac surgeons practicing in NYS from 1989 to 2000 (years data was collected; 1989 data was reported in 1991).	2	↔ 2 of 18 surgeons surveyed (of 31 surgeons who discontinued practice during the study period) reported they left due to pressure to reject high-risk patients; however 10 of the 18 who responded to a survey said the CABG report had no influence on their decision to leave practice; 2 said minimal impact; and 6 moderate or more.
			3	↑ 20% of bottom-quartile surgeons stopped performing CABG during the study period compared to 5% in the top three quartiles.
			4	↔ Performance had no significant impact on market share for surgeons.
			5	↑Surgeons that have low RAMR when data are collected continue to perform well when data are released 2-3 years later. This suggests data are still useful despite the delay from data collection to public reporting.
Mukamel 1998 ⁸⁴ (Fair)	New York State CSRS	Hypothesizes that high-quality surgeons experience increase in market share and price in NYS for 1990, 1991, and 1992 due to public reporting. n=74 surgeons with quality reporting and Medicare claims in study years	4	↓The decline in market share growth rates for individual physicians due to an increase of 1 percentage point in mortality rate was 7 percentage points. For the median surgeon with 60 surgeries this would be a loss of 4.2 patients. ↔There was no significant effect of published RAMR on price changes although this was expected (higher quality physicians raise prices).

Table 4. Summary of evidence: Quality of individual clinicians and outpatient clinics (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results (↑Improvement; ↓Worse; ↔No Difference)
Mukamel 2000 ¹⁶² (Fair)	NYS CSRS	Determines the effect of surgeons' quality report on HMO, PPO, or IPA contracting in NYS by examining what they say and what they do in terms of using quality data in contracting with surgeons. N=31 of 53 (59% response rate) of MCOs in NYS completed interviews Data from 42 of 53 (78%) on contracting with surgeons	4	What MCOs say about contracting with surgeons: ↑60% say quality is the most important consideration ↑64% have examined the NYS CSRS What MCOs do in contracting: ↑Prefer high volume and high-quality outlier surgeons ↓Do not choose based on low-quality outliers or RAMR ↔No systematic bias for either higher or lower quality surgeons
Mukamel 2002 ¹⁶¹ (Fair)	NYS CSRS	Evaluates the association between contracted by MCOs and the quality of surgeons n=42 of 53 MCOs in NYS (78%) 1,709 potential combinations of MCOs and surgeons (1,588 after dropping MCOs that contract with all surgeons)	4	↑Low volume status significantly decreases the probability of contracts (-35.3% upstate and -13.6% downstate; p=0.00) ↑High-quality outlier status results in a significantly higher probability of a contract but only in downstate NY (27.1%; p=0.00) ↑ One standard deviation increase in excess RAMR results in a significant decrease in probability of a contract in Downstate, but not Upstate NY (-6.1% to -9.1% for different types of MCOs)
Mukamel 2004 ⁹⁴ (Good)	NYS CSRS	Evaluates the effect of public reports on cardiac surgeons by comparing selection before (1991) and after (1992) public release in NYS. N=13,078 Medicare Fee for Service enrollees over 65 in NYS	4	↑Higher RAMR (i.e. lower quality) significantly lowers the surgeon's odds of being selected by about 7 to 8 percent. ↑Public report information increases the probability Black patients will select a high quality surgeon and reduced the magnitude of the difference between Whites and Blacks. ↑The impact of price and surgeon's years of experience decline once the public reports are available. ↔Public report information does not appear to change referring physicians' propensity to refer to surgeons at the same hospital where they admit.

Table 4. Summary of evidence: Quality of individual clinicians and outpatient clinics (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results (↑Improvement; ↓Worse; ↔No Difference)
Ranganathan 2009 ¹¹⁰ (Fair)	Bridges to Excellence (created by a nonprofit; provides physician-level performance data)	Evaluates the effect of the mode (internet vs. mail) and the tone of the invitation to view a public report on physician performance on its usage and understanding in active and retired employees of GE, MA. N=3000 for mail, 2111 for email and 1500 retired (mail)	5	Website received 789 hits (11.9% hit rate) ↑Odds of registration was 6.42 times higher in email vs mail for active employees p<0.001 ↔There was a slight increase of odds of response to positive tone vs negative tone messages but it was not significant.
			6	↑Retired employees had 63% higher odds of registration than active employees p<0.001.
Wang 2011 ⁸³ (Good)	PA Cardiac	Examines the impact of CABG public reports on volume trends from 1998-2006 in PA n=114,039	4	↑Public reporting led to significant decrease in volume poor (4.762 percentage points) performing surgeons. ↑The volume of the high performing surgeons increases significantly for low-severity cases ↔The volume of the high performing surgeons does not increase significantly for high-severity cases. ↔The volume of unrated cases shows an increase of 21.9 percentage points but it is not statistically significant.
Werner 2005 ⁶⁸ (Good)	New York CABG	Examines the effect of public reports on racial disparities in receipt of CABG surgery before (1988-1991) and after (1992-1995) public reporting. n=310,412 NYS patients and 618,139 patients in other States	2	↓The disparity in CABG surgery between white and black patients in NYS is 2.0 percentage points higher than other States (p=0.006) ↓The disparity in CABG surgery between White and Hispanic patients in NYS is 3.4 percentage points higher than other States (p=0.01) ↔The difference between White and Black and/or Hispanics in percentage of patients with AMI undergoing cardiac catheterization and PTCA in NYS is 0.4 percentage points lower than other States, but the results are not statistically significant. ↓These results suggest public reporting contributes to worsening of racial disparities in care.

Notes: AMI = acute myocardial infarction; ART = assisted reproductive therapy; CABG = coronary artery bypass graft; CDC = Centers for Disease Control; CSRS = Cardiac Surgery Reporting System; FL = Florida; HMO = Health Maintenance Organization; MCO = managed care organization; PA = Pennsylvania; PPO = preferred provider organization; PTCA = percutaneous transluminal coronary angioplasty; RAMR = risk-adjusted mortality rates; NYS = New York State

Health Plans

Rating and reporting of health plans is linked to the growth of managed care in both the private health insurance market and public health insurance programs. Also important have been the active roles employers and employer purchaser coalitions began to play as agents for their employees in the late 1980s and early 1990s. Businesses went from simple provision of health insurance to active involvement in creating and offering more options and models of health insurance; advancing a quality improvement agenda in health care; and selecting, or in some cases creating, the health plans available to employees. These changes were motivated both by the desire to control the rising costs of health care coverage and to assure a healthy and more productive workforce. At the same time public programs such as Medicaid and Medicare began offering and sometimes requiring enrollment in managed care plans.

Health plans are selected when people start a job or become eligible for a public insurance program. First health plans must be included among the options offered by employers and public programs. Then health plans must appeal to employees and beneficiaries who select from among the offered options. People select health plans for ongoing and future health care needs, and can change plans once yearly during open enrollment periods or if their status changes (e.g., spouse loses coverage from another employer, newborn is added). Health plans may try to increase their market share by offering different combinations of quality of information, benefits, premium structures, and more or less restricted access to providers (physicians, specialists, hospitals, prescription drugs, etc.).

We identified 24 quantitative studies and 32 (reported in 35 articles) qualitative studies lab-type experiments about public reporting of quality information related to health plans that met our inclusion criteria and fit our analytic model. Information abstracted from the articles is included in the Evidence Tables in Appendix L and Appendix M.

Overview of Findings

Quality of Care (Key Question 1)

- Quality measures improved for almost all HEDIS and CAHPS domains studied after public reporting (five studies).⁵³⁻⁵⁷
- During the time period in which some plans allowed their HEDIS measures to be publicly reported while others submitted data but did not allow it to be released, plans that voluntarily released quality data had higher-quality scores^{54,55} (two studies) even after controlling for differences in plans (one study).⁵⁵

Harms (Key Question 2)

- Potential harms were examined in two of the included studies. The potential harms were crowding out which refers to declining quality of care in areas not measured due to a focus on the aspects of care that are measured⁷⁰ and withdrawal of high-quality plans from the market.⁷¹ Neither study found evidence of these harms.

Impact on Providers (Key Question 3)

- No studies were identified.

Impact on Patients or Purchasers (Key Question 4)

- Publicly reported or widely distributed quality information had little impact on the selection of health plans by individuals based on the results of studies of different populations.
 - Quality information had no consistent or significant effect on the health plan choices made by employees of private firms (five studies).^{95-98,113}
 - Four studies of public employees had mixed findings.^{23,99-101}
 - Two reported limited or no impact on the choice of health plan made by State employees in Minnesota⁹⁹ and Federal employees in 86 counties²³
 - Two studies of Federal employees reported that public reports lead to an increase in the use of quality information¹⁰¹ and switching out of plans with low scores.¹⁰⁰
 - In studies that used random assignment to distribute quality rating materials to some beneficiaries of public insurance programs and not others, the quality information had no impact on plan selection (three studies).¹⁰²⁻¹⁰⁴
- Employers were more likely to select health plans to offer to employees that had higher HEDIS and CAHPS ratings (one study).¹⁰⁵

Public Report Characteristics (Key Question 5)

- No studies were identified.

Context (Key Question 6)

- Contextual factors were not frequently studied in research on health plans, limiting what conclusions can be drawn from the literature.
 - The only study of environmental characteristics found quality information was more likely to be used in plan choice in markets that included plans of varying quality.¹¹²
 - Some variation in the importance of quality information to different subgroups of consumers was identified (two studies).^{113,114}
 - Plans that started with lower ratings were more likely to improve their performance after public reporting (two studies).^{53,57}

Description of Quantitative Studies

The 24 quantitative studies of public reporting and health plans are described and synthesized below. These studies were published between 1998 and 2010 and except for one about health plans in the Netherlands,⁵⁷ all were conducted in the United States. The public reports that are the subject of study are all versions of HEDIS or CAHPS, or similar items or domains that predate widespread use of HEDIS and CAHPS. (More detail on HEDIS and CAHPS is provided in the intervention description below and in Appendix E).

The *populations* in the included studies were most frequently employees or people eligible for public insurance programs. Ten studies examined health plan choices of employees of corporations, the U.S. Federal Government, one State government, and one university.^{23,95-98,101,113,180-182} Three studies were of people eligible for Medicaid,^{102,103,183} one was about parents selecting a State plan for children,¹¹⁴ and two were about Medicare enrollees.^{104,112} One study examined how employers selected plans to offer their employees.¹⁰⁵ In the remaining studies the populations were the health plans and the focus was on their responses to public reporting.^{53-57,70,71}

The public reporting *intervention* in eight studies about choice of health plans was public reports or plan rating sheets produced by employers for use by their employees.^{96-101,113,181} In the other studies about choice of plans the public report was HEDIS,⁹⁵ CAHPS,^{102-104,183} or both.^{23,105,112,114} The studies of health plan behavior also examined the effect of HEDIS,^{53-55,70,71} CAHPS,⁵⁷ or both.¹⁸⁴ HEDIS is a set of clinically oriented measures developed by the National Council on Quality Assurance (NCQA) that included measures related to screening, prevention, care coordination, and treatment of specific conditions. HEDIS has been in use for over 20 years and is currently used by over 90 percent of managed care plans and an increasing number of preferred provider organizations (PPOs). It is required in 34 States for reporting on private and public health plans. CAHPS is a measure of member experience initially developed by the Federal government for health plans in the United States. Several versions have been created and used in different health care settings and other countries.⁵⁷

The *comparator* in the majority of health plan studies was either (a) time period during which the report was not available or (b) groups that did not have the publicly reported information. However some studies did not have a true comparator as they measured only change over time after public reporting began.

HEDIS, CAHPS, and custom reports on the quality of health plans have been distributed and published in phases over time. This has allowed for use of a variety of study designs (see Appendix D for definitions of the study design terminology used in this report). The comparator and study design influence but do not alone determine the quality assessments of articles included in this review. Potential confounding as well as the strength of the comparison (similarity across compared groups or compared time periods) was given more weight than other criteria. (See Appendix G for the quality assessment for these studies and Appendix F for a description of the quality assessment criteria). Seven studies were rated as good,^{23,55,71,96,98,102,103} 13 as fair,^{53,54,70,95,96,99-101,104,105,112-114} and 4 were poor according to these criteria.^{56,57,97,183}

Three studies of health plans used random assignment¹⁰²⁻¹⁰⁴ which is rare in studies of public reporting. These studies all examined the impact of CAHPS on plan selection by randomly assigning Medicaid beneficiaries to receive or not receive CAHPS information in their enrollment materials and then compared plan selection across the groups. In one case the random assignments were not recorded by the company responsible for the mailing and the investigators had to ask survey respondents to self-report whether they had received the CAHPS report in their materials.¹⁰⁴ Studies that included data only post public reporting were most common, with two “post only” time series,^{53,56} five studies that reported data for one group post public reporting,^{23,71,95,96,105} and six studies that included a comparison group.^{54,57,97,98,114,183} Studies that included data collected prior to public reporting included one study that interviewed Medicare beneficiaries before various versions of plan information were mailed and compared their plan selections to beneficiaries who received the different mailings;¹¹² three studies that compared different groups before and after public reporting;^{55,70,99} and four studies that analyzed data from one group of subjects pre and post reporting.^{100,101,113,181}

The most common *outcomes* in these studies (17 out of 24) were the selection of health plans by employees, people eligible for public insurance programs, or employers (Key Question 4).^{23,95-105,112-114,181,183} This selection outcome was operationalized in several ways including the likelihood of selecting a plan conditional on its quality rating, the probability of switching plans, or the retention of members by plans. The outcomes of studies that analyzed the changes in health plan performance in response to public reporting were changes in the quality of care provided by health plans (Key Question 1).^{53,54,56,57} Two studies tested potential harms (Key

Question 2): in one the harm was that plans would focus on what was measured in HEDIS and quality would decline on unmeasured care;⁷⁰ and in the other it was proposed that plans with high scores would withdraw from the Medicare market because providing high-quality care is too costly.⁷¹ None of these studies of health plans and public reporting examined other changes in health plan behavior (Key Question 3) or the impact of characteristics of the public report (Key Question 5). Six out of the 24 studies specifically addressed contextual factors (Key Question 6) in addition to other outcomes, including one study that examined the relationship between change in quality and the varying levels of quality of health plans available in the market¹¹² and five studies that reported differences by the characteristics of the decisionmaker.^{53,56,57,113,114}

Effectiveness by Outcome/Key Question: Detailed Analysis of Quantitative Studies

Table 5 at the end of this section provides an overview of each included empirical study and a summary of the key findings. The complete abstracted data for each study is in the Evidence Tables in Appendix L.

Key Question 1. Quality of Health Care

Of the five studies that examined health care outcomes for health plans, three reported the impact of public reporting on HEDIS measures. Lied and Sheingold⁵³ found that all four reported HEDIS measures (adult access to prevention, beta blockers following a heart attack, breast cancer screening, and eye exams for people with diabetes) improved significantly from 1996 to 1998. Bardenheier et al.⁵⁴ reported that childhood immunization rates improved (from 65.7 percent in 1999 to 67.9 percent in 2002) and plans that publicly reported their rates had significantly better rates than those who did not after controlling for several factors including enrollment size and minority status of enrollees. Jung⁵⁵ used health maintenance organizations (HMOs) that did not publicly release their HEDIS data as a comparison group for those who did. After controlling for differences among the plans she concluded that public reporting led to improvements in the composite quality score from 1997 to 2000 and that this improvement occurred in three of four domains (chronic illness, maternity, and childhood immunizations, but not in screening tests). Bost⁵⁶ authored the one study identified that examined changes in both HEDIS and CAHPS data. He found that plans that released their data for 3 years in a row (1997–1999) had significant improvements in three of eight HEDIS measures (adolescent immunization, breast cancer screening, and beta-blocker treatment) and seven out of ten CAHPS domains. Reporting plans performed better than those plans that did not report or started releasing their HEDIS data in 1998. The only non United States study followed scores derived from CAHPS for 3 years after they were released publicly for health plans in The Netherlands.⁵⁷ The study found improvement in four of seven quality aspects. The Dutch government also identified areas in need of improvement among the aspects of quality and publicized this information. However this added attention by the government and the public did not influence where health plan improvement actually occurred.

Key Question 2. Harms

Two studies investigated potential harms due to public reporting about health plans. Pham et al.⁷¹ tested the claim that plans that perform well on HEDIS would be forced to withdraw from Medicare because high quality care cannot be sustained under Medicare payment policy. Results

that included adjustment for several confounders found that withdrawal was five times higher among plans with low scores (20.5 percent vs. 4.5 percent) as opposed to those with high scores on six HEDIS indicators, counter to the expectation related to this proposed harm.⁷¹ In a larger study of the impact of policy on breast cancer screening, Habermann et al.⁷⁰ explored another potential harm by comparing the stage of cancer at diagnosis among women age 65-69 for whom the rates of screening were reported in HEDIS with that for women age 70-75 who were not included in the HEDIS measure. The premise the researchers tested was that health plans will focus their efforts on the activities that are measured and allow quality to deteriorate in areas that are not measured and publicly reported, or crowded out. The finding that the stage at diagnosis did not differ across the age groups suggests quality of care on the unreported activity (screening for women age 70-75) is not crowded out by focus on the reported measure.

Key Question 3. Impact on Providers

We did not identify any empirical studies that examined the impact of public reports on the intermediate outcome of health plan behaviors.

Key Question 4. Impact on Patients or Purchasers

The bulk of the evidence about public reporting and health plans focused on how public reporting affects the selection of plans by employees, people eligible for public insurance programs, and employers planning to offer plans to their employees.

Five studies analyzed the health plan choices of employees in private companies and universities. One study of university employees found that the quality of information had little or inconsistent effects on plan selection.¹¹³ Chernew and Scanlon,⁹⁵ in a study of the choices for single coverage at one large firm, concluded that the information on six out of eight HEDIS measures distributed to employees had no effect on choices during the 1995 enrollment period. A superior rating on the Medical Treatment domain increased selection but only in one of four models and a superior rating on satisfaction was actually related to decreased selection. A similar study of choices for family coverage made by employees of one company⁹⁶ found no strong response to HEDIS-based ratings. A third study of a single company was not able to model the impact of specific measures but identified that plans with below average ratings were less likely to be selected, while superior ratings did not increase the likelihood a plan would be selected.¹⁸¹ Abraham et al.⁹⁷ analyzed information from 16 firms and did not find a link between quality information and employees switching plans. Beaulieu examined the choices of Harvard University and found a small, significant effect with a 1-unit increase in quality resulting in a 10 percent increase in the odds of switching plans.¹¹³

One study evaluated the health plan choices in two different health care purchasing markets. This study⁹⁸ found that despite markedly different markets (Denver, CO and St. Louis, MO) the responses to the report cards were almost the same. Exposure and helpfulness of report cards were limited and related more to employee preferences for the type of information than to their health care needs.

Four studies of State and Federal employees and retirees conducted during the same time periods had mixed results. In a study of Minnesota State employees in 1995, the choices of employees at locations who received a public report on available health plans were compared to those at locations that did not and the reports were found to have limited impact on health plan choice.⁹⁹ Three studies involved Federal employees or retirees. Wedig¹⁰⁰ reported the odds that new hires use quality information in their choice increased 57 percent in 1996 when the public

report was distributed compared with the year before. In another study of the distribution of satisfaction information to Federal employees during open enrollment, retention of health plan members declined compared with prior periods in which satisfaction materials were not distributed, suggesting the information inspired employees to drop plans.¹⁰¹ Jin and Sorenson²³ analyzed the choices of Federal retirees in 86 counties with multiple plan choices and estimated that 99.3 percent of all choices would have been the same, but in the case where employees did change plans the information was important.

The six studies of plan choices in Medicaid and Medicare programs similarly found no or limited impact of public reports on choice of plans. Three of these studies used random assignment to distribute the quality reporting materials and create control and intervention groups. Farley et al. conducted studies in New Jersey¹⁰² and Iowa¹⁰³ in which the intervention groups received Medicaid enrollment materials that contained CAHPS information while the controls received standard enrollment materials. Enrollment data was combined with phone interviews to assess the impact of the CAHPS report. In New Jersey half of the people who were mailed the CAHPS data reported receiving it and there was no difference in HMO selection across the groups. In Iowa the difference in the odds of switching or staying with the assigned plan were the same in the CAHPS and the control group. Furthermore, switching from a low-rated HMO to a higher rated HMO was the same in the two groups, suggesting this choice is based on information from another source. McCormack used a similar design to test the impact of quality information on Medicare beneficiaries.¹⁰⁴ Medicare beneficiaries in 1999 were randomly assigned to receive different versions of program information, one of which contacted a CAHPS report. The different information did not have an impact on switching health plans although it did increase the confidence of experienced beneficiaries in their choice.

Women newly eligible for Medicaid in Kansas were also sent materials with and without CAHPS reports in a study by Fox et al.¹⁸³ The distribution of the materials was not tracked so they had to depend on survey self-reports of respondents as to whether they received the CAHPS materials or not. Those who reported receiving the report said it made it easier to judge plans and they were less likely to be most influenced by a doctor or nurse in their choice. Lui et al. studied the impact of HEDIS and CAHPS on the choices made by parents enrolling their children in a State insurance program in New York State.¹¹⁴ They found that a 1-unit increase in the CAHPS score resulted in a 2.5 percentage point increase in the probability of plan selection while the HEDIS scores had not impact on choices. Dafny and Dronove¹¹² sought to determine the relative importance of quality scores and other sources of information for people selecting Medicare HMOs. They found that Medicare enrollees were switching to high-quality plans independent of public reports. The public report had an effect above this existing switching which was in response to the single item from CAHPS, while the single HEDIS item had no effect.

Finally, one study analyzed the health plan choices employers made to offer to their employees. Looking at large employers in 2000, Chernew et al.¹⁰⁵ found that employers were more likely to offer plans with better HEDIS and CAHPS ratings.

Key Question 5. Public Report Characteristics

We did not identify any empirical studies that examined the impact of public report characteristics on the effectiveness of public reporting.

Key Question 6. Context

Five studies examined outcomes by contextual factors including characteristics of the environment and the decisionmaker.^b One study examined the HMO market for Medicare beneficiaries and found that the quality information was more likely to contribute to plan selection when the market included plans with varying quality.¹¹²

Two studies specifically examined characteristics of the people selecting health plans. In a study of university employees Beaulieu¹¹³ confirmed that older people and people selecting family coverage had stronger preferences for quality while younger people and people selecting single coverage were more sensitive to price. Lui et al.¹¹⁴ determined that parents of children with special needs were more influenced by quality ratings than other parents when choosing from plans offered by a State-sponsored agency.

In two studies, improvement in the quality ratings was attributed more to plans that started with lower ratings. Lied and Sheingold⁵³ documented that most of the improvement in health plan performance on HEDIS measures from 1996 to 1998 could be attributed to improvement by plans with poor performance in 1996. In the one non United States study, for six out of the seven quality aspects measured for Dutch health plans, the improvement in performance of below-average plans outpaced improvement by plans that had average or above-average scores at baseline.⁵⁷

Summary of Qualitative Studies

We identified 32 qualitative studies and lab-type experiments reported in 35 articles that focused on public reporting about health plans and corresponded to at least one of our Key Questions. These are included in the evidence table in Appendix M. All were conducted in the United States and published between 1996 and 2009. The year each study was published is included after the summary of the results in order to allow identification of any trends over time.

Six studies were descriptive surveys¹⁸⁵⁻¹⁹⁰ and 12 articles reported on results from focus groups alone¹⁹¹⁻¹⁹⁷ or in combination with interviews and questionnaires.¹⁹⁸⁻²⁰² Four summarized interviews²⁰³⁻²⁰⁶ and 12 were lab-type experiments in which participants were asked to evaluate materials in terms of format or applicability to future decisions.²⁰⁷⁻²¹⁸

Consumers

Two descriptive surveys asked consumers (people selecting health plans in the future) about their experience with CAHPS and the evaluations were generally positive.

- Sixty percent of health plan members in Washington State reported that CAHPS was easy to understand and 30 percent selected it as the more useful source of information when selecting a plan (1998/2000).^{185,219}
- Similarly, in evaluation surveys in five States, 10 percent to 40 percent of respondents (varied by State) reported that CAHPS had a lot of influence on their choice although fewer than half of intended recipients remember receiving the information (2002).¹⁸⁷
- Interviews with health plan enrollees in The Netherlands focused the demand for and use of information about health plans.

^bStudies often include contextual factors as part of their major analyses in which they serve as control variables, allowing a sensitivity analysis or tests of robustness for the primary comparison. Studies were included here if the contextual factors were the subject of a subgroup analysis or produced different results.

- The key findings from interviews with 20 health plan members were: (1) there is discordance between the large amount of information consumers say they want but then rarely use in making decisions; (2) over the course of the interview, what patients said was most important in choosing a health plan changed, suggesting their values are not fixed; and (3) contradictory information in reports was difficult for consumers to interpret (2009).²⁰⁵

The focus group studies were all with consumers of different types. Two studies were conducted in multiple cities and identified numerous barriers to the use of quality information by people with Medicaid, Medicare, and private insurance.

- Twenty-two focus groups held in eight locations found that the information in public reports was perceived as marketing and that most people did not understand the indicators or expect health plans to be able to influence the results (1996).¹⁹¹
- Results of focus groups in six cities that focused on the impact of formatting reported that most issues were common sense. For example, consumers wanted short, clear information and guidance on how information should be used, but that most existing health plan quality materials do not meet these criteria (2001).²⁰¹

Two studies were specifically constructed to develop and test Medicare materials that included CAHPS quality information.

- Harris-Kojetin reported the results of seven focus groups in which participants reported finding CAHPS generally easy to understand but interpreting the report as “pushing HMOs” as only HMOs were included (2001).¹⁹²
- Goldstein used focus groups, cognitive interviews, and mall-intercept surveys to ask Medicare beneficiaries about the meaningfulness of CAHPS domains and the format. Participants chose “getting needed care” and “getting care quickly” as more important than customer service and office staff; results were mixed on format preferences with some confused by star ratings and others by bar charts (2001).¹⁹⁴

Four focus group studies included people with different types of health care coverage and focused on the format and comprehension of public reports.

- Three articles reported different aspects of the results of 15 focus groups, supplemented by followup questionnaires that focused on comprehension and interpretation, and included people with private insurance and Medicaid as well as uninsured. Participants were unable to generalize from specific indicators to overall assessments of quality and did not understand ratings of undesirable events (1996).²²⁰ Participants stated that patient rating and desirable events were most important to them. But when they chose plans they chose those with better scores, that is, fewer undesirable events because these were viewed as aspects of care they cannot control that could have dire consequences (1996).¹⁹⁹ Another analysis of these group responses found that participants rated the indicators that they better comprehended as most important while those they did not understand were given less weight (1997).²⁰⁰
- One focus group study conducted five focus groups to evaluate the usefulness, trustworthiness, and content of public reports. Most participants claimed that they would use the information if they were dissatisfied with their health plan, had changing health care needs, or were new to the community. Participants requested additional information

about patient-physician relationship, ease of getting referral, clinic facilities and costs. Lastly, the older patients were more skeptical about the quality information than other community members (2002).¹⁹⁷

Two focus group studies asked people with disabilities (2007)¹⁹⁶ and mobility issues (2002)¹⁹⁵ about their information needs.

- In focus groups that discussed CAHPS, participants rated the CAHPS domains as important but also asked for this additional information as well as more on access to specialists, rehabilitation, and equipment (2002).¹⁹⁵
- In focus groups in five States, people with disabilities were shown actual public reports from California, Maryland, Michigan, and Texas. Comments on format included: most wanted shorter public reports with numbers and visuals and some did not understand star ratings or composite scores. In addition to disability-specific information they were interested in ratings on care coordination and the physical accessibility of facilities (2007).¹⁹⁶

An evaluation of the California Quality of Care Report Card used focus groups, interviews, and Web site tracking to evaluate the report from the perspectives of consumers, health plans, and other stakeholders.

- Most visitors to the Web site visited the summary page with the star charts, but did not click through to the more detailed pages. All of the HMO executives and all but one of the medical group directors interviewed were familiar with the report. Forty-seven percent of medical groups and 13 percent of health plans reported undertaking QI efforts in response to the report (2005).²⁰²

Eight lab-type experiments explored the impact of both format and choice options on comprehension and understandability of health plan reporting.

- Included studies concluded that changes in format can increase ease of use and knowledge (2006);²¹³ that using graphics such as bar charts or stars can increase comprehension but the results varied by subgroups of participants (2001);²⁰⁹ that framing quality in terms of risk increased comprehension more than framing as benefits; (2000)²⁰⁸ and that people need evaluative labels such as good, fair, and poor when evaluating performance (2009).²¹⁵
- Lab-type studies have also been used to assess the potential impact of quality information on a decision. One study found that CAHPS increased perceptions of the availability of information on plan performance (2002)²¹² and another study of family members or agents for Medicare beneficiaries found that people say they want more information but time constraints and the increased cognitive burden decrease the likelihood it will be used (2007).²¹⁴
- One lab-type experiment suggested that some presentation approaches like visual cues might improve comprehensibility but others like ordering health plans by cost or member satisfaction or presenting trend data may result in consumers' decisions that undermine their self-interest (2002).²¹⁸
- The difference in public report comprehension between nonelderly and the Medicare population was evaluated by another lab-type experiment. The results indicate that after

controlling for education, the elderly had more difficulty understanding and using comparative information to make health plan choices (2001).²¹⁷

One lab-type experiment explored a topic not considered in other identified studies. It focused on the impact of context information along with report cards on health plan choices.

- The context information made a difference in the understandability of the measures but was insufficient to influence decisions and made no real difference on health plan choice because the individual indicators were often misinterpreted. Thirty-eight percent of the group who were provided the report card without context information said they did not know how the plans educated and informed members compared with 11 percent in the context group (1996).²¹⁶

Other lab-type experiments explored the tradeoffs people are willing to make when selecting plans.

- In one study HMOs and PPOs were given different hypothetical CAPHS ratings and costs and people were more likely to pick the scenario where the plan with the higher CAPHS rating cost less but covered less (2000).²⁰⁷
- In scenarios including quality information and the choice between HMOs and traditional Medicare, the quality information did not increase HMO selection over traditional Medicare, but did impact choices among HMOs (2002).²¹⁰
- In a study that examined the impact of specific indicators on people's willingness to accept plan restrictions, the researcher found this varied by indicator, with people more likely to accept restrictions if the rating was high for members being extremely satisfied with care (2002).²¹¹

Employers/Purchasers

Four surveys/interviews asked employers about how they selected plans to offer as options to their employees.

- An interview with 33 large health care purchasers suggested that the use of clinical quality information among purchasers was relatively low. Seventy-eight percent reported that HEDIS data were available to them but only 50 percent used the data in New York and California, 57 percent in Pennsylvania, and 60 percent in Cleveland, Ohio. The hospital outcomes data usage was low with 0 percent in New York and Pennsylvania, 20 percent in California, and 80 percent in Cleveland, Ohio (1997).²⁰⁶
- A study in 1998 suggested that only 5 percent of employers consider, or are even aware of, HEDIS data when selecting health plans for employees and only 1 percent of them provided the HEDIS performance data to their employees (1998).¹⁹⁰
- One study reported that 58 percent of employers used some source of quality information when making their decision about health plans to offer employees.¹⁸⁶ (2001)
- Other researchers found that just over half of the employers studied considered HEDIS and CAHPS ratings when selecting plans to offer and that this did not vary by company size (2007).¹⁸⁸

Health Plan Leadership/Sponsors

- One study combined the findings from interviews and focus groups conducted over 3 years with representatives of managed care plans who were subject to public reporting of

CAHPS results. Credibility of the report increased, concerns decreased over time, and managed care representatives reported increasing their QI efforts in response to low scores. One expected finding was that the organizations were reluctant to share best practices with others due to competition for better ratings (2001).¹⁹³

- Similarly, interviews with leaders at 24 plans in six States found that despite having issues with the cost of collecting HEDIS information and the specificity of the information, 77 percent of interviewees reported QI activities were identified as a response to performance measurement, with 37 percent attributed directly to the public reporting of HEDIS and 6 percent to CAHPS reports (2001).²⁰³
- Interviews with public agencies and business coalitions that sponsored CAHPS found that sponsors were invested in producing and disseminating reports annually (80 percent, or 20 out of 25 interviewed) and were using various media (Web, 100 percent; written materials, 96 percent) to disseminate the reports (2007).²⁰⁴
- Another survey asked medical directors of health plans if they changed policies and practices in response to the reporting of HEDIS measures and 54 percent reported they revised guidelines and 62 percent reported that they began measuring screening rates (2008).¹⁸⁹

Table 5. Summary of evidence: public reporting on quality of health plans

Key Question 1: Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes, or patient outcomes)?

Key Question 2: What harms result from public reporting?

Key Question 3: Does public reporting lead to change in health care delivery structures or processes?

Key Question 4: Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

Key Question 5: What characteristics of public reporting increase its impact on quality of care?

Key Question 6: What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Author Year (QA)	Public Report	Study Overview	Key Question	Results (↑Improvement; ↓Worse; ↔No Difference)
Abraham 2006 ⁹⁷ (Poor)	Performance results booklet containing member satisfaction survey results awards for quality.	Examined health plan choices of employees of 16 firms that distributed or did not distribute quality information and whether performance information leads to switching plans. N= 651 single employees	4	↔Quality information does not have an impact on switching plans ↑Employees are more likely to be aware of quality information when booklet is distributed to all employees or available on request than when booklet was not distributed by employers
Bardenheier 2007 ⁵⁴ (Fair)	HEDIS	Examined the effect of HEDIS reporting on childhood immunization rates in health plans that publicly reported their data compared with the non publicly reporting health plans. N=423 plans in 1999, 383 plans in 2000, 371 plans in 2001 and 332 plans in 2002.	1	↑Public reporting results in a statistically significant increase in immunization (p<0.009) controlling for accreditation, enrollment size, years in business, region, minority status of enrollees and purporting of enrollees who had a primary care visit.
Beaulieu 2002 ¹¹³ (Fair)	Plan profiles provided by employer (Harvard)	Examined whether quality information affects health plan choice in Harvard University employees from 1994 to 1997. N=11,500 employees	4	↑Employees were slightly but significantly more likely to switch from a low-quality plan than a high quality plan (p<0.01). ↑One unit increase in quality resulted in a 10% increase in odds of switching plans (p<0.01).
			6	↑ Families and older individuals have stronger preferences for quality; younger and single are more sensitive to price

Table 5. Summary of evidence: public reporting on quality of health plans (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results (↑Improvement; ↓Worse; ↔No Difference)
Bost 2001 ⁵⁶ (Poor)	HEDIS and CAHPS	Evaluated the impact of public reporting of HEDIS for 1996, 1997 and 1998, and 1999 on HEDIS and CAHPS scores. N=421 health plans	1	For plans that publicly reported, all 8 HEDIS measures improved over time. ↑ 3 out of these 8 measures improved significantly over the 3 years (p<0.01) ↑ 7 out of 10 CAHPS measures were better for reporting plans compared to non reporting and new reports. (p<0.01)
Chernew 1998 ⁹⁵ (Fair)	HEDIS	Analyzed the impact of plan performance rates on employee health plan choices of single coverage at one company. N=5795 employees	4	Relationship between ratings and choice is inconsistent ↔no effect 6 out of 8 measures ↑Superior rating on medical treatment related to increased selection but only significant in 1 of 4 models. ↓Superior rating on satisfaction is related to lower likelihood of choosing a plan.
Chernew 2004 ¹⁰⁵ (Fair)	CAHPS and HEDIS	A cross sectional comparison of plans offered by employers in the United States by those not offered in terms of quality measures. N= 855 employer/MSA combinations	4	↑ Employers are more likely to offer plans with better HEDIS and CAHPS scores. Also more likely to offer low-cost plans and plans that are nonprofit, established and part of national chains.
Dafny 2008 ¹¹² (Fair)	One HEDIS measure (mammogram rate) and one CAHPS measure (first communicate, then best care) included in the <i>Medicare and You</i> brochure.	Examined the association between public reports and switching behavior by comparing Medicare beneficiary responses before and after receiving mailed information including one HEDIS and one CAHPS indicator. The focus was on separating responses due to learning about quality from other sources from these. N=8212 plan-county-year combination	4	↔ Medicare enrollees were switching to high quality plans independent of the public reports during the period. ↑ A response to the public report is still found controlling for switching already happening. This effect is due to the CAHPS measure about best care, not the HEDIS measure. ↑ Switching is within HMOs, not from traditional plans to HMOs and is small (1.24% of beneficiaries in 2002 estimated through simulations).
			6	↑Impact of public reports greater in markets that have providers of varying quality levels.

Table 5. Summary of evidence: public reporting on quality of health plans (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results (↑Improvement; ↓Worse; ↔No Difference)
Farley 2002a ¹⁰² (Good)	CAHPS	Assessed the impact of CAHPS health plan performance information on plan choices by New Jersey Medicaid beneficiaries randomly assigned to receive or not receive the CAHPS information. N= 1763 intervention and 787 control	4	About 1/2 of people mailed CAHPS report say they received and read it ↔No difference in HMO selection across groups ↑Group that said they read it was more likely to pick a high quality HMO than control, but only if they did not pick the dominate HMO in market
Farley 2002b ¹⁰³ (Good)	CAHPS	Examined the impact of CAHPS on the health plan choice of lowan Medicaid beneficiaries randomly assigned to receive or not receive CAHPS information. N=13,077 new beneficiaries	4	↔The odds of switching vs staying in an assigned HMO in CAHPS vs No CAHPS group was not statistically significant. ↑Participants were significantly more likely to switch from a low-rated HMO to a high-rated HMO than from a high- to a low-rated HMO, independent of the CAHPS information, suggesting this is based on other information.
Fowles 2000 ⁹⁸ (Good)	HEDIS and CHIP	Compared consumer responses to report cards (HEDIS and CHIP) in two health care purchasing cooperatives in Denver, CO (N=670) and St. Louis, MO (N=784). The study assessed the exposure and helpfulness of report cards.	4	↑The number of employees who remember seeing the report card were 35% higher in St Louis than Denver. The results were significant ↔There was no significant difference in the number of employees who had read most or all of the report. ↔There was no significant difference in the number of employees in Denver and St. Louis who found the report helpful. ↑Gender and Education were statistically significantly related to helpfulness in learning about plan quality.
Fox 2001 ¹⁸³ (Poor)	CAHPS	Evaluated the impact of CAHPS report vs. no CAHPS in selecting a managed care plan by Medicaid enrollees in Kansas in May 1998. N= 698 new enrollees	4	↑Ease of judging quality of care was rated easier by in CAHPS report group vs no CAHPS p=0.01 ↓Making Informed Choices: Odds of choosing most influenced by doctor or nurse was 30% lower in CAHPS groups vs No CAHPS group. People self-reporting receiving report: 39.4% said it influenced their choice of plan a lot; 31.7% a little.

Table 5. Summary of evidence: public reporting on quality of health plans (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results (↑Improvement; ↓Worse; ↔No Difference)
Habermann 2007 ⁷⁰ (Fair)	HEDIS	Examined the effect of HEDIS measures on reported and unreported quality care, which is assessed by comparing stage of breast cancer for women 65-69 years old (reported) and 70-75 years old (not reported). N=30,857 Women ages 65-74 diagnosed with breast cancer from 1994 – 2002	2	↔ lack of difference in stage across age groups reported and not reported in HMOs and the persistent of the difference between Fee for Service and HMO across the two age groups suggests there is not crowding out and may be spill over to the older group not included in the HEDIS measure.
Hendricks 2009 ⁵⁷ (Poor)	CAHPS version	Analyzed whether health plan quality improved in The Netherlands after the introduction of public reporting.	1	↑Improvement on 4 of 7 quality aspects (general rating, health plan information, access to call center, transparency of copay requirements). Improvements were small. Identification of areas as important by the government did not influence which areas experienced improvement.
		N= 30 plans in 2005 and 32 in 2006, 2006, and 2008	6	↑6 of 7 quality aspects the performance of below-average scoring health plans increased more than the performance of average and/or above-average scoring health plan.
Jin 2006 ²³ (Good)	HEDIS and CAHPS	Estimated the impact of public reports of quality on choice of plan for retirees covered by the Federal Employee Health Benefit Plan separate from the impact of quality information they can obtain without the report. N= employees in 86 counties with the greatest number of plans	4	↔99.3% of enrollment choices would have been the same with or without the information. ↑The impact of public information on choice of plan is 2.63 percentage points increase in likelihood of choice with one standard deviation increase in reported score.

Table 5. Summary of evidence: public reporting on quality of health plans (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results (↑Improvement; ↓Worse; ↔No Difference)
Jung 2010 ⁵⁵ (Good)	HEDIS	Examined the impact of voluntary information disclosure on quality of care in HMO markets in the United States by comparing HEDIS scores for disclosing and non disclosing HMOs. N= 797 discloser and 265 non disclosing HMOs	1	↑Public reporting leads to an increase in the composite quality score after controlling for differences in plans. ↑in 3 of 4 domains (chronic illness, maternity, childhood immunizations) ↔ on 1 of 4 domains: screening tests
Knutson 1998 ⁹⁹ (Fair)	SEGIP (employee group insurance) produced report	Tested effect of public report vs. no public report on the knowledge, attitudes, and choice of health plan by Minnesota State employees. n=385-431 for different types of employees Total N=3573	4	Limited impact of public reports ↔5 out of 8 outcome measures showed no significant difference in either single or family coverage groups. 3 significant findings ↑Knowledge in single coverage intervention group improved significantly but not in family coverage group. ↑Relative importance of cost and quality of health plan significantly improved in family coverage intervention group but not in single coverage. ↑Single coverage intervention group switched more frequently than control.
Lied 2001 ⁵³ (Fair)	HEDIS	Estimated improvements in four HEDIS measures from 1996 to 1998. N= varies by measure from 55 to 167	1	All improved over study years; within year comparisons varied ↑All 4 outcome measures improved between 1996 to 1998 statistically significantly (p<0.05) . ↑2 out of 4 outcomes increased statistically significantly between 1996 to 1997. ↔2 of the 4 outcomes changed but not significantly between 1996 to 1997. ↑All 4 measures increased between 1997 to 1998 where 3 were significant and 1 was not.
			6	↑ the plans with poor performance in 1996 accounted for most of the improvement.
Liu 2009 ¹¹⁴ (Fair)	CAHPS and HEDIS	Examined whether parents of children enrolled in the New York State Children's Health Insurance Program chose managed care plans with better quality and whether this differs across subgroups such as special needs and income. N=2644 parents of new enrollees	4	One unit increase in CAHPS score increase probability of plan selection by 2.5 percentage points ↔HEDIS scores had no significant association with plan choice.
			6	↑CAHPS had a larger impact on choice by parents of children with special needs ↔Impact was not significantly different by education or income

Table 5. Summary of evidence: public reporting on quality of health plans (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results (↑Improvement; ↓Worse; ↔No Difference)
McCormack 2001 ¹⁰⁴ (Fair)	CAHPS	Examined the impact of CAHPS vs. no public report on the choice and attitudes of Medicare beneficiaries in 1998-1999. N= 1156 experienced beneficiaries (62% response) N=951 new beneficiaries (58% response)	4	↔Use of information for health plan switching did not vary ↑Experience beneficiaries who received CAHPS info were more confident in plan choice p<0.01 ↓New beneficiaries less likely to use mailed materials to chose plan in the group that received the CAHPS p<.01
Pham 2002 ⁷¹ (Good)	HEDIS	Assessed whether high performance on quality indicators by health plans was associated with withdrawal from Medicare. N=2310 Contract-County Units	2	↔The hazard of withdrawal is higher in low-quality health plans vs. high-quality health plans. All results were statistically significant. This is contrary to the suggested harm that high quality plans would withdraw.
Scanlon 1999 ⁹⁶ (Fair)	HEDIS-based ratings created by employer	Analyzed of the impact of HEDIS-based ratings on one company's employee selection of plans for family coverage. N= 96 plans available to sampled employees	4	No evidence of strong response to ratings ↔no effect on 4 out of 5 domains. ↓Superior rating on surgical care is related to lower likelihood of choosing a plan, which may be due to correlation among items.
Scanlon 2002 ¹⁸¹ (Good)	GM Public Report + HEDIS	Examined the impact of HEDIS on health plan choice in GM employees. N=29,000	4	↔ Modeling of impact of specific domains on choice was not successful ↑Plans with below average ratings were less likely to be selected. Impact of below average rating is large compared to impact of price. ↔Superior ratings did not increase likelihood of choice.
Tai-Seale 2004 ¹⁰¹ (Fair)	OPM	Explored the link between distribution of satisfaction information and retention of members in health plans among Federal employees. N=250 plans	4	↑Distribution of satisfaction information appears to have an impact in that it is associated with lower retention, suggesting the information induced people to withdraw from plans.

Table 5. Summary of evidence: public reporting on quality of health plans (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results (↑Improvement; ↓Worse; ↔No Difference)
Wedig 2002 ¹⁰⁰ (Fair)	Public report created by Office of Personnel Management for Federal employees.	Tested the hypothesis that publicly reported quality indicators impact the choice of health plans in Federal employees between 1995 where public report distribution was limited and 1996, where public report was widely disseminated. N=4299 in 1995 N=4863 in 1996	4	↑In 1996, the odds of using quality information for choosing a plan was 57% higher for new hires and 21% higher in existing employees, compared to 1995 hires.

Notes: CAHPS = Consumer Assessment of Healthcare Providers and Systems; HEDIS = Healthcare Effectiveness Data and Information Set; HMO = health maintenance organization

Long-Term Care Services

Prior systematic reviews of public reporting do not contain studies of reporting on the quality of long-term care services either because the searches predated major national initiatives in public reporting of the quality measure for this setting, or the search strategy, inclusion criteria, and types of designs allowed precluded inclusion of studies of public reporting about long-term care (e.g., Fung,¹⁵ Marshall,²²¹ and Ketelaar²²²) The Centers for Medicare and Medicaid Services (CMS) began posting quality data on the Medicare Nursing Home Compare Web site in 2002 and on Home Health Compare in fall 2003.

Selecting a long-term care (LTC) service may be substantially different than selecting other health care services. Decisions about LTC may be likely to involve family members. They may be made during a hospitalization to expedite discharge with the involvement of discharge planners or social workers. Alternatively people may be admitted from the community when disease progression and functional impairments require more than outpatient management. Nursing homes (NHs) (alternatively referred to as nursing facilities or skilled nursing facilities) and home health agencies admit people from hospitals and the community. Nursing homes provide postacute care to people who are expected to improve (referred to as short-stay residents) as well as care for long-stay residents with degenerative or debilitating conditions who are likely to need care for an extended period. Similarly, home health agencies provide postacute care and also admit people from the community with long-term chronic care needs.

Long-term care organizations and individuals that provide care (collectively referred to as “providers”) and quality improvement efforts might also differ from acute care and health plans. As the market areas are different for LTC, the choices may be greater when there is some substitution among types of services (NH, home health, assisted living, etc.). Conversely, the choices may also be more limited when only one provider is available in a geographic area or a location near family is more important than any other consideration. Many LTC service providers are for-profit yet public payers (Medicare and Medicaid) are major sources of revenue. For this reason and due to a history of financial crime, unsafe conditions, and abuse, long-term care services have traditionally been heavily regulated. Combined with the need to serve two very different populations, short-stay and long-stay residents, these factors create a challenging environment. While the underlying theory of how public reporting may lead to quality improvement is the same across settings, the different environment and history may affect its potential impact on long-term care differently than how public reporting affects hospitals, individual clinicians, and health plans.

We identified 23 quantitative observational studies and six qualitative studies that met our inclusion criteria and corresponded to our Key Questions. The observational studies are described and analyzed first. This is followed by a summary of the qualitative studies.

Overview of Findings

Quality of Care (Key Question 1)

- Some QMs, but not all, improved after public reporting (seven studies).
 - Measures for short-stay residents of nursing homes showed improvement across studies (two studies).^{13,58}

- For long-stay residents improvement was less consistent. The measures that improved across multiple studies were physical restraints and pain while the rest of the measures had no improvement or mixed results (five studies).⁵⁹⁻⁶³
- Public reporting for LTC is a national program. This makes it challenging to design studies where the improvement can be attributed to the public report.
 - The one study that controlled for regression to the mean concluded that there was improvement above what could be explained by regression to the mean.⁶⁰
 - Most studies used prior periods to examine trends^{62,63,74,80,81,106,108,109,223} while more recent studies constructed a comparison group consisting of small NHs not included in NH Compare or compared outcomes for pilot and non pilot status.^{13,61,73,75,107} However, many studies were “post only” designs that made it difficult to determine if the public report contributed to the change.^{14,59,60,115,224}

Harms (Key Question 2)

- Five studies examined different harms (selection/cream skimming, crowd out, rehospitalization, and down coding) that correspond to actions NHs may take to improve NH Compare ratings rather than actually improve the quality of care.
 - One study found some evidence that the number of patients admitted with pain declined among NHs after they had low-quality scores reported for pain. Level of pain on admission also declined and among for profit and nonprofit NHs compared with government NHs. The study authors concluded this indicates some cream skimming.⁷²
 - Another study that looked at patient sorting among NHs for postacute care⁷³ found no cream skimming, rather that high-risk patients were more likely to be admitted to high quality facilities after public reporting
 - No evidence was found that quality in other areas was crowded out by NHs focus on the publicly reported measures (one study).⁷⁴
 - Indications of “down coding,” that is changing the coding of assessments in order to improve NH Compare scores were found in a study of postacute care, but for only one (pain) out of three quality measures (one study).⁷³
 - The most serious harm identified to date is that NHs may re-admit postacute care patients to the hospital before they are assessed for NH Compare in order to improve their performance (one study).⁷⁵

Impact on Providers (Key Question 3)

- NH administrators reported in surveys that they were taking action in response to NH Compare (three studies).^{63,78,79}
 - Actions appeared to be motivated more by the administrators’ belief that public reporting influences referral from professionals and the State survey process than by patient and family use of NH Compare in their selection of NHs.
 - Nursing homes that reported taking actions experienced improvements in quality measures.⁶³
 - An additional study documented that NH administrators invested more resources in clinical care after public reporting.⁸⁰

- Improvement in one QM (influenza vaccination rates) improved after public reporting, but it increased even more among community dwelling elderly, supporting the idea that factors other than public reporting may be driving change (one study).⁸¹

Impact on Patients or Purchasers (Key Question 4)

- Six studies attempted to determine if public reporting influenced the selection of NHs
 - One study looked at patient selection and used a problematic outcome measure (occupancy rate) that may have limited variation or be caused by factors other than patient selection.¹⁰⁶
 - Two studies used market share to measure NH selection, with one finding no impact from the reporting of five indicators for long-stay residents on market share⁶¹ and one finding small increase in market share for postacute care associated with higher NH Compare ratings.¹⁰⁷
 - Patient matching, meaning higher-risk patients selected higher-quality NHs, was found to increase after public reporting (one study).⁷³
 - Increase in selection of NHs with better performance on NH Compare by Medicare patients was demonstrated to be the link between higher-quality and better financial performance and this relationship was stronger after NH Compare was made public (two studies).^{108,109}

Public Report Characteristics (Key Question 5)

- No studies were identified.

Context (Key Question 6)

- Studies that examined the impact of two market characteristics, competition and occupancy rates (characteristics of the environment), found that publicly reported quality measures are more likely to improve in competitive markets and in markets with low occupancy rates (suggesting there are choices and providers must compete to fill beds).^{60,61,115}
 - These findings supported the idea that public reporting provides information that influences market-based behavior.
- Ownership characteristics of NHs (e.g. for profit/nonprofit, government, chain affiliation, hospital-based) did not have a consistent effect on the impact of public reporting (two studies).^{59,62}
- One study found that NHs with higher percentages of black residents had smaller changes in quality after public reporting, but that for some indicators they started with better QMs than NHs with fewer black residents.⁶²
- Nursing homes and home health agencies that started with lower publicly reported quality ratings were more likely to improve their ratings than those that started with higher scores (three studies).^{14,78,81}
- Only one study included any analyses by patient characteristics other than their baseline risk on the QMs. A study of patient selection for postacute care found that patients with higher levels of education were slightly more responsive to public reporting.¹⁰⁷

Description of Quantitative Studies

We identified 23 observational studies about public reporting on long-term care services (see Evidence Tables in Appendix N) and reported on the results of 22. One study was not included after inconsistencies were identified in the reported results.²²⁵ All these studies were published between 2005 and 2012. One study was about home health care services¹⁴ and the rest concerned NHs. All studies were conducted in the United States and used national data or a sample based on national data.

The *populations* in the studies were both organizations that provide long-term care (nursing homes and home health agencies) and patients/families/payers that select and use these services. Nursing homes or home health agencies are assumed to respond to public reporting by improving care practices that lead to improvements in the reported quality measures as well as other health care outcomes. Patients or payers are assumed to respond by selecting higher quality NHs or home health agencies. However, selection was not measured directly in any of these studies. In the studies where patient choice was the outcome of interest, occupancy rate¹⁰⁶ and market share^{61,107} were used to represent selection.¹⁰⁶

The public reporting *intervention* in almost all of the identified studies was NH Compare. Fifteen of the studies concerned public reporting of quality measures for both long-stay and short-stay nursing home residents. Of these, thirteen studied some aspect of the impact of NH Compare,^{59-63,72,78,79,81,106,109,115,226} while one focused on a designation given by CMS to facilities with chronically poor quality (Special Focus Facilities [SFFs])²²⁴ and one analyzed State survey deficiency and staffing level information that was made public prior to existence of quality indicators on NH Compare.¹⁰⁶ Six studies were about NH Compare but limited their scope to the quality measures for short-stay, or postacute, residents.^{13,58,73-75,107} We identified one study about Home Health Compare.¹⁴

Nursing Home Compare and Home Health Compare are nationwide public reporting programs that include almost all nursing home and home health agencies certified by Medicaid and Medicare. Only those agencies that accept solely private payments and those with small numbers of patients/residents are excluded. Nursing Home Compare was initially launched in six States (Colorado, Florida, Maryland, Ohio, Rhode Island, and Washington) as a pilot in April 2002, then 7 months later in November 2002 it became available nationwide. This has affected what *comparators* and study designs have been possible (see Appendix D for definitions of the study design terminology used in this report). This also influenced the quality assessment of the studies and is the reason confounding and similarity across compared groups or compared time periods were given more weight than other criteria (see Appendix G for the quality assessment for these studies and Appendix F for a description of the quality assessment criteria). Twelve studies were assessed as good quality, nine as fair quality, and one as poor quality in terms of their ability to rigorously address our Key Questions.

The most common type of study we identified was “interrupted time series” (nine studies), in which data on quality measures from periods prior to NH Compare were compared with periods after NH Compare was made public in 2002.^{62,63,74,80,81,106,108,109,223} Three additional studies were “multiple group interrupted time series” that compared multiple time periods before and after NH Compare for two groups. These three studies compared pilot and nonpilot NH Compare States^{61,73,75} for the 7 months before NH Compare was nationwide within the context of trends for both groups. Two studies, one time series¹³ and one pre-post,¹⁰⁷ used a group of small NHs not required to report in NH Compare as a comparison group. Five other studies included data from periods only after the quality data were made public: two were “time series post only”

studies that examined change and trends after NH or Home Health Compare;^{14,59} two were “one group post only” that quantified a change from one time period to another after NH compare;^{60,115} and one “comparison group post only” study compared NHs in counties with and without a NH designated as chronically poor quality by CMS – a SFF – after these facilities were publicly identified.²²⁴ Two studies were cross sectional and based on survey data.^{78,79} One other study with pre and post NH Compare data included a “one group pre post” study in which MDS data was used to calculate the values of the quality measures before they were publically reported and then compared these with scores for the 12 months after they were publically reported by NH Compare.⁵⁸

The most frequent *outcomes* in these studies were changes in the publicly reported quality measures reported in eight articles (seven studies), either overall (Key Question 1) or compared across provider or market characteristics (Key Question 6). Four studies examined potential harms (Key Question 2) and used different outcomes including characteristics of admission cohorts before and after public reporting to determine if NHs were choosing not to admit people who could negatively impact their quality rating; performance on measures not publicly reported to determine if NHs focused on improving the publically reported measures to the detriment of other aspects of care; trends in assessments to determine if NHs changed how assessments were coded; and rehospitalizations of patients to avoid their inclusion in the NH Compare measures. Three of the five studies that reported on changes in health care delivery (Key Question 3) used survey responses by NH administrators about actions they have taken in response to public reports. The other two examined whether NHs increase clinical expenditures and one other looked at changes in vaccination rates in response to public reporting. The only study that looked at changes in patients’ or purchasers’ behavior (Key Question 4) used occupancy rates as the outcome measure. None of these studies of long-term care services examined the impact of characteristics of the public report (Key Question 5). Twelve studies specifically addressed the impact of context, such as market characteristics or characteristics of the NHs or their administrator, on the effectiveness of public reporting. Market characteristics studied included competition, occupancy rates, and the presence of chronically poor-quality nursing homes in the same market. Provider characteristics examined in identified studies included ownership (for profit/not for profit/government ownership), chain affiliation, percentage of Medicare residents, percentage of black residents, and high or low rating on QM in prior periods or at baseline.

Table 7 at the end of this section provides an overview of each included study and a summary of the finding.

Effectiveness by Outcome/Key Question: Detailed Analysis of Observational Studies

The results for each Key Question are discussed below.

Key Question 1: Quality of Health Care

All seven studies that examined health care outcomes for long- or short-stay NH residents analyzed changes in the QMs reported in NH Compare. Improvement was noted in some QMs and others had no significant change, while for a few, quality worsened during the period of study. At its launch NH Compare included 10 QMs, but items were dropped and added during the first few years (see superscripts in Table 6). Four of the studies examined all the measures available at the time of the study period for their population of interest. Three studies⁶¹⁻⁶³ were

restricted to a more limited set of QMs that could be reliability constructed from prior data for a pretest/posttest comparison.

Table 6 demonstrates that four QMs consistently showed improvement across studies while the results for most other QMs were mixed. Some of the QMs that were dropped after 2003 (e.g., infection) or added in 2004 (e.g., lose too much weight) have not been reported in enough studies to identify a pattern. Pain and physical restraints in long-stay patients as well as pain and delirium in short-stay residents have been reported since 2002 or 2003 and multiple studies have found improvement.

The one identified study of Home Health Compare¹⁴ found that QMs for patients' ability to manage four activities (bathing, transferring, taking medications, and walking) and pain improved after the publication of Home Health Compare. Changes ranged from a 7.1 percent improvement for transferring to a to 18.9 percent improvement for ability to walk around. Need for urgent care remained stable while hospitalizations increased (interpreted as worse quality) during the study period.

Table 6. Study findings: change in Nursing Home Compare quality measures

First Author, Year (Quality Assessment)	Zinn, 2005 ⁵⁹ (Fair)	Mukamel, 2008 ⁶³ (Good)	Castle, 2008 ⁶⁰ (Fair)	Werner, 2009 ¹³ short- stay only (Good)	Werner, 2010 ⁵⁸ short- stay only (Good)	Grabowski, 2011 ⁶¹ (Good)	Gaudet, 2011 ⁶² (Good)
Quality Measure							
Long-Stay Residents							
Increased help with daily activities	↔	↔	↓	NR	NR	↔	↓
Pain	↑	NR	↑	NR	NR	NR	↑
Pressure sores ^a	↔	↓	NR	NR	NR	NR	↔
Pressure sores risk adjusted ^a	↔	NR	NR	NR	NR	NR	NR
High-risk with pressure sores ^b	NR	NR	↑	NR	NR	↔	NR
Low-risk with pressure sores ^b	NR	NR	↑	NR	NR	↔	NR
Physically restrained ^c	↑	↑	↑	NR	NR	↔	↑
More depressed ^b	NR	NR	↑	NR	NR	NR	NR
Lose control of bowel or bladder ^b	NR	NR	↓	NR	NR	NR	NR
Catheter ^b	NR	NR	↑	NR	NR	NR	NR
Infection ^a	↔	↔	NR	NR	NR	NR	NR
Most time in bed or chair ^b	NR	NR	↔	NR	NR	NR	NR
Worse ability to move around ^b	NR	NR	↓	NR	NR	NR	NR
Urinary tract infection ^c	NR	NR	↓	NR	NR	↔	NR
Lose too much weight ^b	NR	NR	↓	NR	NR	NR	NR
Short-Stay Residents							
Delirium	↑	NR	↑	↑	↔	NR	NR
Delirium risk adjusted ^a	↔	NR	NR	NR	NR	NR	NR
Pain	↑	↑	↑	↑	↑	NR	NR
Pressure sores ^b	NR	NR	↑	NR	NR	NR	NR
Walking ^a	↔	NR	NR	↑	↔	NR	NR

Note: ↑improvement; ↓worse; ↔ no change

^aIncluded only in 2002 and 2003.

^bAdded in 2004.

^cAdded in 2003.

NR = not reported

Key Question 2: Harms

Four studies examined different potential harms that could result from public reports about LTC. Mukamel et al. (2009)⁷² examined whether NHs changed their admission patterns and admitted residents likely to improve the facility's NH Compare scores; Werner et al. (2009b)⁷⁴ investigated whether NHs would focus on the publicly reported measures to the detriment of other aspects of quality of care; Konetzka et al.(2012)⁷⁵ analyzed whether NHs were rehospitalizing high risk postacute care patients before their first post admission assessment

thereby improving the NH's reported performance; and Werner (2011)⁷³ searched for evidence of both cream skimming (preferentially admitting low risk patients) and down coding (assessing patients at lower levels of an indicator in order to improve performance ratings).

Mukamel et al.⁷² analyzed the characteristics of NH admission cohorts to determine if NHs responded to the public report by changing their admission policies. Specifically, they examined whether NHs admitted less sick or frail people in order to improve their publicly reported quality ratings. This is referred to as "cream skimming." To do this they examined six characteristics of admission cohorts and found that four (ADLs, diabetes, incontinence, and stage 2 or higher pressure ulcers) did not decline in people admitted post NH Compare, suggesting that there was no cream skimming. For these four admission characteristics in which there was no decline, a decline was also not found in stratified analyses by NH types, suggesting the overall analyses were not hiding cream skimming within specific types of NHs. For two characteristics, pain and memory loss, there were small declines; a 13 percent decline in admissions related to the prevalence of pain and a 0.7 percent decline in admissions for memory loss. For pain the evidence of some cream skimming was seen across the subgroups by NH ownership and initial quality with no differences by chain affiliation or region. For profits and nonprofits were more likely to cream skim than government-owned NHs and but the strongest association was that NHs with poorer quality scores at initial publication were more likely to cream skim. For memory loss, the subgroups with more cream skimming were for profits and NHs with chain affiliation.

The harm, or unintended consequence, investigated by Werner et al.,⁷⁴ was that NHs will invest their resources in improving performance on what is reported in NH Compare and the quality of other unreported aspects of care will deteriorate. The idea is that with limited resources, improvement in the reported measures will crowd out improvement in the unreported activities or outcomes. To investigate this Werner et al.⁷⁴ compared quality indicators for short-stay nursing home residents that were publically reported with other indicators for which NHs submit data but are not included in the public reporting. Data were available for both public and nonpublic indicators prior to, as well as after, the release of NH Compare. This allowed analyses of the trend before and after public reporting as well as point estimates of the change. All three of the publicly reported QMs improved (pain, delirium, and walking) while the nine unreported measures were split with five showing improvement (improvement in pain, locomotion, shortness of breath, incontinence, and respiratory function) and four worsening quality (urinary tract infection, ADLs, mid-loss ADLs, and early-loss ADLs). The QMs that worsened were trending downward prior to 2002 when NH Compare was released. While that might suggest the decline was not caused by NH Compare, it does not negate that possibility that focusing on the publicly reported QMs preempted QI on these. However, stratified analyses found that facilities that scored highest on the reported QMs were more likely to improve on the unreported measures. This suggests that crowding out is limited and that the difference may be in the capacity of the NHs to implement QI.

Researchers used a unique aspect of public reporting about NHs to determine if providers might be rehospitalizing high-risk patients to keep these patients from having a negative impact on their NH Compare scores. The publicly reported measures for NHs were based on an assessment done on 14 patients after admission, but postacute care patients who were readmitted to the hospital before day 14 were not included in the NH Compare reporting. Konetzka et al.⁷⁵ analyzed postacute patients with lengths of stay in NHs of 10 to 20 days both before and after the launch of NH Compare in both the pilot States and nationwide. They categorized all

rehospitalizations for these patients as discretionary or non discretionary and indicated whether they occurred before day 14 or not. This analysis revealed a 1.2 percentage point increase in discretionary hospitalizations before day 14 that persisted, though it was smaller (0.5 percentage points) after controlling for trends in hospitalization by comparing the pilot and non pilot States. Furthermore, the patients rehospitalized before day 14 were at higher risk of scoring poorly on NH Compare than those rehospitalized after day 14, even after controlling for risk at admission. This suggests that NHs may admit high-risk patients despite the potential to negatively impact their publicly-reported performance and then use selective rehospitalization to limit the impact of these patients on their NH Compare quality reports. In addition to the implications for quality reporting and quality of care in NHs, this suggests that providers attempting to “game” public reporting may be able to do this at points other than admission.

Werner (2011)⁷³ used data from 2001 through 2003 for the pilot and non pilot States to examine two potential harms/unintended consequences: whether public reporting changes what patients facilities admit and whether NHs change their coding in assessments in order to improve their NH Compare reports. The analyses found no evidence of “cream skinning”, that is NHs did not try to admit more low-risk patients or patients with a better prognosis. However there was some evidence of down coding in the assessment of pain, suggested by lower levels of pain recorded at admission after public reporting that was not explained by changes in other patient characteristics.

Key Question 3: Impact on Providers

Five studies of public reporting explored the impact of the NH Compare on behaviors of organizations and individuals who provide care.^{63,78,80,81,227}

Three of the studies used surveys to collect information from nursing home administrators on their specific responses to NH Compare. Zinn et al.⁷⁹ and Mukamel et al.⁶³ used data from the survey that was mailed in May and June 2004 to a 10 percent sample of administrators of nursing homes that were included in the first publication of NH Compare. Of the 1,502 surveys sent, 724 were completed (48.2 percent). Zinn⁷⁸ conducted another survey with different questions in 2007 that was also mailed to 10 percent random sample of administrators of NHs included in NH Compare in 2006. This second survey was sent to 1,407 administrators and returned by 538 (38.3 percent).

In the first survey Zinn⁷⁹ asked administrators if they took any of seven actions in response to NH Compare, had the administrators complete items to identify their strategic orientation using an existing typology, and then assessed whether differences in strategic orientation were associated with different responses to NH Compare. Administrators identified as the strategic type most likely to change frequently and to value innovations were most likely to take four actions: respond immediately, investigate reasons for the score, revise job descriptions, and change priorities for QI. The administrators who were of the strategic type that focused on core services were more likely to say they took no action. For two actions, talking to families about NH Compare and purchasing new equipment or technology, no differences were found among the administrators.

Mukalmel et al.⁶³ used the same survey and merged the results with the data on the QMs for the NHs the administrators directed prior and post NH Compare. These data were first used to identify trends in improvement (reported above) and then used to determine if improvements were linked to actions by the nursing home administrators. An analysis of the number of actions taken suggested that when more actions are taken, the quality of NHs improves more, but that the

marginal improvement decreases, indicating diminishing returns. Comparing different actions with improvement in specific QMs revealed no consistent associations, suggesting there were different routes to improvement.

The second survey by Zinn et al.⁷⁸ collected information on perceptions of NH administrators on the influence of NH Compare on referrals, choice of facility, and the State survey process. The main outcome was the association of these perceptions with the likelihood an administrator would take one of six actions that required a significant investment in resources (hiring more clinical staff or new nursing or medical director, increasing wages, initiatives to hire and retain staff, and purchases of new equipment or technology). Administrators took the most actions when they thought NH Compare influenced the survey process but took only one action (hired additional staff) when they thought NH Compare influenced selection of facility.

Using a different approach, Mukalmel et al.⁸⁰ studied the ratio of clinical to hotel (room and board) expenditure by NHs before and after public reporting based on the theory that NH Compare made visible clinical quality that was once invisible and motivated greater investment in clinical care. The ratio of clinical to hotel expenditures was stable for 2 years prior to NH Compare then increased in the 4 years after NH Compare. This increase persisted, though it decreased in magnitude when the difference in growth in the prices of clinical and hotel services was added to the analysis. Subgroups expected to be more sensitive to public reporting (e.g. those in competitive markets, lower occupancy, for profit, and chain-owned) shifted more resources to clinical services.

Focusing on the provision of one service, Cai⁸¹ examined whether the State rate of flu vaccination in NHs changed after this was added to NH Compare in 2004. Vaccination rates increased (5.46 percent for short-term residents and 1.67 percent for long-term residents) for two flu seasons after NH Compare compared with what they were the flu season prior to the public release of the data. However, immunization rates also increased 6.41 percent in community dwelling elderly, suggesting the increase may not be due to public reporting. Facilities that had low baseline rates were more likely to increase their vaccination rate than facilities that had high rates when the information was first made public.

Key Question 4: Impact on Patients or Purchasers

Six studies attempted to determine if public reporting influenced the selection of NHs by patients or residents. One of the earlier studies of NHs used occupancy rates as a proxy for choice of NH. Stevenson¹⁰⁶ examined whether public reporting of deficiencies from State surveys and staffing levels that predated NH Compare reporting of QMs resulted in changes in occupancy rates. All of the alternative models supported the hypothesis that public reporting has an impact on selection of NH, but the effect sizes are extremely small: An increase in 10 deficiencies would result in 0.4 percent decrease in occupancy and doubling of nursing staff would be needed to increase occupancy 0.5 percent.

Grabowski and Town⁶¹ reported that NH Compare had no meaningful impact on selection based on an analysis of the impact of scores on five QMs (urinary tract infection, ADL loss, physical restraints, and pressure ulcers in high and low risk residents) on market share over several years (1999–2005) before and after NH Compare was launched.

Werner et al.¹⁰⁷ also used market share to measure selection of NHs, but limited the sample to postacute care admissions and found that NH Compare resulted in small increases in selection of high quality facilities associated with only one of three QMs, suggesting that public reporting has had a minimal impact on consumers of postacute care. This was based on finding that

improvements in the pain measure were associated with increases in market share after public reporting but that better scores on the delirium and improvement in walking had no impact, or a small negative effect on market share.

Three studies used outcomes other than occupancy and market share to study selection. Focusing on the acute care market again, Werner et al.⁷³ asked whether high-risk patients were more likely to select high-quality NHs after NH Compare data were public. They analyzed patient admission characteristics and facility QMs for 2001 to 2003 and compared these over time, as well as across the pilot and non pilot States for NH Compare, and found significantly better matching (high-risk to high quality; low-risk to low quality) occurred after NH Compare was launched for pain but not for the other two QMs (delirium or improvement walking).

In two articles, Park^{108,109} explored issues related to how quality of care is related to financial performance and whether this was affected by public reporting. In one study¹⁰⁸ data from 1999-2002 and 2003-2005 were used to compare revenues, expenses, operating, and total profit margin before and after NH Compare. Nursing homes that improved in quality had increased revenues and higher profit margins than NHs that stayed the same or were worse. The authors attribute this to increases in Medicare admissions.

The second article¹⁰⁹ used ten years of data 1997 to 2006 to demonstrate that quality is associated with better financial performance, but only after NH Compare is available nationwide. However, the size of the effect are small and most likely not clinically meaningful.

Key Question 5: Public Report Characteristics

We identified no empirical studies that examined the impact of characteristics of public reports on quality of care.

Key Question 6: Context

Several studies of public reporting of LTC focused on contextual factors.^c Two common characteristics of the environment or the market included in studies were the amount of competition and the occupancy rate. The underlying idea was that public reporting is a market-based intervention and that public reports will have a greater impact on provider behavior, selection of providers, and ultimately the quality of care in markets where there is more competition or a lower occupancy rate.

Three studies focused specifically on the impact of competition and occupancy rates. Castle et al.¹¹⁵ found that five out of 14 QMs were significantly better in markets with higher competition while eight out of 14 QMs were better in markets with lower occupancy rates based on data from 2002 to 2004. The same group of researchers continued to study this question using different data (2004 to 2006) and incorporating a control for regression to the mean.⁶⁰ The results were similar with or without this control. Eight out of 15 QMs were significantly better in markets with higher competition while 10 out of 15 QMs were bettering markets with lower occupancy rates. The overall quality differences were also higher in high competition and low occupancy markets. Grabowski and Town⁶¹ analyzed data from 1999 to 2005 and found that for two (pressure ulcers, high risk and pressure ulcers, low risk) of five QMs studied significant improvements in quality were more likely to occur after public reporting in NHs in more

^cStudies often include contextual factors as part of their major analyses in which they serve as control variables, allowing a sensitivity analysis or supplement for the primary comparison. When this was the case in the studies identified for this review, the results were discussed in the section on the Key Question addressed by the primary outcome. Studies were included here if the contextual factors were the focus of the study.

competitive markets. Their model predicted that an increase in competition equivalent to going from two to five average size facilities in a market would result in an improvement in pressure ulcers among high-risk residents equal to 15 percent of a standard deviation and among low-risk residents 89 percent of a standard deviation.

Gaudet⁶² examined whether nonprofit ownership, market competition, and percentage of Medicare residents mediated the impact of public reporting and found no significant effect for nonprofit ownership or competition and a very small difference in improvement in performance associated by with a high percentage of Medicare residents after public reporting. Gaudet also tested whether NHs with higher percentages of black residents differed in terms of both their QMs and their response to public reporting. The results were mixed with gaps in baseline quality favoring NHs with more black residents for some quality indicators; however for three of the four measures studied, the change after NH Compare was smaller in these NHs when compared to NHs with fewer black residents.

As part of a study of how the relationship between financial performance and quality of care is influenced by public reporting, Park and Werner¹⁰⁹ found that the association increased more after public reporting in competitive markets (5.3 percent) than in less competitive markets (1.9 percent). Changes in the relationship between financial performance and four specific quality indicators after public reporting were significant for only one indicator (number of deficiencies) while for profit NHs had significantly higher profit margins when quality was higher on three of four quality indicators after public reporting.

We identified one study of a less commonly studied market characteristic: the presence of a chronically poor quality facility in the NH market. Castle et al.²²⁴ examined a small number of extremely poor performers that were publicly given the designation of SFF by CMS. They then separated all other NHs based on whether they were in the same county as a SFF and analyzed whether being in a county with a SFF had an impact on quality. The underlying assumption was that being in proximity to a facility receiving extra attention for a history of poor quality might motivate quality improvement. Little evidence of this spillover effect was found with only four of 22 quality indicators significantly better among NHs in the same county as a SFF.

Other studies considered characteristics of NHs or Home Health agencies such as for profit/nonprofit, chain affiliation, or hospital-based/free standing either separately or in combination with market characteristics. In one of the early studies of NH Compare, Zinn et al.⁵⁹ looked at the change in QM over the first five reporting periods (see results under Quality of Health Care above). For those QMs in which a change was found, the change was examined by NH characteristics. Few differences were found by facility characteristics. A difference was found in the rate of change, but what type of facility had the better score did not change.

In the only Home Health Compare study, Jung et al.¹⁴ found that nonprofits, hospital-based agencies, and agencies with longer Medicare tenure improved more from 2003 to 2007. Nonprofit agencies started with lower scores than for profits on some QMs, but had higher scores on all by the end of the study period.

Another characteristic of NHs and home health agencies included in several studies were their QMs at baseline. Zinn et al. reported that NHs with low QM scores are three times likely to make investments;⁷⁸ Jung et al. reported that agencies with lower baseline scores experience greater improvement;¹⁴ and Cai found that NHs that started with low influenza vaccination rates were more likely to improve.⁸¹ Whether these types of results represent regression to the mean or a ceiling effect for those providers with high scores requires more in-depth investigation.

Werner et al.¹⁰⁷ 2012 included extension of their study of patient choice of NHs for postacute care to test whether responsiveness to public reporting varies across levels of education. They found patients with a higher level of education (high school or higher) were slightly more responsive to public reports than people with less than a high school education. While this difference was small it was evident across all three of the QMs (pain, delirium, and difficulty walking).

Summary of Qualitative Studies

We identified six qualitative studies that focused on public reporting for NHs and addressed at least one of our Key Questions. Two were surveys of NH administrators,^{12,228} two were surveys of consumers,^{229,230} and two were lab-type experiments used to test comprehension and preferences for alternative formats.^{231,232} The studies were published between 2005 and 2010 and one was conducted in the Netherlands²³¹ while the rest were conducted in the United States.

Administrators

The two surveys of administrators described awareness and self-reported actions taken in response to NH Compare (Key Question 3).

- Castle et al.²²⁸ mailed a survey to a 30 percent random sample of NH administrators in two States without a State NH public report (Maryland and Pennsylvania) and two States with a State NH public report (Connecticut and Tennessee). Three hundred and twenty-four were completed out of 477 mailed, a 68 percent completion rate. The survey asked administrators first for their own ratings on content, then for their opinion on consumers' perspective on comprehension, navigation, and decision process related to NH Compare. The survey was conducted in January 2003. At that time 33 percent of administrators had used NH Compare in their facility and 51 percent planned to in the future. Administrator ratings of NH Compare were relatively high for themselves and lower for residents/families. Most ratings were not statistically different for two States with prior NH public report than for two States without prior NH public reports (1998).
- The second survey used a 10 percent random sample of all U.S. NH administrators in May and June of 2004 and had a response rate of 42 percent (n=724).¹² Eighty-two percent of administrators had reviewed NH Medicare Compare and 60 percent believed that quality of care influences the reported QMs (though high percentages also attributed the QM scores to coding, case mix, and unusual events). Sixty-three percent reported taking actions that could lead to improvement in quality of care such as investigator reasons for scores, 41.6 percent reported changing priorities for QI, and 36.3 percent reported changing care protocols. NHs with more QM scores in the bottom 20 percent of their State reported more actions in response to NH Compare (2007).

Consumers

- A survey of consumers also asked about awareness of NH Compare and how it was used in the selection of a NH (Key Question 4). The two studies reporting surveys of people consumers had overlapping samples. One included a sample of family members of people recently admitted to one of 200 randomly selected NHs (2008).²²⁹ The second survey combined this NH sample with a survey of family members of people admitted to 25 randomly selected assisted living facilities in Pennsylvania and a survey of elders living to in 25 randomly selected senior high-rise housing buildings.

- The survey of family members of newly admitted NH residents received 4754 responses, a 59 percent response rate. Respondents were asked about use of the internet and NH Compare in looking for information about NHs. Thirty-one percent reported using the internet and 12 percent specifically recalled using NH Compare. Respondents were then provided with a hard copy of NH ratings from the site and they were asked a series of comprehension questions. The comprehension scores were moderate to high (mean of 5.56 across all indicators with 8 being the maximum score).
- In the study that combined the survey of families of NH residents with family members of assisted living residents (496; 61 percent response rate) and elders in high-rise buildings (1252; 63 percent response rate), internet use was also high (53 percent for Assisted Living family and 23 percent for community elders). (2001)²³⁰ The rates reporting that they looked at a public report on NHs were 29 percent for NH family members, 47 percent for assisted living family members, and 15 percent for community elders. The most frequent actual use of the public reports was to find the location (35 to 49 percent). Respondents examining quality information ranged from 29 percent to 47 percent.

Two lab-type experiments were relevant to Key Question 5 as they tested different hypothetical formats for actual NH public reports and explored what characteristics of public reports were most likely to result in their use.

- One study recruited 90 volunteers in two U.S. cities to view seven different formats for actual NH Compare information.(1999)²³² Participants were asked closed-ended questions to assess their comprehension and ability to interpret the information, followed by probes about why they responded as they did, and questions about their preference for a format as well as ease of use. Key findings are that (1) people preferred an evaluative table with words (Better, Average, Worse) or stars to a bar graph; (2) a major barrier to understanding is the use of a negative direction (lower numbers are better), which people find confusing in spite of the labels and directions on report; and (3) people prefer to be able to compare several NHs on one page.
- The second lab-type experience was conducted in the Netherlands with three different samples in order to test a prototype of an internet public report about NHs (2005).²³¹ The samples included 181 members of a consumers-of-care organizations (63 percent out of 300 invited), 38 university students (91 percent out of 42 invited), and 59 NH managers and staff (66 percent out of 70 invited). All were given one practice case and then randomly assigned six cases where the public reports differed in one component. They were asked questions about the quality of the NH presented in each case, whether they would choose that nursing home, and about the content and format of each public report. Overall rating of the public reports were high and did not differ across the three types of respondents, however care consumers rated the public reports lower on completeness and whether they were understandable. Participants selected the consumer satisfaction section as the most important of their decisions and interpreted missing information as a sign of low quality. When asked what else should be included, participants ask for more explanation of the terms used in the report and more information about the opinions of relatives, informal caregivers, and volunteers.

Table 7. Summary of evidence: long-term care services

Key Question 1: Does public reporting result in improvements in the quality of health care (improvements in health care delivery structures, processes, or patient outcomes?)

Key Question 2: What harms result from public reporting?

Key Question 3: Does public reporting lead to change in health care delivery structures or processes?

Key Question 4: Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?

Key Question 5: What characteristics of public reporting increase its impact on quality of care?

Key Question 6: What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?

Author Year (QA)	Public Report	Study Overview	Key Question	Results ↑ Improvement; ↓ Worse; ↔ No difference
Cai 2010 ⁸¹ (Fair)	NH Compare	Compared State vaccination rates for three flu seasons (2005-2006, 2006-2007, 2007-2008) after the publication of vaccination rates in NH Compare. Rates for NH residents compared with rates for community dwelling elderly. N=51 (all States and DC).	3	State vaccination rates change with NH Compare ↑ Vaccination rate: Short-stay and long-stay residents ↔ Larger increase in community-dwelling elderly than in NH residents
			6	↑ More improvement among NHs with lower baseline rate ↓ Slight decline among NHs with higher baseline rate
Castle 2007 ¹¹⁵ (Fair)	NH Compare	Compared publicly reported QMs for U.S. NHs in markets with high competition and low occupancy rates to NHs in markets with low competition and high occupancy rates in 2003 and 2004. N=14,554	6	<u>Higher Competition</u> ↑ 5 out of 14 QMs improved and overall improvement Long Stay: ADLs, low risk pressure sores; short stay: delirium, pain, pressure sores ↔ no significant effect: 9 out of 14 QMs <u>Lower Occupancy</u> ↑ 8 out of 14 QMs improved and overall improvement Long stay: ADLs, low risk pressure sores, catheter, ability to move around Short stay: delirium, pain, pressure sores ↔ no significant effect: 7 out of 14 QMs

Table 7. Summary of evidence: long-term care services (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results ↑ Improvement; ↓ Worse; ↔ No difference
Castle 2008 ⁶⁰ (Fair)	NH Compare	Examined trend in improvement post public reporting adjusted for regression to the mean for U.S. NHs from 2004 to 2006. Subgroup comparisons by market characteristics. N=14,224	1	↑ 9 of 15 QMs Long stay: pain, high risk PU, low risk PU, restraints, depressed, catheters Short stay: delirium, pain, pressure sores ↓ 5 of 15 QMs Long stay: ADLs, incontinence, move about, UTI, lose too much weight ↔ 1 of 15 QMs Long stay: mostly in chair or bed
			6	<u>Higher Competition</u> ↑ 8 out of 15 QMs and overall Long stay: ADLs, high risk pressure sores, depressed, most time in bed or chair, UTI, lost too much weight Short stay: delirium, pain ↔ no significant effect: 7 out of 15 <u>Lower Occupancy</u> ↑ 10 out 15 QMs and overall Long stay: ADLs, low risk pressure sores, restraints, depressed, incontinence, UTI, ability to move around, lost too much weight Short stay: delirium, pressure sores ↔ no significant effect: 7 out of 14 QMs
Castle 2010 ²²⁴ (Fair)	Special Focus Facility designation by CMS (on Nursing Home Compare)	Compared all U.S. NHs divided by whether they are in counties that had one or more special focus facility in 2007 (n=135) compared with NHs in counties where none had this designation. (N=14,1553)	6	Impact on quality measure of SFF in same county ↑ 4 out of 22 QMs High-risk PU, low-risk PU, UTI, short-stay PU ↓ 2 out of 22 QMs Any deficiency, quality citations ↔ 16 out of 22 QMs ↑ 8 out of 22 QMs when only facilities below the median level of quality are analyzed
Gaudet 2011 ⁶² (Good)	NH Compare	Examined how NH performance changed in response to public reporting and how this varies across market and facility characteristics, particularly the proportion of black residents in NHs. N=over 14,500 NHs (exact n varies for each quarter)	1	Change in NH Compare QMs ↑ Restraints, pressure ulcers, pain ↓ ADLs
			6	↔ Percent no significant effect of Medicare residents, nonprofit ownership, market competition on QMs ↔ Percent Black residents had no significant effect overall; NH with higher percent Black residents started a higher quality pre public reporting on some QMs. NH Compare had less of an impact (slope of change was less) on facilities with higher percent Black residents compared to facilities with lower levels of Black residents

Table 7. Summary of evidence: long-term care services (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results ↑ Improvement; ↓ Worse; ↔ No difference
Grabowski 2011 ⁶¹ (Good)	NH Compare	Evaluated the effect of NH Compare on facility performance and consumer demand for services in pilot and on pilot States. N=15,553 NHs	1	QMs post NH Compare; comparison of pilot and non pilot States ↔ No impact on 5 of 5 QMs
			4	↔ No impact of 5 publicly reported QMs on market share
			6	<u>Higher competition</u> ↑2 of 5 QMs High-risk PU, low-risk PU ↔ 3 of 5 QMs
Jung 2010 ¹⁴ (Fair)	Home Health Compare	Described change in quality measures from 2003 to 2007 (yearly measures) and change by Home Health Agency Characteristics. N=8,679 agency with at least 2 years of data.	1	Change in QMs post HH Compare ↑7 of 7 functional measures Number of QM for which agencies changed quality indicator scores ↑ 6 of 7 more agencies improved ↓ 1 of 7 more agencies worsened
			6	↑ Nonprofit started lower than for profits on some QM, but had greater improvement and ended with higher scores on all QMs ↑ hospital-based had greater improvement ↑ longer Medicare tenure had greater improvement ↑ lower baseline QMs increased more
Konetzka 2012 ⁷⁵ (Good)	NH Compare	Analyzed if NHs responded to public reporting by rehospitalizing postacute care patients who might have a negative impact on their NH Compare scores before they are assessed (Day 14) for NH Compare scores. N=8,139 NHs	2	↓ 1.2% increase in discretionary rehospitalizations. 0.5% after controlling for secular trends by comparing pilot and non pilot States. Increase greater in patients at higher risk of poor scores on NH Compare QMs
Mukamel 2008 ⁶³ (Good)	NH Compare	Compared quality scores for all U.S. NHs. Pre Public Reporting(4th Q 2001 to 4th Q 2002) and Post Public Reporting: (1st Q 2003 to 4th Q 2003). Merged with survey responds for 10% sample of administrators. 724 completed survey (48.2%)	1	↔0 of 5 for time trend ↑2 of 5 for change in level after public report: physical restraints, short-stay pain ↓ 1 out of 5: pressure ulcers (in non demonstration States) ↔2 out of five: ADLs, infection and PU in demo States.
			3	Change in QMs with number of actions taken ↑ With increase in actions: Physical restraints, short-stay pain ↓ With increase in actions: Pressure Ulcers ↔ With increase in actions: ADL and Infections

Table 7. Summary of evidence: long-term care services (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results ↑ Improvement; ↓ Worse; ↔ No difference
Mukamel 2009 ⁷² (Fair)	NH Compare	Compared NH admission cohorts for all U.S. nursing homes for periods pre and post reporting as well as after changes in 1st Q 2004. Pre Reporting: 1st Q 2001 to 4th Q 2002. Post Reporting: 1st Q 2003 to 4th Q 2005. N=16,745	2	↔ No significant change in admission cohorts indicating no cream skimming ADL, diabetes, incontinence, PU stage 2 or higher ↓ Decrease indicating cream skimming Pain and memory loss
			6	Change in admission cohorts by NH characteristics ↔ADL, diabetes, incontinence, PU stage 2 or higher Reduced admissions ↓ Pain: for profit and nonprofit reduced admissions, government NH did not Memory loss: for profit and chain reduced admissions
Mukamel 2010 ⁸⁰ (Fair)	NH Compare	Compared ratio of clinical to hotel expenses by NHs for 2 pre report-card years and 4 post public report years including 10,022 NHs over 6 years from 2001 to 2006 (54,235 observations).	3	↑ by 5% in the ratio of clinical to hotel expenditures post public report Magnitude of effect reduced significantly by controlling for differential growth in costs.
			6	↑ Ratio for NH with: Lower-quality scores Lower occupancy For profit Chain owned More competitive markets
Park (13080) 2011a ¹⁰⁸ (Good)	NH Compare	Examined if high quality NHs or NHs that improve on publicly reported quality scores receive a return in terms of financial performance by increasing admissions by comparing 1999-2002 to 2003-2006. N=6,286 NHs	4	Improvement in NH Compare QMs leads to ↑ Market share, specifically increased Medicare admissions leading to better financial performance (higher revenues) If NHs is High Quality based on NH Compare QMs than ↔ Market share and financial performance relationship do

Table 7. Summary of evidence: long-term care services (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results ↑ Improvement; ↓ Worse; ↔ No difference
Park (12601) 2011b ¹⁰⁹ (Good)	NH Compare	Explored if public reporting changes the relationship between financial performance and quality of care in NHs prior to NH Compare (1997-2002) vs after NH Compare (2003-2006). N=9,444 NHs	4	Interaction between profit margin and QMs ↑ 3 of 4 QMs the association between profit margin and QMs was stronger after public reporting (total staff hours per resident day, incidence of pressure ulcers, number of deficiency citations) ↔ 1 of 4 QMs the association between profit margin and restraint use was not significantly different after public reporting
			6	For profit vs. nonprofit ↑ For profit: 3 of 4 QMs stronger association between profit margins and QMs after public reporting ↑ Nonprofit: 1 of 4 QMs stronger association between profit margins and QMs after public reporting Competitive Markets ↑ greater increased association between profit and quality in competitive markets after public reporting
Stevenson 2006 ¹⁰⁶ (Poor)	Nationally posted Deficiencies and Staffing Levels for NHs	Compared Pre Reporting: 1996 - Oct. 15, 1998 (1996, 1997, 1998) to Post Reporting Years: (1999, 2000, 2001, 2002).	4	Change in occupancy rate as measure for patient selection Post quality rating: ↑ Increase in occupancy with fewer prior deficiencies, with fewer prior serious deficiencies with more LPN/RN staff ↓ Decrease in occupancy with more aide staff (contrary to hypothesis)
Werner 2009a ¹³ (Good)	NH Compare for Post Acute care	Compared all NHs with residents with postacute stays of at least 14 days pre 2002 NH Compare launch vs. post NH Compare and compared these to small nursing homes not included in NHC. N= 8,137 in NH Compare; 2,777 small NHs	1	↑ 3 of 4 QMs Pain, delirium, walking ↓ 1 of 4 QMs Preventable rehospitalization Incorporation of secular trend ↑ 3 of 4 QMs Pain, smaller magnitude Delirium: no change in magnitude Walking: slight increase in magnitude ↓ 1 of 4 QMs Preventable rehospitalization Slight worsening, then stable but did not improve.

Table 7. Summary of evidence: long-term care services (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results ↑ Improvement; ↓ Worse; ↔ No difference
Werner 2009b ⁷⁴ (Good)	NH Compare for Post Acute Care	Compared all U.S. NHs using MDS data pre NH Compare and post NH Compare on postacute care measures on NH Compare. N=13,683	2	Change After NH Compare ↑3 of 3 publicly reported QMs Pain, delirium, walking Not publicly reported QMs for same period ↑5 of 9 QMs Pain, locomotion, shortness of breath, incontinence, respiratory infection ↓4 of 9 UTI, ADLs, mid-loss ADLs, early-loss ADLs Non publicly reported for NHs with high score on publicly reported ↑6 of 9 QMs Pain, locomotion, shortness of breath, incontinence, respiratory infection, UTI ↓3of 9 QMs ADLs, mid-loss ADLs, early-loss ADLs ↓Nurse staffing decline less for high score than low score on reported measures
Werner 2010 ⁵⁸ (Good)	NH Compare for Post Acute Care	Compared all NHs reporting postacute measures twelve months before Public Report to twelve months after launch of NH Compare. Disaggregates change into portions due to QI, market share and residual N=8,137	1	Post acute care measure change post NH Compare ↑ Pain overall ↑Pain due to QI ↑Pain due to market share ↓Pain due to residual ↔Delirium overall ↔Delirium due to QI ↑Delirium due to market share ↓Delirium due to residual ↔walking overall ↑Walking due to QI ↑Walking due to market share ↓Walking due to residual

Table 7. Summary of evidence: long-term care services (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results ↑ Improvement; ↓ Worse; ↔ No difference
Werner 2011 ⁷³ (Good)	NH Compare for Post Acute Care	Compared pilot and non pilot States prior to and after NH Compare to determine if public reporting results in changes in the types of people choosing high and low quality providers (patient sorting) occurred for postacute care. N=8,139 NHs	2	Cream skimming ↔ No evidence NHs admitted lower risk patients in order to improve NH Compare scores Down coding ↓ Change in admission levels of pain (lower after public reporting) suggests facility may be down coding high risk patients
			4	Patient sorting; high risk patients admitted to higher quality NHs ↑ 1 of 3 QMs. Pain (correlation between higher risk on admission and high quality increased after NH Compare. 10 point higher NH Compare score associated with 1% point increase in admission pain level for following quarter ↔ 2 of 3 QMs Delirium and difficulty walking. No change
Werner 2012 ¹⁰⁷ (Good)	NH Compare for postacute care	To determine if public reporting influences patients' selection of NHs for postacute care.	4	Selection of NHs (market share) ↑ 1 of 3 QMs; Pain Change in a Pain score from 25 th to 74 th percentile (fewer patients with pain) increases market share 1.3% ↔ 1 of 3 QMs; Delirium near zero ↓ 1 of 3 QMs; Walking Counter intuitive result: improvement in score associated with decline in market share
			6	Patient Education Level ↑ 3 of 3 QMs larger response to public reporting by patients with higher (High school or more) education level NH Occupancy/Capacity Constraints ↑ Greater impact on selection in markets with lower occupancy (lower capacity constraints) Not reporting in NH Compare ↓ Smaller NHs not required to publicly report lose market share after public reporting, suggesting patients interpret the lack of data as a sign of poor quality.

Table 7. Summary of evidence: long-term care services (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results ↑ Improvement; ↓ Worse; ↔ No difference
Zinn 2005 ⁵⁹ (Fair)	NH Compare	Assessed quality improvement using NH Compare quarterly reports from November 2002 (first publication) through January 2004 for all NHs reporting. (N=over 13,00 for long-stay resident measures, over 9,000 for short-stay resident measures)	1	Post NH Compare: ↑ Long stay: pain, physical restraints Short stay: delirium, pain ↔ Long stay: daily tasks, PU, PU risk adjusted, infection Short stay: delirium risk adjusted, walking
			6	Characteristics compared on rate of improvement. End level was still higher even though improvement is faster for NH with characteristics (the trend lines do not cross) Long Stay Residents ↑ Pain higher rate of improvement in hospital-based vs. not hospital-based Short Stay Residents ↑ Delirium higher rate of improvement with low occupancy rate vs. high ↑ Pain higher rate of improvement in non chain vs. chain NH
Zinn 2008 ⁷⁹ (Good)	NH Compare	Cross-sectional comparison of response to NH Compare by different types of strategic orientation: Prospectors changed frequently and valued innovation and flexibility. Defenders focused on core services and emphasize operating efficiencies. Analyzers blended characteristics of the first two. Reactors lacked a strategy. Survey responds for 10% sample of administrators. 724 completed survey (48.2%)	3	37% took immediate action due to NH Compare; 30% took no action Found differences in responses by strategic type of administrator <ul style="list-style-type: none"> • Respond immediately: Prospectors • Take no action: Defenders • Communicate with families about public report: No strategic type • Investigate reasons for scores: Prospectors and analyzers • Revise job descriptions: Prospectors • Invest in equipment of technology: No strategic type
			6	37% took immediate action due to NH Compare; 30% took no action Characteristics of NH more like to take these actions: <ul style="list-style-type: none"> • Respond immediately: Nonprofits, high competition • Take no action: Poor initial quality, low competition • Communicate with families about public report: High competition, chain • Investigate reasons for scores: Poor initial scores • Revise job descriptions: Poor initial scores • Invest in equipment of technology: different by no NH characteristics

Table 7. Summary of evidence: long-term care services (continued)

Author Year (QA)	Public Report	Study Overview	Key Question	Results ↑ Improvement ; ↓ Worse ; ↔ No difference
Zinn 2010 ⁷⁸ (Fair)	NH Compare	Likelihood of investing resources to response to NH compared by administrator perceptions and NH characteristics. 10% random sample of NH administrators at all facilities with at least one quality measure reported on NH Compare in 2006. 538 responses from 1407 contacted (38.3%)	3	Likelihood of resource intensive changes in response to perceptions of NH Compare influence Believe NH Compare Influences Referrals ↑4 out of 6 actions ↔ 2 out 6 Believe NH Compare Influences Choice of NH ↑1 out of 6 actions ↔5 out 6 Believe NH Compare Influence State Survey ↑5 out of 6 actions ↔1 out 6 Have Managed Care Contract ↓ 3 out of 6 actions ↔ 3 out 5
			6	↑3 out of 6 actions More likely if NH had low-quality scores as opposed to high-quality scores and is in a highly competitive market

Notes: ADL = activities of daily living; CMS = Centers for Medicare and Medicaid Services; NH = nursing home; PU = pressure sores or ulcers; QI = quality improvement; QM = quality measure; SFF = special focus facility; U.S. = United States; UTI = urinary tract infection

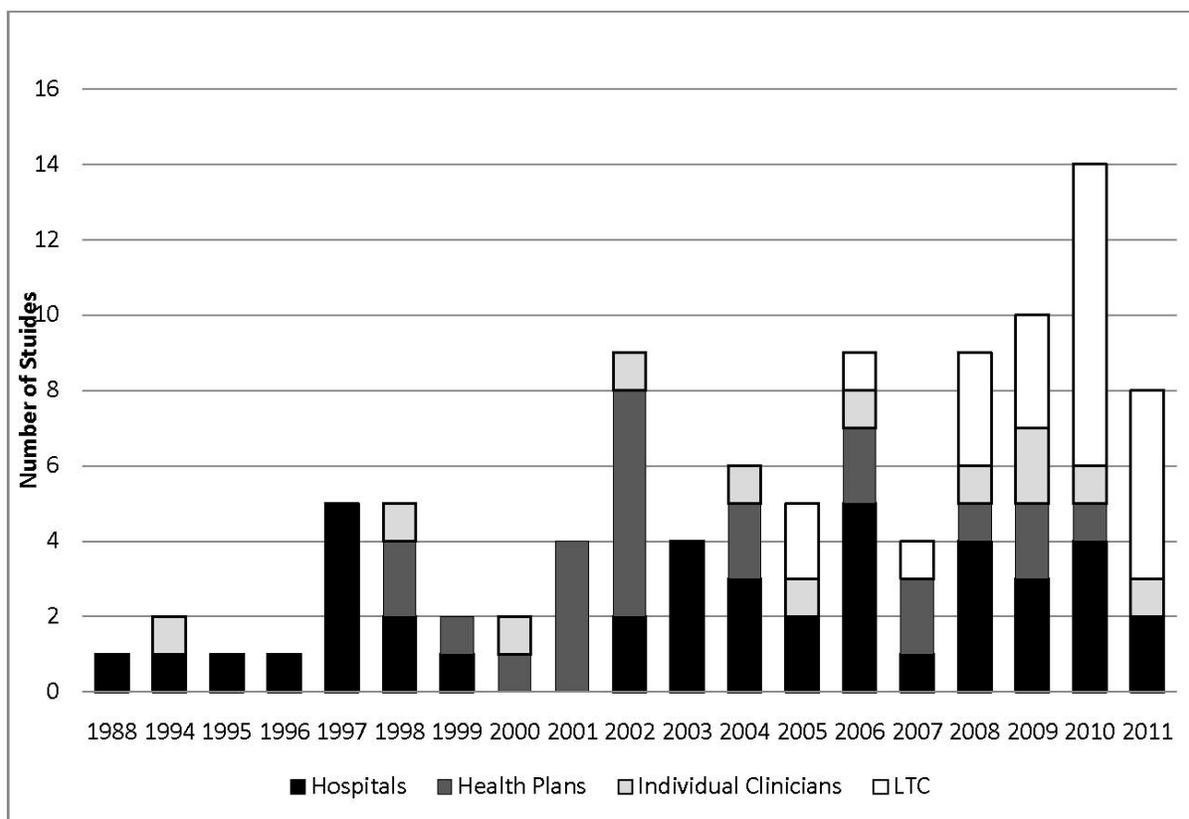
Discussion

Publicly reporting quality information on health care is a population-level intervention that can serve many purposes for a variety of stakeholders. For this review we considered public reporting as a mechanism designed to influence health care delivery, and ultimately health care outcomes, by creating incentives that encourage the provision of high-quality care. Our focus conforms to the theme of the Closing the Quality Gap: Revisiting the State of the Science series (CQG series) but it is not meant to suggest that public reporting is intended only as a quality improvement strategy. This purpose does delineate what was included in the review and how we assess the identified research.

Public reporting has a 25-year modern history that began in the United States but has gained traction in other countries as efforts to use market mechanisms and transparency to promote quality improvement and the provision of high-quality health care services have become increasingly popular.

Early public reports on hospital mortality in the United States and hospital-level and then surgeon-specific cardiac surgery outcomes in New York State and Pennsylvania generated a significant amount of controversy and research. Studies of reports on health plans came after the public reports were created and were based on Healthcare Effectiveness Data and Information Set (HEDIS) and Consumer Assessment of Healthcare Providers and Systems (CAHPS) data. Their public release was first voluntarily, then later mandated by many States and the Federal government for some programs. Most recently, the creation and release of quality measures for long-term care services (nursing homes and home health agencies) in 2002 and 2003 has been the subject of public reporting through the Medicare Compare Web sites. Through the Medicare.gov Web site the Centers for Medicare and Medicaid Services (CMS) provides information on a variety of health services and reports on additional services that are being added to Medicare Compare as data and measures are available. These above-mentioned public reports are the subject of the majority of public reporting research and the volume of research has increased as these public reports have become available. Most of this research has been funded by U.S. government agencies or private foundations (the funder of each study is included in the evidence tables in the Appendixes). Figure 3 below presents the number of quantitative studies identified for this review by publication year and by health care setting in order to illustrate trends in research production.

Figure 3. Number of included quantitative studies by year and health care setting



Note: 2011 includes two studies that were available online or presented at conferences in 2011 but were not published until 2012.

The main findings from this review are summarized in Table 8. The results in this table are presented by Key Question and then by outcome across health care settings. We have also assessed the strength of the body of evidence and this determination is included in Table 8. The assessments of the criteria that contributed to these determinations of the strength of evidence are included in Appendix P. The variety of outcomes underscores the heterogeneity of the research literature about health care public reports. Different outcomes have been used across studies, prohibiting quantitative synthesis and making even qualitative synthesis difficult on some topics.

We synthesized across health care settings for the same outcome (e.g., we considered the impact of public reporting on market share for hospitals, individual providers, health plans, and long-term care). Combining across settings was possible because the outcomes overlapped sufficiently across settings even though all of the same outcomes were not studied in all settings (e.g. mortality was studied in hospitals and individual providers but not long-term care and health plans).

Discussion by Key Question

There is some evidence that public reporting has an impact on the quality of health care (**Key Question 1**), but this is less consistent for changes in mortality, which has been the subject of research in hospitals, and more evident in improvement in care processes and quality indicators that have been the subject of public reporting on health plans and long-term care services as well as hospitals. The evidence that supports this came from 19 studies; nine of these from long-term

care where there have been more studies of improvements in quality measures that are part of Nursing Home Compare and Home Health Compare. The strength of evidence was rated as high because the results are consistent and many of the included studies were rated as good quality.

Harms (**Key Question 2**), or unintended consequences that could result from public reporting, are frequently discussed but less consistently studied and the results of the identified studies do not support that the harms are common or widespread. The included studies consisted of evidence for two types of harms: access restrictions and unintended (negative) provider behavior. Twelve studies examined various ways that public reporting could have a negative impact on access to services. Mechanisms that restrict access that were studied included providers avoiding high-risk patients or selecting low-risk patients (referred to as cream skimming), referring high risk patients out of State, delaying treatment of high risk patients, or discriminating against patients from racial or ethnic groups that might be considered higher risk. The results of these studies were inconsistent, with most finding that access was not restricted; however studies that found that access is adversely affected merit attention because restricting access can have persistent effects and contribute to health care disparities (e.g., the finding that an increase in racial and ethnic disparities in access to services increased after public reporting and that it persisted for 9 years.⁶⁸

The other type of harm that has been studied is provider behaviors that reflect either perverse incentives or attempts to “game” public reporting. These types of behaviors include any actions designed to improve performance reporting without actually improving quality, such as changing the way data are recorded as well as a focus on the reported measures to the detriment of other aspects of care (referred to as crowd out). Crowd out was not confirmed in studies of either long-term care or health plans and studies of individual clinicians and health plans did not find that providers left markets in order to improve public reporting scores. However, long-term care evidence from one study suggested that providers changed how they assessed pain in order to improve their performance scores⁷³ while the results of another study indicated that nursing homes readmitted patients to the hospital who could lower their performance ratings before they are assessed.⁷⁵

Recent discussions of the theory and justification for public reporting have focused on its impact on individual clinicians and organizations that provide care (**Key Question 3**). The suggestion is that one of the primary pathways from public reporting to improved quality is via the influence on provider behavior. Whether the motivation is fear of losing patients, desire to obtain more contract or referrals, or concern about reputation, the assumption is that health care providers will want to improve and will not want to appear to be negative outliers in relation to their peers. This outcome was not always included in earlier studies of public reporting about hospitals and health plans in part because the issue had not been raised and the focus was on mortality. The processes that lead to mortality were a “black box” in that it was left to the providers to manipulate as they saw fit to get to the outcome. Isolating the impact of public reporting on providers is difficult because many other factors could be the cause of the change in behavior. More recent studies have attempted to address the impact of public reporting on provider behavior and care processes through innovative study design. Studies identified in this review found that individual clinicians and organizations respond to public reporting as intended by changing policies, offering more services, and increasing focus on clinical and quality improvement activities. This research included mixed mode studies that collected information on quality improvement activities via interviews or observations and then linked this to administrative data to confirm whether the reported actions resulted in improvement. This

suggests the possibility that additional research using data from sources such as electronic health records and clinical registries could be useful in evaluating public reporting.

The idea that public reports affect the choices made by patients and families, or people acting as their agents, is part of the rationale for public reporting (**Key Question 4**). Addressing asymmetries in the availability of information should encourage more efficient market function and may have other effects as well such as increased patient engagement. However public reporting has been evaluated in terms of its ability to affect selection. As a core concept in the economic theory-based rationale for public reporting, selection has been more frequently studied than most other outcomes. While the strength of the evidence differs somewhat across setting, the conclusion is that public reporting has no or very little impact on selection. The most positive conclusion that could be made is that results are mixed, but it is hard to say more given the weak designs of most of the included studies.

The qualitative research provided insights into why this might be case. The primary reasons public reports did not influence selection were that people are not aware that the quality information is available; the information provided in public reports was not what they needed or valued, the information was not always available when they need it to make a decision; or the information was not presented in a way that is comprehensible. Much of the qualitative research has focused on how presentation and format could increase comprehension. Perhaps if all producers of public reports followed the resulting recommendations on format and presentation, the impact of public reports on selections of providers would increase. However, this is not a given. Neither the design of most public reports, nor the design of studies of public reporting adequately consider that health care decisions are complex and that consumer preferences may differ significantly from those of health care providers and policymakers. To effectively influence the selection of providers, public reporting would need to be significantly redesigned to address these issues in addition to changing format and presentation.

While the literature on decisionmaking and public reporting acknowledges that several different characteristics of the intervention likely determine its effectiveness (**Key Question 5**), this was rarely examined directly in quantitative studies and it was even difficult to assess indirectly. We found only two quantitative studies that either varied on some characteristics or empirically examined the impact of existing variation. Assessing this indirectly would require having access to more comprehensive descriptions of the public reports and determining if selected characteristics of the public reports are associated with variation in results. This is discussed in Future Research Needs below in more detail.

The idea that context matters (**Key Question 6**) is reflected in the fact that some environmental factors are studied in relation to public reporting. Within each setting there is not enough evidence to draw conclusions; however across settings there were consistent findings related to competition and baseline performance. An economic model of public reporting suggests that in competitive markets the public reporting may have a greater impact on quality of care. The idea is that public reporting allows health care providers to compete on quality whereas when these data were not available they had to compete on other factors like price and amenities.

Table 8. Summary evidence table: effectiveness of public reporting of health care quality as a quality improvement strategy

Key Question	Outcome: Conclusion	Total Studies^a Settings (Number of Studies)	Strength of Evidence
Key Question 1 Does public reporting result in improvements in the quality of health care (including improvements in health care delivery structures, processes, or patient outcomes)?	<i>Reduction in mortality:</i> Public reporting was associated with a small decline in mortality after controlling for trends in reductions in mortality.	19 Hospitals (18) Individual clinicians (1)	Moderate
	<i>Quality and process Indicators. (e.g. CAHPS, HEDIS, Nursing Home Compare):</i> Most studies found that public reporting is associated with improvement in quality and process indicators, though this varies across specific measures.	19 Hospitals (5) Health plans (5) Long-term care (9)	High
Key Question 2 What harms result from public reporting?	<i>Increase in Mortality:</i> In one study an increase in mortality was attributed to public reporting.	1 Hospitals	Insufficient
	<i>Inappropriate diagnosis and treatment:</i> In one study the hypothesis that a publicly reported measure would lead to over diagnosis and prescribing was not supported.	1 Hospitals	Insufficient
	<i>Access restrictions:</i> Most studies concluded that public reporting does not contribute to reduced access for patients (e.g., avoiding high-risk patients, referring high-risk patients out of State). Fewer studies have identified instances of reduced access, suggesting this conclusion could be changed based on future research.	13 Hospitals (8) Individual clinicians (2) Long-term care (3)	Low
	<i>Unintended provider behavior:</i> There was some evidence from LTC that public reporting motivates NHs to change coding and readmitting patients to the hospital. No evidence supported a link with surgeons or organizations withdrawing from the market or with declines in quality for items not measured (crowding out).	5 Individual clinicians (1) Health plans (2) Long-term care (2)	Moderate
Key Question 3 Does public reporting lead to change in health care delivery structures or processes?	<i>Provider actions:</i> The evidence suggested that individual clinicians and organizations respond to public reporting in positive ways including adding services, changing policy and increasing focus on clinical care. One study found that low-quality surgeons leave practice (considered a positive action). A study of vaccination rates was the only one that found no effect.	10 Hospitals (4) Individual clinicians (1) Long-term care (5)	Moderate

Table 8. Summary evidence table: Effectiveness of public reporting of health care quality as a quality improvement strategy (continued)

Key Question	Outcome: Conclusion	Total Studies^a Settings (Number of Studies)	Strength of Evidence
<p>Key Question 4 Does public reporting lead to change in the behavior of patients, their representatives, or organizations that purchase care?</p>	<p><i>Selection (market share/volume):</i> Studies found no or minimal impact of public reporting on selection as measured by market share or volume. Contracting patterns suggested purchasers give only minimal consideration to publicly reported quality when selecting providers.</p>	<p>47 Hospitals (15) Individual clinicians (9) Health plans (17) Long-term care (6)</p>	Moderate
<p>Key Question 5 What characteristics of public reporting increase its impact on quality of care?</p>	<p><i>Mode and tone of message:</i> One study found that mode (email vs. mail) affects use of public reports, while tone of the message (risks vs. benefits) does not.</p>	<p>1 Individual clinicians</p>	Insufficient
	<p><i>Accuracy and usefulness:</i> One study found that the quality information contained in public reports is accurate and useful for patient selection even if there is a substantial delay between data collection and publication.</p>	<p>1 Individual clinicians</p>	Insufficient
<p>Key Question 6 What contextual factors (population characteristics, decision type, and environmental) increase the impact of public reporting on quality of care?</p>	<p><i>Competitive market:</i> Studies have found that public reporting is more likely to result in improvements in quality if the clinician or provider is in a competitive market.</p>	<p>7 Hospitals (2) Long-term care (5)</p>	High
	<p><i>Baseline performance:</i> The likelihood of improvement after public reporting was greater for entities with lower quality before or at the first instance of reporting.</p>	<p>5 Health plans (2) Long-term care (3)</p>	High
	<p><i>Nursing home characteristics:</i> Characteristics (e.g., ownership) did not reliably predict how NHs react to public reporting. Studies found no consistent difference across characteristics.</p>	<p>6 Long-term care (6)</p>	Low
	<p><i>Patient characteristics/ subgroups:</i> Different patient characteristics such as age, specific health care needs, and insurance coverage may have increased the likelihood that publicly reported data affects choice.</p>	<p>3 Health plans (1) Individual clinicians (2)</p>	Low
	<p><i>Variation in quality:</i> Public reporting was more likely to influence quality if the level of quality varies across plans in market</p>	<p>1 Health plans</p>	Insufficient

Notes: CAHPS = Consumer Assessment of Healthcare Providers and Systems; HEDIS = Healthcare Effectiveness Data and Information Set; LTC = long-term care; NH = nursing home

^a Conclusions and strength of evidence are based on the 97 included quantitative studies. Studies that examined more than one outcome are included separately for each outcome.

Applicability

Drawing our conclusions about public reporting from evidence across different health care settings but also across different geographic areas and different time periods limits the

applicability of our results. Not all of our overarching conclusions would be applicable to a present-day public reporting effort for one health care setting in a specific geographic region. We included dates and geographic information (whether the public reporting was national or region, in the United States or in other countries) in the description of studies in the sections of the report that present the results by settings and when study results are presented in detail in order to make this as transparent as possible. However, we did not develop a schema that weighted more recent studies or studies from particular geographic regions more heavily in our conclusions.

For these reasons, this review does not result in a guide to how to produce the most effective public reports in a given setting. Nevertheless, we believe the summary of prior research, even if that research is not representative of the scope of current public reporting, may be useful to several audiences. The results of this review can be used to help set realistic expectations for how much public reporting can influence decisionmaking and result in improvements in quality. These realistic expectations should be used to inform both the design of public reporting programs and the research designed to evaluate these efforts. Organizations or individuals promoting of public reporting should specify their objectives in term of in terms of other goals such as increasing transparency as well as expected levels of quality improvement.

Another importance role for this review is to identify for policymakers, research funders, and researchers the state of the current science of public reporting. This review summaries how public reporting efforts have been evaluated in the past and underscores the need for both improvements in methods for the evaluation of public reporting and similar population-level interventions and the need for research to be representative of more contemporary public reporting programs.

Limitations of the Review

The major limitations of this review are related to the nature of public reporting as an intervention and affect both what studies were included and how they were summarized.

Public reporting is multidisciplinary and population-based and has a 25-year history in several countries and geographic regions. Additionally, it is often viewed as a policy, management, or educational activity that focuses on disseminating existing information rather than generating new knowledge. Each of these characteristics creates a challenge in adapting systematic review methods in health care that have been developed primarily for comparing and evaluating medical interventions.

Public reporting quality information in health care is an intervention based on theories in economics, decision science, psychology of behavior change, organizational sociology, and public policy, and this list is not complete. While our search was not limited to only biomedical databases, it is likely there is literature from some relevant disciplines in social science, humanities index in discipline-specific databases that we did not search. The large number of articles we triaged and reviewed, combined with input from experts with significant experience limits, does not negate the possibility that we missed significant studies or other types of relevant research. Also, although we included qualitative literature in our narratives, our review is not a true qualitative review. While we did not exclude studies based on study design, our search was not tailored specifically to identify qualitative studies. We summarized these qualitative studies, but we did not employ qualitative synthesis methods that usually involve iterative cycles of review, synthesis, and revision of the study questions until saturation is reached.

We believe as well, but cannot definitively prove, that there are studies of public reporting that exist but that have not been published in peer review journals or distributed through the grey

literature sources that we were able to access or identify despite searches and a targeted email request for unpublished research sent to identified producers of public reports. This belief is based on discussion with our expert panel, as well as other indications. For example, in one of the qualitative studies we identified, 50 percent of public report sponsors reported in interviews that they had evaluated their public report initiatives,²⁰⁴ but there were not corresponding research publications in the literature we searched. The likely reason is that these studies are done as part of operations or program evaluations to meet the specific needs of a stakeholder such as the public report producer, a State agency, or an advocacy group. Once these needs are met, there may be no motivation to publish the results, particularly for non academic producers or stakeholders. Even if academics are involved in the evaluation, if the study is designed for a narrow purpose or specific use, the researcher and/or journal editor may not be interested in publishing the results if they are not perceived as adding to the larger body of knowledge, regardless of how useful they may be to the client or how useful a synthesis of these evaluations might be to the field.

Public reports exist for various reasons and are implemented by different agencies or organizations. In a systematic review of literature we are limited to what has been studied and published. As a result we are limited to drawing conclusions based on what public reporting was at the time the included studies were conducted. If the field has evolved so that public reporting today is materially different than what was studied, the review may not represent the current, state-of-the-art public reporting and it is unlikely to include cutting edge innovations.

This review included a broad range of public reports across about four different health care settings. There is significant variation in what is the subject of public reporting within settings (e.g., hospitals include cardiac surgery, obstetrics, hip replacement) as well as across them. It stands to reason that the decisions patients and clinicians need to make, how they make them, and the potential utility of public reports could also differ significantly. We debated the validity of drawing conclusions across settings. While we decided to do this and present the conclusions by Key Question and outcome across settings, we acknowledge that summarizing on this level may mask important differences that might have been identified if more research was available and the body of evidence could be summarized at the level of more specific decisions about distinct types of health services.

Limitations of the Research on Public Reporting

Public reporting is a population-based intervention that more closely resembles public health activities like putting fluoride in drinking water or smoking bans than it resembles clinical, medical, or health care interventions which treat specific individuals. Public reporting makes information available to anyone who wants it and may involve marketing and dissemination, but it is difficult to identify exactly who is poised to make a health care decision, and we rarely know who actually receives and uses the information. This makes designing studies and conducting research challenging because there are almost always many potential sources of confounding.

Collecting outcomes data and identifying appropriate comparisons is often difficult. The fact that conducting rigorous studies in this field is challenging is mirrored in the challenges we faced in assessing individual studies and the body of evidence based on tools and interventions rooted in the evaluation of clinical research. The focus on randomized trials and observational designs common in clinical research is understandable given that clinic medicine is the basis of evidence-based practice and early comparative effectiveness research. However, the result is that there is limited consensus about how to systematically assess evidence for questions in health services,

public health, and quality improvement. While we attempted to adapt the methods recommended by the Agency for Healthcare Research and Quality (AHRQ) Effective Health Care Program, our approach is only one of several, and others may be equally or more valid.

The majority of the research we identified focused on the intermediate and final outcomes included in our analytic framework and correspond to Key Questions 1, 2, 3, and 4. We included Key Questions 5 and 6 because understanding the implications of variation in the intervention and content are important from a quality improvement perspective in which the desire is not just to know if something works, but also who it works for and when. From this perspective the results of our review were limited by the current state of the literature. Studies rarely reported enough (if anything at all) about the public report or the context. Without this information it was impossible to compare and contrast studies where public reporting had an impact to those where it did not and hypothesize if the difference was due to specifics of the nature of the public reports or the context. This leaves several important questions unanswered. For example, the current research does not adequately address the correspondence between what patients want to know and what is publicly provided or whether the information is assessable (e.g., do consumers have the level of health literacy required to correctly interpret the information?). Similarly for providers we do not know how well the publicly reported measure corresponds to what they believe they can influence or their quality improvement goals.

There is a substantial amount of research on risk adjustment and creation of measures that was not included in this review. The validity and acceptability of measures is essential if public reporting is to have any impact. Research on the impact of public reporting often mentions the importance of the validity of the measures and the research on risk adjustments will often discuss the implications for public reporting, but research rarely links the two.

While we may not be sure if our review missed evaluations of public reports (see limitations of the review above), we know that many more public reports exist than have been studied. An AHRQ-maintained clearinghouse contained over 200 public reports and a recent study identified 263 public reports in 21 geographic areas.²³³ This diversity of reports is not reflected in the research literature. Public reports on cardiac surgery outcomes in three States (New York State, Pennsylvania, and California) and Nursing Home Compare are the subject of just under half of the total quantitative studies in this report. The fact that research has been narrowly focused on a few public reporting initiatives may limit the generalizability and applicability of its results to other reporting efforts and broader public policies.

Future Research

We identified a large number of studies in this review, but the return in terms of credible guidance on how to maximize the impact of public reporting on quality of health care is generally low. The reasons for this are translated into ideas for future research for both public reporting and the synthesis of research on this type of intervention in this section. However this is not an exhaustive inventory of future research needs; it is limited to what can be directly based on or extrapolated from the experience of conducting this review, background materials including many editorials and commentaries, as well as input from our expert panel, peer reviewers, and public comments. These recommendations are limited in that they are not based on a systematic interaction with stakeholders or prioritization of future research needs.

Research Reflecting the Diversity of Public Reporting. The research available on public reporting does not appear to correspond to the current state of practice in several ways. Producers

of public reports have a wide range of motivations and goals for the public reports that appear to be broader than the outcomes that are most frequently included in research. Additionally, public reporting may be part of a multifaceted strategy designed to achieve these goals. The current research does not reflect the scale of the public reporting enterprise, its connection to other initiatives, or innovations in the field. Only a very few of the public reports have been the subject of research. It is possible that studying a wider variety of reports as well as public reporting in a broader context of transparency, patient engagement, and reducing disparities could produce stronger, more nuanced, if not totally different, conclusions. The challenge is that in order to include more public reports in research, the existence of the reports needs to be more widely known and corresponding data needs to be available. Cataloging and tracking a larger number of public reporting efforts and linking them to data would require considerable resources.

Coordinated Agenda for Research on Public Reporting. When the outcomes of the identified studies are examined by setting and Key Question, the impact of heterogeneity in this body of literature becomes clear. There are few outcomes for which it is possible to draw a conclusion based on only research in one setting, requiring summaries across settings. Looking across settings provides the potential to answer some questions, but not others. This is one example of how the research in this field appears to be ad hoc in the sense that studies do not seem to build on prior studies by addressing either previously identified methodological or knowledge gaps. There are some researchers who individually have conducted several studies in the field and it is possible to see how their approach has become more sophisticated with time, perhaps due to increasing experience or availability of data. However, these few cases are not enough to create a pattern in the complete body of literature.

Future research needs to build on what came before with an eye toward advancing understanding and focus on developing the science rather than repeating past approaches that have had a relative low yield. This review may help by uniting more literature in one place than has been done before on this topic. However, it may be unrealistic to expect a coordinated approach to happen without outside intervention given that much of this research appears to be driven predominately (though not completely) by the availability of data. Stakeholders including producers of public reports, researchers, and funding agencies need to identify key issues for the field, and then develop and conduct research targeted to these issues. To do this effectively may require identifying or developing data sources that are appropriate to the research questions and outcomes of interest.

Attention to the Specifics of Public Reporting Including Interventions and the Context.

Considering the research on public reporting in a quality improvement or comparative effectiveness framework requires an understanding of the how the characteristics of the intervention and the context impact whether public reporting leads to higher quality of care. We do not just want to know if it works (efficacy), we want to know who it works for and in what situations (effectiveness). While this may seem obvious, it is not consistently reflected in either the information available in most currently published quantitative research or in the research questions and designs.

It seems unlikely that one approach to public reporting would be effective given the different needs, preferences, and skills of the various users. Considering patients as users of reports, levels of literacy/numeracy, facilities with computers, and values can be expected to be quite diverse. This would suggest that public reports may need to be targeted to smaller audiences to be

effective. While this is a policy more than a research issue, research could contribute to the identification of both the subgroups of patients who make up these smaller audiences and the most effective ways to aim distribution and communicate information.

It is also important to understand of what the intervention, in this case public reporting, consists. Most quantitative research articles provided very little or no information about the content or format of the public report that is the subject of study, or about the context in which the intervention was implemented and studied. This lack of specification of the characteristics and components of public reports and the context makes it difficult to think about how to apply the research results in the future or move from experimentation to implementation on a larger scale. Often, the reason for this lack of detail in descriptions has been attributed to journal policies on article length and content. However, with the use of supplemental Web materials and the creation of clearing houses and databases on interventions, insufficient space is no longer an acceptable excuse. Future research should include finding a way to document, share, and preserve this vital information. Additionally, useful research needs to go beyond simply describing intervention characteristics and context to direct examination of the impact of public report characteristics and context on quality of care.

Our review found very few quantitative studies that tried to go beyond simple description to answer the important questions about what works best when and for whom. More frequently these topics were addressed in qualitative research. This supports the idea that integrating qualitative and quantitative evidence in systematic reviews may lead to more meaningful results. One promising approach that has been suggested is to use qualitative research to develop a list of important intervention characteristics from patients' perspectives, and then assess the quantitative research in terms of whether the interventions incorporate these characteristics and whether there is a pattern of positive quantitative results when this is the case.²³⁴ Unfortunately, the lack of descriptions of the public reports and context in the published literature precluded this approach in our review of public reporting. Implementing this approach would require primary data collection on the characteristics of the reports, which is beyond the scope of this review. Our approach was to categorize the qualitative research and provide narrative summaries of the main results. Development of additional approaches would benefit future reviews.

Systematic Approach to the Study of Harms/Unintended Consequences. Public reporting has the potential to produce perverse incentives that lead to unintended consequences and potential harm to patients and providers. When harms were studied they were reported in the results. Critics of public reporting often describe harms although there is currently limited evidence supporting the occurrence of harms. That does not mean harms do not need to be studied. In fact serious, potentially harmful effects such as increasing disparities or the use of more health services (e.g., more hospital re admissions from long-term care) require more study to identify the extent of the harms and how they can be avoided. Rigorous studies that focus on perverse incentives and unintended consequences are needed in order to provide information that can be used to develop programs and oversight so that harm does not occur in the future.

Methods Development. Both our assessment of the quality of individual studies and our work on this systematic review have sensitized us to the need for more developmental research in methods. Study designs and analyses in individual studies were frequently not able to create adequate comparisons or adequately address important sources of confounding. Methods used in clinical studies (randomized controlled trials, large cohort studies) are often not practical

approaches to reducing bias in health services, public health, or quality improvement research. However, an increasing number of the questions of interest to stakeholders including patients, clinicians, and policymakers are in these fields. Changes in technology and the increasing availability of large quantities of electronic data open up many possibilities, but data alone cannot improve the quality and ultimately the impact of research. By the same token, systematic review and comparative effectiveness research methodology has been predominately developed for the synthesis of research on clinical interventions. The heterogeneity in the body of evidence on public reporting and its limited ability to address major practice and policy issues suggests that research syntheses might have an important role in focusing and driving future research. The chances of success are lowered when the tools used for the synthesis are adaptations that sometimes seem to be wedging square pegs in round holes.

Conclusion

Based on the studies identified in this review we can conclude: Public reporting is associated with improvement in health care performance measures such as those included in Nursing Home Compare. Quality measures that are publicly reported do improve over time. Almost all identified studies found no evidence or only weak evidence that public reporting affects the selection of health care providers by patients or their representatives. Studies of health care providers' response to public reports suggest they do engage in activities to improve quality when performance data are made public. Characteristics of the intervention and the context, which are likely to be important when considering the diffusion of quality improvement activities, were rarely studied or even described. Although the potential for harms are frequently cited by commentators, the amount of research on harms is limited and most studies do not confirm the potential harm.

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Abbreviations and Acronyms

ADL	Activities of daily living
AHRQ	Agency for Healthcare Research and Quality
AMI	Acute myocardial infarction
ART	Assisted reproductive therapy
CABG	Coronary artery bypass graft surgery
CAHPS	Consumer Assessment of Healthcare Providers and Systems
CDC	Centers for Disease Control
CHF	Congestive heart failure
CHOP	California's Hospital Outcomes Project
CHQC	Cleveland Health Quality Choice
CMS	Centers for Medicare and Medicaid Services
CQG series	Closing the Quality Gap: Revisiting the State of the Science series
CSRS	Cardiac Surgery Reporting System
ED	Emergency department
EPC	Evidence-based Practice Center
HAI	Healthcare acquired infection
HAI	Hospital acquired infections
HCFA	Health Care Financing Administration
HEDIS	Healthcare Effectiveness Data and Information Set
HER	Hospital Effectiveness Report
HMO	Health Maintenance Organization
HQA	Hospital Quality Alliance
LTC	Long-term care
MCO	Managed care organization
NH	Nursing home
NHS	National Health Service
PCI	Percutaneous coronary intervention
PPO	Preferred provider organization
PTCA	Percutaneous transluminal coronary angioplasty
QI	Quality improvement
RAMR	Risk adjusted mortality rates
SFF	Special focus facility
TEP	Technical Expert Panel
TOO	Task Order Officer
VBAC	Vaginal birth after cesarean

Appendix A. Literature Search Databases and Strings

List of Electronic Databases for Searches

Name	Platform Provider
Primary Search	
Medline	OvidSP
Current Index to Nursing and Allied Health Literature (CINAHL)	EBSCO
PsycINFO	OvidSP
Embase	Embase
Econlit	EBSCO
EBM Reviews: Cochrane Database of Systematic Reviews (CDSR)	OvidSP
Database of Abstracts of Reviews of Effects (DARE)	
National Health Service Economic Evaluation Database (NHS EED)	
Health Economic Evaluations Database (HEED)	
Business Source Premier	EBSCO
Public Affairs Information Service (PAIS)	ProQuest CSA
EPOC Register of Studies	Cochrane Effective Practice and Organisation of Care Group
Pearling/Citation search of identified studies	
SCOPUS	SciVerse
Grey Literature	
NYAM Grey Literature Database	New York Academy of Medicine Library
Conference Papers	ProQuest CSA
AARP Ageline	OvidSP

Specific Searches

Medline/CINAHL Search

Ovid MEDLINE(R) and Ovid OLDMEDLINE(R) 1947 to May Week 2 2011 and

Ovid MEDLINE(R) In-Process & Other Non-Indexed Citations May 18, 2011

Date Searched: 05/18/2011; updated search through 12/31/2011 conducted on 1/12/2012

1	Benchmarking/ or Information Services/ or Information Dissemination/ or Disclosure/ or Access to Information/ or Mandatory Reporting/
2	Quality indicators, health care/ or Quality assurance, health care/ or Quality improvement/ or "process assessment (health care)"/ or "outcome assessment (health care)"/ or (quality adj2 indicator\$.ti,ab.
3	1 or 2
4	exp Hospitals/ or exp Physicians/ or Nursing Homes/ or Home Care Services/ or Competitive Medical Plans/ or Health Maintenance Organizations/ or Managed Care Programs/ or Insurance, Health/ or Medicare/ or Medicaid/ or Hospices/ or Ambulatory Care/ or Skilled Nursing Facilities/ or Group Practice/ or exp Primary Health Care/ or Institutional Practice/ or Private Practice/ or Family Practice/ or Physicians, Family/ or Professional Practice/ or Allied Health Personnel/ or Outpatient clinics, hospital/ or Academic Medical Center/ or Health Care Sector/ or Hospital Administration/ or Public Health Administration/ or Long Term Care Facility\$.ti,ab. or health care center\$.ti,ab. or health care provider\$.ti,ab. or (coronary or cardiac or cardiolog\$).ti,ab.

5	((Dissem\$ or Disclos\$ or Profil\$ or Inform\$ or Indicator\$ or Metric\$ or Rank\$ or Compar\$ or Score\$ or Rating\$ or Rate\$ or data or measure\$ or criteria or standard\$ or account\$ or report\$ or release\$ or initiative\$ or Star) adj5 (Performan\$ or assessment\$ or evaluat\$ or quality or public\$ or consumer\$ or patient\$ or transparen\$ or provider\$)) or score card\$ or (quality adj2 report\$) or report card\$ or league table\$ or (star adj2 rating) or (Star adj2 performance)).ti,ab.
6	Consumer Participation/ or Consumer Advocacy/ or Consumer Satisfaction/ or Patient Satisfaction/ or Decision Making/ or Choice Behavior/ or Attitude of Health Personnel/ or Physician's Practice Patterns/ or Nurse's Practice Patterns/ or Professional Practice/ or Guideline Adherence/ or Patient Selection/ or Patient Participation/ or Hospital Mortality/ or (decision\$ or choice\$ or choos\$ or behav\$ or patient outcome\$).ti,ab.
7	(Medicare Compare or nursing home compare or Calhospital Compare or California State Report Card or California Hospital Outcomes or myhealthcareadvisor or Massachusetts Health Quality or (Pennsylvania adj3 coronary) or (Hospital Quality adj2 Safety Survey) or Home health Compare or Physician Compare or (New York adj2 Cardiac adj2 Report\$) or (New York adj5 surg\$) or Cleveland Health Quality Choice or (HCFA adj5 mortality) or (HCFA adj5 death) or Federal employee health benefit guide or QualityCounts or CAHPS or HEDIS).ti,ab.
8	3 and 4 and 5 and 6
9	7 or 8
10	limit 9 to yr="1980 -Current"
11	remove duplicates from 10
12	limit 11 to (comment or editorial or letter)
13	11 not 12

Ovid PsycINFO 1806 to May Week 1 2011

Date Searched: 05/10/2011; updated search through 12/31/2011 conducted on 1/12/2012

1	information/
2	"quality of services"/ or quality of care/ or quality control/ or (quality adj2 indicator\$).ti,ab.
3	1 or 2
4	Consumer attitudes/ or Client attitudes/ or Patients/ or Consumer Behavior/ or job performance/ or consumer satisfaction/ or (decision\$ or choice\$ or choos\$ or behav\$ or patient outcome\$).ti,ab.
5	exp Hospitals/ or exp Physicians/ or Nursing Homes/ or exp allied health personnel/ or clinicians/ or outpatient treatment/ or home visiting programs/ or Health Maintenance Organizations/ or Managed Care/ or Medicare/ or Medicaid/ or health insurance/ or Palliative Care/ or private practice/ or health care delivery/ or health care services/ or facilities/ or primary health care/ or public health services/ or long term care/ or Long Term Care Facilit\$.ti,ab. or health care cent\$3.ti,ab. or health care provider\$.ti,ab. or (coronary or cardiac or cardiolog\$).ti,ab.
6	((Dissem\$ or Disclos\$ or Profil\$ or Inform\$ or Indicator\$ or Metric\$ or Rank\$ or Compar\$ or Score\$ or Rating\$ or Rate\$ or data or measure\$ or criteria or standard\$ or account\$ or report\$ or release\$ or initiative\$ or Star) adj5 (Performan\$ or assessment\$ or evaluat\$ or quality or public\$ or consumer\$ or patient\$ or transparen\$ or provider\$)) or score card\$ or (quality adj2 report\$) or report card\$ or league table\$ or (star adj2 rating) or (Star adj2 performance)).ti,ab.
7	(Medicare Compare or nursing home compare or Calhospital Compare or California State Report Card or California Hospital Outcomes or myhealthcareadvisor or Massachusetts Health Quality or (Pennsylvania adj3 coronary) or (Hospital Quality adj2 Safety Survey) or Home health Compare or Physician Compare or (New York adj2 Cardiac adj2 Report\$) or (New York adj5 surg\$) or Cleveland Health Quality Choice or (HCFA adj5 mortality) or (HCFA adj5 death) or Federal employee health benefit guide or QualityCounts or CAHPS or HEDIS).ti,ab.
8	3 and 4 and 5 and 6
9	7 or 8
10	limit 9 to yr="1980 -Current"

CINAHL EBSCO Plus with Full Text

Date Searched: 05/18/2011; updated search through 12/31/2011 conducted on 1/12/2012

S51	S49 NOT S50
S50	S42 or S48 Limiters – Publication Type: Commentary, Editorial, Letter; Exclude MEDLINE records; Published Date from: 19800101-20111231
S49	S42 or S48 Limiters – Exclude MEDLINE records; Published Date from: 19800101-20111231
S48	S43 and S44 and S46 and S47
S47	S32 or S33 or S34 or S35 or S36 or S37 or S38 or S39 or S40 or S41
S46	S26 or S27 or S28 or S29 or S30 or S31 or S45
S45	S24 and S25
S44	S5 or S6 or S7 or S8 or S9 or S10 or S11 or S12 or S13 or S14 or S15 or S16 or S17 or S18 or S19 or S20 or S21 or S22 or S23
S43	S1 or S2 or S3 or S4
S42	AB (“Medicare Compare” or “nursing home compare” or “Calhospital compare” or “California State Report Card” or “California Hospital Outcomes” or myhealthcareadvisor or “Massachusetts Health Quality” or (Pennsylvania n3 coronary) or (“hospital quality” n2 “safety survey”) or “home health compare” or “physician compare” or (“New York” n2 cardiac n2 report*) or (“New York” n5 surg*) or “Cleveland Health Quality Choice” or (HCFA n5 mortality) or (HCFA n5 death) or “Federal Employee Health Benefit Guide” or QualityCounts or CAHPS or HEDIS)AB (“Medicare Compare” or “nursing home compare” or “Calhospital compare” or “California State Report Card” or “California Hospital Outcomes” or myhealthcareadvisor or “Massachusetts Health Quality” or (Pennsylvania n3 coronary) or (“hospital quality” n2 “safety survey”) or “home health compare” or “physician compare” or (“New York” n2 cardiac n2 report*) or (“New York” n5 surg*) or “Cleveland Health Quality Choice” or (HCFA n5 mortality) or (HCFA n5 death) or “Federal Employee Health Benefit Guide” or QualityCounts or CAHPS or HEDIS)
S41	(MH “Decision Making+”)
S40	(MH “consumer satisfaction”)
S39	(MH “consumer advocacy”)
S38	(MH “consumer participation”)
S37	(MH “Hospital Mortality”)
S36	(MH “Patient Selection”)
S35	(MH “Guideline Adherence”)
S34	(MH “Professional Practice+”)
S33	(MH “Attitude of Health Personnel”)
S32	(MH “Patient Satisfaction”)
S31	AB star w2 performance

S30	AB star n2 rating*
S29	AB league w1 table*
S28	AB report w1 card*
S27	AB quality n2 report*
S26	AB score w1 card*
S25	AB (performan* or assessment* or evaluat* or quality or public* or consumer* or patient* or transparen* or provider*)
S24	AB (dissemin* or disclos* or profil* or inform* or indicator* or metric* or rank* or compar* or score* or rating* or data or measure* or criteria or standard* or account* or report* or release* or initiative* or star)
S23	AB ("health care cent*" or "Health care provider?" or coronary or cardiac or cardiologist?)
S22	(MH "Public Health Administration")
S21	(MH "Health Facility Administration")
S20	(MH "Health Care Industry")
S19	(MH "Professional Practice")
S18	(MH "Family Practice")
S17	(MH "Private Practice")
S16	(MH "Primary Health Care")
S15	(MH "Group Practice") OR (MH "Joint Practice")
S14	(MH "Hospices") OR (MH "Hospice Care")
S13	(MH "Medicaid")
S12	(MH "Medicare")
S11	(MH "Health Maintenance Organizations")
S10	(MH "Insurance, Health+") OR (MH "Managed Care Programs+")
S9	(MH "Home Health Care+") OR (MH "Home Nursing, Professional")
S8	(MH "Nursing Homes+") OR (MH "Skilled Nursing Facilities")
S7	(MH "Physicians+") OR (MH "Allied Health Personnel+")
S6	(MH "Long Term Care") OR "long term care facilit**"
S5	(MH "Hospitals+") OR (MH "Ambulatory Care Facilities+") OR (MH "Academic Medical Centers") OR (MH "Hospitals, Public+") OR (MH "Hospitals, Rural") OR (MH "Hospitals, Special+") OR (MH "Hospitals, Urban") OR (MH "Magnet Hospitals") OR (MH "Housing for the Elderly") OR (MH "Ancillary Services, Hospital") OR (MH "Hospitals, Community")
S4	(MH "Truth Disclosure") or (MH "Access to Information") or (MH "Mandatory Reporting")
S3	AB quality n2 indicator*
S2	(MH "Quality Assurance") OR (MH "Clinical Indicators") OR (MH "Performance Measurement Systems") OR (MH "Health Plan Employer Data and Information Set") OR (MH "Outcome Assessment Information Set") OR (MH "Nursing Audit") OR (MH "Quality of Care Research")
S1	(MH "Benchmarking") OR (MH "Quality Improvement") OR (MH "Quality of Health Care") OR (MH "Performance Measurement Systems") OR (MH "Quality Assessment")

EMBASE - Elsevier (1973-present)

Date searched: 06/29/2011; updated search through 12/31/2011 conducted on 1/12/2012

9	#7 NOT #8
8	#5 OR #6 AND ('editorial'/it OR 'letter'/it)
7	#5 OR #6
6	#1 AND #2 AND #3 AND #4
5	'medicare compare':ab,ti OR 'nursing home compare':ab,ti OR 'calhospital compare':ab,ti OR 'california state report card':ab,ti OR 'california hospital outcomes':ab,ti OR myhealthcareadvisor:ab,ti OR 'massachusetts health quality':ab,ti OR (pennsylvania NEAR/3 coronary):ab,ti OR ('hospital quality' NEAR/2 'safety survey'):ab,ti OR 'home health compare':ab,ti OR 'physician compare':ab,ti OR ('new york' NEAR/2 cardiac):ab,ti OR ('new york' NEAR/5 surg*):ab,ti OR 'cleveland health quality choice':ab,ti OR (hcfa NEAR/5 mortality):ab,ti OR (hcfa NEAR/5 death):ab,ti OR 'federal employees health benefit guide':ab,ti OR qualitycounts:ab,ti OR cahps:ab,ti OR hedis:ab,ti AND [embase]/lim AND [2006-2011]/py
4	'hospital'/exp OR 'physician'/exp OR 'hospice'/de OR 'hospital management'/exp OR 'public health service'/de OR 'health care facility'/de OR 'nursing home'/de OR 'home care'/de OR 'health insurance'/de OR 'health maintenance organization'/de OR 'medicare'/de OR 'medicaid'/de OR 'ambulatory care'/de OR 'group practice'/de OR 'primary health care'/de OR 'private practice'/de OR 'general practice'/de OR 'paramedical personnel'/de OR 'outpatient department'/de OR 'university hospital'/de OR ('long term care facilities':ab,ti OR 'health care center':ab,ti AND 'health care centers':ab,ti OR 'health care centre':ab,ti OR 'health care centres':ab,ti OR 'health care provider':ab,ti AND 'health care providers':ab,ti) OR coronary:ab,ti OR cardiac:ab,ti OR cardiologist:ab,ti OR cardiologists:ab,ti AND [embase]/lim AND [2006-2011]/py
3	'consumer advocacy'/de OR 'consumer attitude'/de OR 'decision making'/de OR 'patient decision making'/de OR 'patient attitude'/de OR 'health personnel attitudes' OR 'physician attitudes' OR 'nurse attitudes' OR 'clinical practice'/de OR 'professional practice'/de OR 'practice guideline'/de OR 'patient selection'/de OR 'patient participation'/de OR 'mortality'/de OR decision*:ab,ti OR decide*:ab,ti OR choice*:ab,ti OR choos*:ab,ti OR behav*:ab,ti AND [embase]/lim AND [2006-2011]/py
2	((disseminat* OR disclos* OR profil* OR inform* OR indicator* OR metric* OR rank* OR compar* OR score* OR rating* OR rate* OR data OR measure* OR criteria OR standard* OR account* OR report* OR releas* OR initiative* OR star) NEAR/5 (perform* OR assessment* OR evaluat* OR quality OR public* OR consumer* OR patient* OR transparen* OR provider*)):ab,ti OR 'score card':ab,ti OR 'score cards':ab,ti OR (quality NEAR/2 report*):ab,ti OR 'report card':ab,ti OR 'report cards':ab,ti OR 'league table':ab,ti OR 'league tables':ab,ti OR (star NEAR/2 rating):ab,ti OR (star NEAR/2 performance):ab,ti AND [embase]/lim AND [2006-2011]/py
1	'information service'/de OR 'information dissemination'/de OR 'mandatory reporting'/de OR 'access to information'/de OR 'performance measurement system'/de OR 'quality of nursing care'/de OR 'health care quality'/de OR 'quality control'/de OR 'health services research'/de AND [embase]/lim AND [2006-2011]/py

EBSCO Econlit (1969-present)

Date Searched: 05/25/2011; updated search through 12/31/2011 conducted on 1/13/2012

S7	s1 or s6
S6	S2 and S3 and S4 and S5
S5	(AB (benchmark* or disclos* or rank* or compar* or score* or rating* or rate* or standard* or account* or report*)) and (AB (perform* or assessment* or evaluat* or quality* or public* or transparen*)) or (AB (score n1 card* or quality w2 report* or report n1 card* or league n1 table* or star w2 rating or star w1 performance))
S4	AB (decision* or decid* or attitud* or choice* or choos* or behav* or effect* or incentiv* or select*)
S3	(AB (consumer* or patient* or doctor* or physician* or surgeon* or nurse* or nursing w1 home* or hospice* or long w1 term w1 care w1 facilit* or medicare or medicaid or allied w1 health or provider* or insurance or HMO or health w1 maintenance w1 organization* or hospital* or group w1 practice* or private w1 practice* or public w1 health))
S2	SU "Health: Government Policy; Regulation; Public Health" or SU "analysis of health care markets "

S1	AB medicare n1 compare or nursing w1 home w1 compare or Calhospital w1 compare or California w1 State w1 Report w1 Card or myhealthcareadvisor or California w1 Hospital w1 Outcomes or Massachusetts w1 Health w1 Quality or Pennsylvania n3 coronary or Hospital w1 Quality n2 Safety Home w1 Health w1 Compare or Physician w1 Compare or New w1 York n2 Cardiac w2 Report* or New w1 York n5 surg* or Cleveland w1 Health w1 QualityHCFA n5 mortality or HCFA n5 death or Federal w1 Employee w1 Health w1 Benefit w1 Guide or QualityCounts or CAHPS or HEDIS
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EBSCO BUSINESS SOURCE PREMIER

Date Searched: 05/25/2011; updated search through 12/31/2011 conducted on 1/13/2012

S12	s1 or s10
S11	s1 or s10
S10	S4 and S5 and S6 and S9
S9	S7 or S8
S8	AB (dissem* or disclos* or profil* or inform* or indicator* or metric* or rank* or compar* or score* or rating* or rate* or data or measure* or criteria or standard* or account* or report* or releas* or initiative* or star) and AB (performan* or assessment* or evaluat* or quality or public* or consumer* or patient* or transparen* or provider*)
S7	AB "public report*" or "score card*" or scorecard* or (quality n2 report*) or "quality n2 measur*" or "report card*" or "league table*" or (star n2 rating) or (star n2 performance)
S6	SU "patient education" or "patients" or "patient satisfaction" or "patient selection" or "decision making" or "consumer attitudes" or "consumer satisfaction" or "consumers' preferences" or "consumer behavior" or "consumer activism" or "organizational behavior" or "information behavior"
S5	DE "HOSPITALS" OR DE "CANCER hospitals" OR DE "CHRONIC disease hospitals" OR DE "MEDICAL hospitals" OR DE "NEUROLOGY hospitals" OR DE "SURGICAL hospitals" or DE "medical care" or DE "health services administration" or DE surgeons or DE "Insurance companies" or DE "nursing care facilities" or DE medicare or DE medicaid or DE physicians or DE "health care industry" or DE "health insurance" or DE "long-term care facilities" or DE "nursing homes" or DE "hospitals-administration" or DE nurses or DE "nursing care facilities" or DE "nursing home chains" or DE "health maintenance organizations" or DE "managed care plans" or DE "group medical practice" or DE "allied health practitioners"
S4	S2 or S3
S3	SU benchmarking or SU key performance indicators or SU evaluation or SU quality control or SU quality standards or SU quality assurance or SU standards or AB quality n2 indicat*
S2	SU disclosure of information or SU disclosure or SU access to information or SU report writing or SU databases
S1	AB "medicare compare" or "nursing home compare" or "calhospital compare" or "california state report card" or "california hospital outcomes" or myhealthcareadvisor or "massachusetts health quality" or (pennsylvania n3 coronary) or ("hospital quality" n2 "safety survey") or "home health care compare" or "physician compare" or ("new york" n2 cardiac n2 report*) or ("New York" n5 surg*) or "Cleveland Health Quality Choice" or "health care finance administration" or "Federal Employees Health Benefit Guide" or QualityCounts or CAHPS or HEDIS

Public Affairs Information Service International (PAIS)

ProQuest CSA

Searched 5/25/2011; updated search through 12/31/2011 conducted on 1/13/2012

(AB=((Medicare Compare) or (Nursing Home Compare) or (Calhospital Compare)) or AB=((California State Report Card) or (California Hospital Outcomes) or myhealthcareadvisor) or AB=((Massachusetts Health Quality) or (Pennsylvania within 3 coronary) or (hospital quality within 2 safety survey)) or AB=((home health compare) or (physician compare) or (new york within 2 cardiac within 2 report*)) or AB=((New York within 5 surg*) or (Cleveland Health Quality Choice) or HCFA) or AB=(QualityCounts or (Federal Employee Health Benefit Guide) or HEDIS) or AB=CAHPS) or(((DE=(medical service or physicians or nurses or surgeons or medical workers or medical profession: group practice or hospitals or nursing homes or home care or hospices (terminal care) or outpatient services or medical centers or public health or public health administration or medicare or medicaid program or health insurance or managed care or health maintenance organizations))
and(DE=(quality control or performance or measurement or standards)))
and((AB=((dissem* or disclos* or profil* or inform* or indicator* or metric* or rank* or compar* or score* or rating* or rate* or data or measure* or criteria or standard* or account* or report* or release* or initiative* or star) within 10 (perform* or assessment* or evaluat* or quality or public* or consumer* or patient* or transparen* or provider*)) or(AB=(score card* or scorecard* or (quality within 2 report*) or report card* or league table* or (star within 2 rating) or (star within 2 performance))))))

Search strategies for the grey literature databases comprised keyword/phrase searching (e.g., public report*, Medicare compare, etc) primarily, due to the unavailability of relevant subject searching capability in most of the databases. The NYAM Grey Literature database search was comprised of keyword/phrase searching ‘ANDed’ together with their subject term ‘quality of health care.’

AARP Ageline (OvidSP)

Searched 07/22/2011; updated search through 12/31/2011 conducted on 1/13/2012

1	report card\$.ti,ab.	40
2	((Performan\$ or assessment\$ or evaluat\$ or public\$ or consumer\$ or patient\$ or transparen\$ or provider\$) adj5 (quality adj2 report\$)).ti,ab.	77
3	(Medicare Compare or nursing home compare or Calhospital Compare or California State Report Card or California Hospital Outcomes or myhealthcareadvisor or Massachusetts Health Quality or (Pennsylvania adj3 coronary) or (Hospital Quality adj2 Safety Survey) or Home health Compare or Physician Compare or (New York adj2 Cardiac adj2 Report\$) or (New York adj5 surg\$) or Cleveland Health Quality Choice or (HCFA adj5 mortality) or (HCFA adj5 death) or Federal employee health benefit guide or QualityCounts or CAHPS or HEDIS).ti,ab.	107
4	1 or 2 or 3	206

Appendix B. Inclusion and Exclusion Criteria

Abstract and Title Triage

<p>Include: Based on Public Reporting Definition and PICOTS (If there is doubt, Pull Paper)</p> <p style="text-align: center;">-OR-</p> <p>Exclude (Primary Reason)</p>	<ul style="list-style-type: none"> <input type="radio"/> Pull Paper <input type="radio"/> Background (e.g., Relevant Theory, Historical Perspective, Recent Technological Changes that affect Public Reporting, etc.) <input type="radio"/> Unsure - Pull Paper <input type="radio"/> Wrong Topic/Intervention (not about Public Reporting) <input type="radio"/> Focuses only on methodological issues related to the quality measures reported (e.g., risk adjustment methods, validity of the measures reported, etc.) <input type="radio"/> Public Reporting as an Outcome, not Intervention <input type="radio"/> Wrong population/setting: not a health/medical care setting or service <input type="radio"/> Wrong population/setting: not an included individual provider type (e.g., Include: doctor/nurse; Exclude: dentist, dietician, etc.) <input type="radio"/> No outcome data/study design (e.g., non-systematic review, letter, editorial) <input type="radio"/> Not human population <input type="radio"/> Pre 1980 data or report <input type="radio"/> No English Abstract of a Foreign Language article (if English abstract is available, include or exclude based on content) <input type="radio"/> Other Reason (Specify)
------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------

Full Text Review

Include: Based on Definition, PICOTS and that it corresponds to at least one key question. (If include, complete the following four questions):

1. What is the name/subject of the Public Report:

2. What types of health care setting are the Public Reports about (all that apply):

- Health Plan/Insurer/HMO
- Hospital Health System
- Physician/Individual Providers
- Nursing Homes Home Health
- Outpatient Clinics Group Practices
- Other, Specify:

3. Key Questions article addresses (all that apply):

- KQ1 KQ2 KQ3 KQ4 KQ5 KQ6
- None EXCLUDE

4. What best describes the study design:

- Randomized Study
- Observational
- Survey research
- Single Case Study
- Lab-Type Experimental
- Secondary Data Analysis/Modeling
- Qualitative, Focus Groups
- Qualitative, In-depth Interviews
- Systematic Review
- Other/Unclear, Specify:
-

Background (Consider for introduction or discussion)

Unsure/Pending

Exclude (Primary Reason):

Please select primary exclusion reason:

- Wrong Topic/Intervention (not about Public Reporting)
- Focuses only on methodological issues related to the quality measures reported (e.g., risk adjustment methods, validity of the measures reported, etc.)
- Public Reporting as an Outcome, not Intervention
- Wrong population/setting: not a health/medical care setting or service
- Wrong population/setting: not an included individual provider type (e.g., Include: doctor/nurse; Exclude: dentist, dietician, etc.)
- No outcome data/study design (e.g., non-systematic review, letter, editorial)
- Not human population
- Pre 1980 data or report
- Not in English (if English abstract is available, include or exclude based on content)
- Not Relevant/Other Codes do not Apply (Specify):

Study design triage:

Studies were divided in to

- A. Trials and observational studies with relevant outcomes for KQs
- B. Qualitative studies and other studies reporting outcomes that are necessary but not sufficient precursors to the outcomes in the stated key questions (e.g., awareness, comprehension, attitudes toward public reporting including specific presentations) or hypothetical choices or decisions tasks. These study designs include:
 - a. Descriptive surveys
 - b. Focus Groups
 - c. Interviews
 - d. Lab-type experiments
 - i. Choice tasks (usually hypothetical)
 - 1. Constrained or based on different materials
 - ii. Cognitive interviewing
- C. Studies to be now be excluded based on design
 - a. Single case studies
 - b. Descriptive studies of implementation of report cards (no outcomes)
 - c. Descriptive surveys or other qualitative studies that were predominately about another subject (not about public reporting) and contained one-item or question about the public disclosure of data.

Appendix C. Included and Excluded Studies

Included Studies

1. Abraham J, Sick B, Anderson J, et al. Selecting a provider: what factors influence patients' decision making? *J Healthc Manag.* 2011 Mar-Apr;56(2):99-114; discussion -5. PMID: 21495529.
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1426. Zaslavsky AM, Shaul JA, Zaborski LB, et al. Combining health plan performance indicators into simpler composite measures. *Health Care Financ Rev.* 2002 Summer;23(4):101-15. PMID: 12500473. **Exclusion reason: Background**
1427. Zhao M, Haley DR. Nursing home quality, staffing, and malpractice paid-losses. *J Health Care Finance.* 2011 Fall;38(1):1-10. PMID: 22043643. **Exclusion reason: Wrong topic**
1428. Zhou X. Information in healthcare: An ethnographic analysis of a hospital ward: Zhou, Xiaomu: U Michigan, US; 2011. **Exclusion reason: Wrong topic**
1429. Zikmund-Fisher BJ, Fagerlin A, Ubel PA. "Is 28% good or bad?" Evaluability and preference reversals in health care decisions. *Med Decis Making.* 2004 Mar-Apr;24(2):142-8. PMID: 15090100. **Exclusion reason: Background**
1430. Zima BT, Mangione-Smith R. Gaps in quality measures for child mental health care: an opportunity for a collaborative agenda. *J Am Acad Child Adolesc Psychiatry.* 2011 Aug;50(8):735-7. PMID: 21784290. **Exclusion reason: No outcome data**
1431. Zimmerman C. Public gives hospitals scores in customer satisfaction. *NAHAM Access Manag J.* 2001;27(2):17. PMID: 11577382. **Exclusion reason: No outcome data**
1432. Zoccali C. Medical knowledge, quality of life and accreditation of quality in health care. The perspective of the clinical nephrologist. *Int J Artif Organs.* 1998 Nov;21(11):717-20. PMID: 9894748. **Exclusion reason: Wrong topic**
1433. Zoler ML. Consumers get hospital scores. *Med World News.* 1989 Aug 14;30(15):62-3. PMID: 10294473. **Exclusion reason: No outcome data**
1434. Zuvekas A, Hur R, Richmond D, et al. Applying HEDIS clinical measures to community health centers: a feasibility study. *J Ambul Care Manage.* 1999 Oct;22(4):53-62. PMID: 11184889. **Exclusion reason: PR as outcome**

Appendix D. Study Design Terminology

The study design terminology used in this review and included in the evidence tables were based on the definitions from the glossary at the Health Services Research Methods website maintained by AcademyHealth <http://www.hsrmethode.org/Home.aspx>. Minor changes were made in the names for consistency.

One Group Post-test Only

A type of experimental study in which only one group receives a treatment and is then measured in a post test -- after treatment. In this design, there is no control group or baseline condition to compare with.

One Group Pretest Posttest

A study design in which a sample is observed twice, one prior to (pre), and once after (post) an intervention or experiment.

Time Series Posttest Only

Study design in which outcomes are measured repeatedly in a single group of participants only after a manipulation or a natural event.

Interrupted Time Series

Study design in which outcomes are measured repeatedly in a single group of participants both before and after a manipulation or a natural event.

Comparison Group(s) Posttest Only

A study design in which two or more groups, at least one study group and one control group, are measured at one point in time following an intervention or experiment. The study group experiences an intervention or experiment while the control group does not.

Comparison Group(s) Pretest Posttest

A study design in which two or more groups subject to different experiences or treatments are compared. The purpose is to make statistical comparisons between two or more groups and demonstrate a causal relationship between the independent variable and outcome of interest.

Multiple Group Interrupted Time Series

A form of *Time Series Design* that adds an equivalent control group to the Interrupted Time Series Design.

Cross Sectional

Studies that conduct measurements on a group of subjects at one point in time. Cross-sectional studies look at both exposure and outcomes at one point in time and are designed to evaluate associations between risk factors and outcomes in a specific population.

Appendix E. Description of Public Reports From the Included Studies

This appendix includes descriptive information about public reports on health care quality that are the subject of two or more included studies in this systematic review in order to avoid repeating these descriptions in the text and evidence tables. *This is not an exhaustive list of all available public reports.*

Table E1. Descriptive information about public reports from the included studies

Name	Producer	Dates (Start and End)	Description			Source
			Format	Content	Distribution	
Nursing Home Compare	CMS	11/2002 to Present	Stars: Much Above Avg. ***** Above Avg. **** Average *** Below Avg. ** Much Below Avg. *	Report on quality measures for nursing homes: <ul style="list-style-type: none"> Quality measures (19) come from the (Minimum Data Set) MDS Repository, included measures have changed over time Separate measure for long-stay and post-acute care residents Five of the quality measures are risk-adjusted at the resident level to reduce the heterogeneity in resident health conditions Sortable results based on overall quality, health inspections, nursing home staffing, quality measures, program participation, number of certified beds, and type of ownership 	Web site, no fee	Nursing Home Compare Website: http://www.medicare.gov/NHCompare/Home.asp

Table E1. Descriptive information about public reports from the included studies (continued)

Name	Producer	Dates (Start and End)	Description			Source
			Format	Content	Distribution	
Home Health Compare	CMS	Fall 2003 to Present	Tables reporting percentages	<p>Report on quality measures for home health agencies. Categories of process and outcome measures include:</p> <ul style="list-style-type: none"> • Managing Daily Activities • Managing Pain and Treatment Symptoms • Treating Wounds and Preventing Pressure Sores • Preventing Harms • Preventing Unplanned Hospital Care <p>Comparisons with state and national data provided. Information comes from the Outcome and Assessment Information Set (OASIS) quality data submitted by home health agencies to state repositories. Comparisons with state and national data provided.</p>	Web site, no fee	Home Health Care Compare Web site: http://www.medicare.gov/homehealthcompare/search.aspx
Hospital Compare	CMS	April 2005 to Present	Graphs and tables	<p>Yearly hospital report includes quality measures in the following categories:</p> <ul style="list-style-type: none"> • Process of Care Measures • Outcome of Care Measures • Use of Medical Imaging • Surveys of Patients' Hospital Experiences • Patient Safety Measures • Medicare Payment and Volume <p>Medical conditions included in the report:</p> <ul style="list-style-type: none"> • Surgical • Health Attack • Pneumonia • Heart Failure • Children's Asthma • Medical Imaging 	Web site, no fee	Hospital Compare Web site: http://www.hospitalcompare.hhs.gov/

Table E1. Descriptive information about public reports from the included studies (continued)

Name	Producer	Dates (Start and End)	Description			Source
			Format	Content	Distribution	
HEDIS	NCQA	1991 to Present	Star ratings in five technical domains	Health plan report card with 71 quality measures in five domains: <ul style="list-style-type: none"> • Effectiveness of Care • Access/Availability of Care • Experience of Care • Utilization and Relative Resource Use • Health plan descriptive information 	Web site, no fee	NCQA Web site: http://www.ncqa.org/tabid/59/default.aspx
CAHPS Health Plan	AHRQ	1998 to Present	Stars about performance and bar charts for trends	Health plan report card on the experiences of respondents (adults and/or guardians of children) in the following areas: <ul style="list-style-type: none"> • Getting needed care • Getting care quickly • How well doctors communicate • Health plan information and customer service 	Printed and Web site, no fee	AHRQ Web site: https://www.cahps.ahrq.gov/Surveys-Guidance/HP.aspx
CAHPS Hospitals	AHRQ	2005 to Present	Stars about performance and bar charts for trends	Hospital report card on the experiences of respondents in the following areas: <ul style="list-style-type: none"> • Nurse Communication • Doctor Communication • Explanation of Medicines • Timely help from hospital staff • Information about recovery • Pain Control • Cleanliness • Quiet at night 	Printed and Web site, no fee	AHRQ Web site: https://www.cahps.ahrq.gov/content/products/HOSP/P ROD_HOSP_Intro.asp
CAHPS Clinicians and Group Practices	AHRQ	2005 to Present	Stars about performance and bar charts for trends	Clinicians and groups survey report on the experiences of respondents in the following areas: <ul style="list-style-type: none"> • Getting appointments and health care when needed • How well doctors communicate • Courteous and helpful office staff 	Printed and Web site, no fee	AHRQ Web site: https://www.cahps.ahrq.gov/CAHPSkit/files/309_CG_R eporting_Measures.htm

Table E1. Descriptive information about public reports from the included studies (continued)

Name	Producer	Dates (Start and End)	Description			Source
			Format	Content	Distribution	
New York CSRS	NYS DOH	1989 to Present	Data and graphs	Report on hospitals and individual providers (cardiac surgeons). Reports in-hospital and 30-day expected, observed and risk-adjusted mortality rates for adults and children undergoing Percutaneous Coronary Interventions (PCI) and/or Coronary Artery Bypass Graft (CABG).	Printed and Web site, no fee	New York State Department of Health Web site: http://www.health.ny.gov/statistics/diseases/cardiovascular/
Cardiac Surgery in Pennsylvania	PHC4	1994 to Present	Data and graphs	Report on hospitals and surgeons. Reports number of surgeries performed, in-hospital and 30-day mortality rates, readmission rates within 7-30 days, data on post-surgical lengths of stay and hospital charges.	Printed and Web site, no fee	PA Health Care Cost Containment Council Web site http://www.phc4.org/reports/cabg/09/docs/cabg2009report.pdf
California CABG Outcomes Reporting Program	OSHPD Health Care Outcomes Center	1997 to Present	Data and graphs	Report on hospitals and surgeons. It reports the risk-adjusted operative mortality rates by regions. The hospitals are rated yearly and surgeons every other year.	Printed and Web site, no fee	http://www.oshpd.ca.gov/HID/Products/PatDischargeData/CABG/index.html

Table E1. Descriptive information about public reports from the included studies (continued)

Name	Producer	Dates (Start and End)	Description			Source
			Format	Content	Distribution	
Wisconsin Quality Counts	Alliance, a large employer- purchasing cooperative in the Madison, Wisconsin, area.	1999- present	<p>Graphics used to indicate rating:</p> <p>(+) Plus signs indicate that there were fewer mistakes, complications, and deaths than expected</p> <p>(0) Circles mean that there was an average number of mistakes, complications, and deaths</p> <p>(-) Minus signs mean that there were more mistakes, complications, and deaths than expected</p>	Report in 2001 included two summary indices of adverse events (deaths and complications) occurring within the broad categories of surgery and non surgery, and indices in three individual clinical areas: hip/knee surgery, cardiac care, and maternity care.	The 2001 report was inserted into the Madison newspaper; and Alliance employers sent it to employees' homes. It was also available on a Web site, and copies were distributed by community groups and at libraries. Not currently publicly available.	Currently available to subscribers only: http://the-alliance.org/QClogin.aspx

Table E1. Descriptive information about public reports from the included studies (continued)

Name	Producer	Dates (Start and End)	Description			Source
			Format	Content	Distribution	
Cleveland Health Quality Choice Report Card	Cleveland Health Quality Choice Coalition	May 1993 to Dec 1998	Public release available to all: Graphs/Tables indicated hospital performance as better than expected, as expected, or worse than expected. Detailed release: available only to qualified users who attended 1/2 day training contained unadjusted data and the 95% CIs around the predicted values.	The semi-annual report included hospital in-patient data on patient satisfaction, intensive care unit mortality and length of stay, general hospital mortality and length of stay for selected diagnoses and/or procedures, and several indicators of obstetrical performance.	Printed	Example report provided at: http://qualitysafety.bmj.com/content/11/2/202/T1.expansion.html
California Hospital Outcomes Project	Office of Statewide Health Planning and Development	1993 to present	Graphs	Reports on risk adjusted outcomes for several diagnoses, including cardiovascular, infection and others at acute care hospitals.	Printed and Web site, no fee	http://www.oshpd.ca.gov/
HCFA Mortality Report	HCFA	1986 to 1992	Data	Reports hospitals' predicted and actual in-hospital mortality data for several diagnoses. Through time, they presented a somewhat different breakdown of the mortality rates by disease or procedure categories.	Printed	Menemeyer, 1997. Website N/A.
Ontario Cardiac Reports	Cardiac Care Network of Ontario	1999 to present	Data and graphs	Reports on cardiac procedure outcomes.	Printed and Web site, no fee	www.ccn.on.ca
PHC4 Hospital Effectiveness Report	PHC4	1989 to present	Data and graphs	Report of approximately 50 (depending on region) individual diagnosis related groups and hospital summary statistics, including mortality.	Printed and Web site, no fee	http://www.phc4.org/default.htm

Appendix F. Method for Quality Assessment of Individual Quantitative Studies

Overall Ratings

Individual studies were rated as “good”, “fair”, or “poor” based on definitions from the chapter titled “Assessing the Risk of Bias of Individual Studies when Comparing Medical Interventions” in the *AHRQ Methods Guide for Effectiveness and Comparative Effectiveness Reviews* (hereafter, *Methods Guide*).^{1,2}

Good quality/Low risk of bias implies confidence on the part of the reviewer that results represent the true treatment effects (i.e., study results are considered valid). The study reporting is adequate to judge that no major or minor sources of bias are likely to influence results.

Fair quality/Medium risk of bias implies some confidence that the results represent true treatment effect. The study is susceptible to some bias, but the problems are not sufficient to invalidate the results (i.e., no flaw is likely to cause major bias). The study may be missing information, making it difficult to assess limitations and potential problems.

Poor quality/High risk of bias implies low confidence that results represent true treatment effect. The study has significant flaws that imply biases of various types that may invalidate its results; these may arise from serious errors in conduct, analysis, or reporting, large amounts of missing information, or discrepancies in reporting.

Assessment Criteria

We prespecified six key criteria that could be applied to the various types of observational studies as well as the few studies that use random assignment to evaluate public reporting.

The selected criteria are based on recommendations in the AHRQ chapter in the *Methods Guide*, “Assessing the Risk of Bias of Individual Studies when Comparing Medical Interventions.” We reviewed the types of bias and the suggested criteria discussed in this chapter and followed the recommendation that those most relevant to the topic and appropriate for the study designs be employed.

Based on this assessment we selected six criteria for this review:

1. How adequate was randomization? (for randomized studies) or how appropriate was selection of comparison groups or times? (for observational studies)
2. How similar were groups at baseline (or time periods) or how well did the analysis control for differences?
3. How well did the design or analyses account for important potential confounding and modifying variables?
4. How well did the study rule out any impact from an unintended exposure or a concurrent intervention that might bias results?
5. How well were all potential outcomes prespecified and were the prespecified outcomes reported?
6. How well were primary outcomes assessed? Were valid and reliable measures used and implemented consistently across all study participants/groups?

The overall assessment was not derived from a direct linear combination of the six criteria. Given the nature of public reporting as an intervention, the criteria corresponding to selection bias (1, 2, and 3) were of greatest concern when determining how much confidence we could have in each study's result. For this reason it is possible for a study to be given an overall assessment of "poor" even if some individual criteria were rated as "good."

Guidelines Used for Quality Assessment: Type of Bias, Related Criteria, and Examples

Included below are the definitions of the types of bias considered in our quality assessments, the corresponding criteria, and elaboration on how they might apply to public reporting. The definitions are the Cochrane definitions provided in the *Methods Guide* chapter cited above.

Selection Bias

Definition

"Systematic differences that arise from self-selection of treatments, physician-directed selection of treatments, or association of treatment assignments with demographic, clinical, or social characteristics. Includes confounding by indication (when patient prognostic characteristics, such as disease severity or co-morbidity, influence both treatment source and outcomes)."

Application for Public Reporting

In assessing our confidence in the results of a study about public reporting, selection bias was the greatest concern in that the comparison (either between groups or across time periods) was less valid because factors that affected the two groups/time periods differently impacted the results and these may not be addressed sufficiently in the study design or analyses. Few studies in this field were trials (where the researcher controls the assignment of public reporting); most were observational studies of various kinds. For observational studies selection bias is a critical issue.

Assessment Questions

1a. [for RCTs only] Was treatment adequately randomized?

1b. [for observational studies only] How appropriate is the selection of the comparison groups or the time periods?

Raters need to ask, "Does what was selected for comparison make sense given the study questions?" If the authors do not justify the selection, the raters have to make their own assessments. If the authors do explain the selection, the raters still have to decide if the groups are appropriate, considering both what the authors said and their own assessment.

Prompts

Examples of study characteristics to consider. If comparing on the level of geographic regions (e.g., States, Countries, Counties, etc.) do the researchers justify the selection? Does the researcher demonstrate that they are similar on key variables? If the comparison is pre-post, are

the time periods actually prior to the public reporting and after it has been distributed/disseminated, and do the time periods seem reasonable? Are sample sizes sufficient? Are there any other aspects of the comparison groups that make them inappropriate for comparison?

2. How similar are groups at baseline (or the time periods) or how well did the analysis control for differences?

Simply listing baseline variables in a table or adding them into an equation is not sufficient. In addition to the variables reported, the rater should consider what variables would be important and rate the article lower if key differences are not reported.

3. How well does the design or analyses account for important potential confounding?

Confounding means something is different across the groups or time periods that is also associated with the outcome. We are worried that something is “muddying up” the relationship between the intervention and the results. Confounding is important to consider given that public reporting is an intervention that is evaluated in situations where few factors can be controlled by the researchers. Raters need to be skeptical, but they cannot assess all possible confounding. The focus is on important potential confounding that could invalidate the results.

Specific concerns are: (1) If something changes (say a public policy or the number of health care options) the concern is that it could be different across the groups. If everyone in the universe of the study is equally affected, it is not confounding. (2) The confounding variable would likely impact the results. If something changes that has no conceptual link to results, it should not be considered—and is unlikely to be measured/mentioned in article.

Raters should be most worried that what is different would *increase* the difference across groups or time periods that is being reported as the result. That is, the bias is in the same direction as the impact of the intervention. If the confounding is likely to counteract the impact of the intervention, then it is possible that a study will not address it and the results might be considered a conservative estimate of the true impact.

Study design/structure can be more or less likely to account for confounding. Because of this, study design can be considered when thinking about confounding even though it should not be used as the sole basis for the rating

Analyses can also be used to address confounding if it cannot be controlled for in the design (e.g. sensitivity analyses, regression diagnostics, statistical approaches to identifying or controlling for gaming/codings/measurement issues).

Performance Bias

Definition

“Systematic differences in the care provided to participants and protocol deviation. Examples include: contamination of the control group with the exposure or intervention, unbalanced provision of additional interventions or co-interventions, difference in co-interventions, and inadequate blinding of providers and participants.”

Application to Public Reporting

This bias is about the intervention, which in this case is public reporting. Here the main concern is that either the non-public reporting group or time period really was exposed to public reporting. This is contamination.

Concurrent interventions are less likely in public reporting, but possible. Example: the study is of hospitals before and after Medicare reporting in two states. In one state between the pre and post period the state department of health issues a report card; that would be a co-intervention. Using these states would then be a poor study design as the performance bias would affect our confidence in the results.

Assessment Question

4. How well does the study rule out any impact from an unintended exposure or a concurrent intervention that might bias results?" (i.e., is contamination across the groups or time periods minimized?)

Reporting Bias

Definition

"Systematic differences between reported and unreported findings, e.g., differential reporting of outcomes or harms, incomplete reporting of study findings, potential for bias in reporting through source of funding"

Application to Public Reporting

We were unlikely to have protocols to compare the article to, so this was based on the article alone. We looked for results that sounded like they were exploratory, but were not presented that way. For example this would be "poor" if a study were to say the objective is to compare mortality and readmission across groups of hospitals with and without public reporting, but the results reported did not include mortality but reported an increase in quality improvement activities, and did not mention readmission.

NOTE: If the study said number of quality improvement activities was the outcome, then reported it, this would be fine. The issue is agreement between what the researchers say the outcomes are and what is reported.

Assessment Question

5. How well are all potential outcomes prespecified and are the prespecified outcomes reported?

Detection Bias

Definition

"Systematic differences in outcomes assessment among groups being compared, including systematic misclassification of the exposure or intervention, covariates, or outcomes because of variable definitions and timings, diagnostic thresholds, recall from memory, inadequate assessor blinding, and faulty measurement techniques. Erroneous statistical analysis might also affect the validity of effect estimates."

Application to Public Reporting

This bias was about how things were measured: whether they were measured well (valid and reliable) and/or whether this was the same across groups or time periods.

Assessment Question

6. How well are primary outcomes assessed? Were valid and reliable measures used and implemented consistently across all study participants/groups?”

Considerations When Selecting and Applying Criteria

Public reporting as a quality improvement strategy does not lend itself to all of the same types of study designs common to studies of clinical interventions for several reasons. The following are factors we considered when selecting the criteria for assessing the quality of these studies:

- Blinding people (patients, researchers) to the intervention is not practical.
- Public reporting is often a “population level” intervention rather than targeted at individuals. Sometimes it is easier to think about this as a public health intervention, such as putting fluoride in the water or banning smoking in public places. Outcomes for individuals are measured and combined to evaluate the intervention that is designed to affect the entire population, but it is often unknown whether individuals experienced the intervention.
- The outcomes in studies of public reporting vary. They might include mortality, quality improvement activity, or choice of a provider by a patient or by the selection of provider by payers. They may also include actual behavior, reports of what people would do in a hypothetical situation, or their attitudes toward or willingness to use a tool. Risks of bias may differ according to the outcome.
- Public reporting is one of many things that could influence a decision/outcome. This is what makes design and conduct of a good study challenging. In a situation where it is difficult to control influential factors, it is important to be particularly aware of selection bias and confounding. The study design and analyses need to be constructed to increase confidence in the comparison made in the study.

For quality rating the issue is not necessarily that other factors influence the decision, it is whether these other factors are distributed differently across the groups or time periods used in the comparisons.

Appendix G. Quality Assessment of Individual Quantitative Studies

Table G1. Quality assessment criteria for quantitative studies

Author	Year	Adequate Randomization (for RCTs) or appropriateness of the comparison groups or time periods?	How similar are groups at baseline or how well did the analysis control for differences?	How well does the design or analyses account for important potential confounding?	How well does the study rule out any impact from an unintended exposure or a concurrent intervention or that might bias results?	How well are all potential outcomes prespecified and are the prespecified outcomes reported?	How well are primary outcomes assessed? Were valid and reliable measures used and implemented consistently across all study participants/groups?	Overall QA
Hospitals								
Apolito ³	2008	Good	Good	Good	Fair	Good	Good	Good
Baker ⁴	2003	Good	Good	Fair	Good	Good	Good	Fair
Baker ⁵	2002	Good	Fair	Fair	Good	Good	Good	Fair
Bridgewater ⁶	2006	Good	Good	Good	Unclear	Good	Good	Good
Carey ⁷	2006	Good	Good	Poor	Unclear	Good	Fair	Fair
Caron ⁸	2004	Fair	Fair	Poor	Good	Fair	Fair	Fair
Caron ⁹	1999	Fair	Fair	Poor	Poor	Good	Good	Poor
Clough ¹⁰	2002	Good	Fair	Fair	Good	Good	Good	Fair
Cutler ¹¹	2004	Good	Good	Fair	Good	Fair	Good	Fair
Dranove ¹²	2008	Good	Good	Good	Good	Good	Good	Good
Dranove ¹³	2003	Good	Good	Fair	Good	Good	Good	Good
Elliot ¹⁴	2010	Good	Good	Good	Good	Good	Good	Good
Evans ¹⁵	1997	Good	Good	Fair	Good	Fair	Fair	Fair
Foreman ¹⁶	1995	Fair	Unclear	Poor	Good	Good	Good	Poor
Friedberg ¹⁷	2009	Good	Good	Good	Good	Good	Good	Good
Ghali ¹⁸	1997	Poor	Poor	Good	Good	Good	Good	Fair
Guru ¹⁹	2005	Good	Fair	Fair	Good	Good	Good	Fair

Table G1. Quality assessment criteria for quantitative studies (continued)

Author	Year	Adequate Randomization (for RCTs) or appropriateness of the comparison groups or time periods?	How similar are groups at baseline or how well did the analysis control for differences?	How well does the design or analyses account for important potential confounding?	How well does the study rule out any impact from an unintended exposure or a concurrent intervention or that might bias results?	How well are all potential outcomes prespecified and are the prespecified outcomes reported?	How well are primary outcomes assessed? Were valid and reliable measures used and implemented consistently across all study participants/groups?	Overall QA
Hannan ²⁰	2003	Fair	Good	Good	Good	Good	Good	Good
Hannan ²¹	1994	Good	Good	Good	Good	Good	Good	Good
Hannan ²²	1994	Good	Good	Good	Good	Good	Good	Good
Hibbard ²³	2005	Unclear	Unclear	Good	Good	Good	Good	Fair
Hibbard ²⁴	2003	Unclear	Fair	Fair	Fair	Fair	Fair	Fair
Hollenbeak ²⁵	2008	Good	Good	Good	Good	Good	Good	Good
Howard ²⁶	2006	Fair	Good	Fair	Good	Good	Good	Fair
Jang ²⁷	2010	Fair	Fair	Good	Unclear	Good	Good	Fair
Jang ²⁸	2011	Fair	Fair	Good	Good	Fair	Good	Fair
Jha ²⁹	2006	Good	Good	Good	Good	Good	Good	Good
Longo ³⁰	1997	Fair	N/A	Fair	Good	Good	Good	Fair
Mennemeyer ³¹	1997	Good	Fair	Good	Fair	Good	Good	Fair
Moscucci ³²	2005	Fair	Fair	Fair	Good	Good	Fair	Fair
Mukamel ³³	1998	Good	Good	Poor	Good	Good	Good	Fair
Omoigui ³⁴	1996	Poor	Fair	Fair	Good	Good	Fair	Poor
Peterson ³⁵	1998	Good	Good	Good	Good	Good	Good	Good
Pope ³⁶	2009	Good	Good	Good	Poor	Good	Good	Fair
Romano ³⁷	2004	Good	Good	Fair	Good	Good	Good	Good
Romano ³⁸	2011	Fair	Fair	Good	Good	Good	Good	Fair
Rosenthal ³⁹	1997	Good	Good	Good	Good	Good	Good	Good
Shabino ⁴⁰	2006	Good	Poor	Poor	Fair	Good	Good	Poor
Tu ⁴¹	2009	Unclear	Good	Good	Fair	Good	Good	Fair
Vladeck ⁴²	1988	Good	Unclear	Unclear	NR	Good	Poor	Poor
Wang ⁴³	2011	Good	Fair	Good	Good	Good	Good	Good
Werner ⁴⁴	2010	Good	Good	Good	Good	Good	Good	Good
Wübker ⁴⁵	2008	Good	Unclear	Fair	Good	Good	Good	Fair

Table G1. Quality assessment criteria for quantitative studies (continued)

Author	Year	Adequate Randomization (for RCTs) or appropriateness of the comparison groups or time periods?	How similar are groups at baseline or how well did the analysis control for differences?	How well does the design or analyses account for important potential confounding?	How well does the study rule out any impact from an unintended exposure or a concurrent intervention or that might bias results?	How well are all potential outcomes prespecified and are the prespecified outcomes reported?	How well are primary outcomes assessed? Were valid and reliable measures used and implemented consistently across all study participants/groups?	Overall QA
Individual Clinicians								
Bundorf ⁴⁶	2009	Good	Good	Good	Good	Good	Good	Good
Epstein ⁴⁷	2010	Fair	Fair	Fair	Fair	Good	Good	Fair
Glance ⁴⁸	2008	Good	Fair	Fair	Good	Good	Good	Fair
Hannan ²¹	1994	Good	Good	Good	Good	Good	Good	Good
Jha ²⁹	2006	Good	Good	Good	Good	Good	Good	Good
Mukamel ⁴⁹	2002	Good	Unclear	Fair	Good	Good	Good	Fair
Mukamel ⁵⁰	2000	NA	Fair	Poor	Good	Good	Good	Fair
Mukamel ³³	1998	Good	Good	Poor	Good	Good	Good	Fair
Mukamel ⁵¹	2004	Good	Fair	Good	Good	Good	Good	Good
Ranganathan ⁵²	2009	Unclear	NR	Fair	Good	Good	Good	Fair
Wang ⁴³	2011	Good	Fair	Good	Good	Good	Good	Good
Werner ⁵³	2005	Good	Good	Good	Fair	Good	Good	Good
Health Plans								
Abraham ⁵⁴	2006	Good	Poor	Fair	Good	Fair	Good	Poor
Bardenheier ⁵⁵	2007	Good	Fair	Fair	Fair	Good	Good	Fair
Beaulieu ⁵⁶	2002	Fair	Fair	Fair	Good	Good	Good	Fair
Bost ⁵⁷	2001	Fair	Poor	Poor	Good	Good	Good	Poor
Chernew ⁵⁸	2004	Fair	NA	Fair	Fair	Good	Good	Fair
Chernew ⁵⁹	1998	NA	Good	Good	Good	Good	Good	Fair
Dafney ⁶⁰	2008	Fair	Good	Fair	Good	Good	Fair	Fair
Farley ⁶¹	2002	Fair	Good	Good	Good	Good	Good	Good
Farley ⁶²	2002	Fair	Fair	Fair	Good	Good	Good	Good
Fowles ⁶³	2000	Poor	Fair	Fair	Good	Good	Good	Fair
Fox ⁶⁴	2001	Poor	Poor	Fair	Poor	Good	Good	Poor
Haberman ⁶⁵	2007	Good	Fair	Fair	Good	Good	Good	Fair
Hedricks ⁶⁶	2009	Good	Fair	Poor	Poor	Good	Good	Poor

Table G1. Quality assessment criteria for quantitative studies (continued)

Author	Year	Adequate Randomization (for RCTs) or appropriateness of the comparison groups or time periods?	How similar are groups at baseline or how well did the analysis control for differences?	How well does the design or analyses account for important potential confounding?	How well does the study rule out any impact from an unintended exposure or a concurrent intervention or that might bias results?	How well are all potential outcomes prespecified and are the prespecified outcomes reported?	How well are primary outcomes assessed? Were valid and reliable measures used and implemented consistently across all study participants/groups?	Overall QA
Jin ⁶⁷	2006	Fair	Good	Good	Good	Good	Good	Good
Jung ⁶⁸	2010	Fair	Good	Fair	Good	Good	Good	Good
Knutson ⁶⁹	1998	Fair	Fair	Fair	Good	Good	Good	Fair
Lied ⁷⁰	2001	Fair	Fair	Fair	Good	Good	Good	Fair
Liu ⁷¹	2009	Good	Fair	Fair	Fair	Good	Good	Fair
McCormack ⁷²	2001	Fair	Good	Fair	Good	Fair	Fair	Fair
Pham ⁷³	2002	Good	Good	Good	Good	Good	Good	Good
Scanlo ⁷⁴	2002	Good	Good	Fair	Good	Good	Good	Good
Scanlon ⁷⁵	1999	NA	Good	Fair	Fair	Good	Good	Fair
Tai-Seale ⁷⁶	2004	Good	Fair	Fair	Good	Good	Good	Fair
Wedig ⁷⁷	2020	Good	Good	Fair	Fair	Good	Good	Fair
Long-term Care								
Cai ⁷⁸	2010	Good	Fair	Fair	Good	Good	Good	Fair
Castle ⁷⁹	2007	Fair	Good	Fair	Good	Good	Good	Fair
Castle ⁸⁰	2008	Fair	Good	Good	NR	Good	Good	Fair
Castle ⁸¹	2010	Fair	Good	Good	NA	Good	Good	Fair
Gaudet ⁸²	2011	Good	Good	Good	Good	Good	Good	Good
Grabowski ⁸³	2011	Good	Good	Fair	Good	Good	Good	Good
Konetza ⁸⁴	2012	Good	Good	Good	Good	Good	Good	Good
Jung ⁸⁵	2010	Fair	Fair	Good	NA	Good	Good	Fair
Mukamel ⁸⁶	2008	Good	Good	Fair	Good	Good	Good	Good
Mukamel ⁸⁷	2009	Good	NR	Fair	Good	Good	good	Fair
Mukamel ⁸⁸	2010	Good	Fair	Fair	Good	Good	Good	Fair
Park ⁸⁹	2010	Good	Good	Good	Fair	Good	Good	Good
Park ⁹⁰	2010	Fair	Good	Good	Good	Good	Good	Good
Stevenson ⁹¹	2006	Good	Fair	Fair	Good	Good	Poor	Poor
Werner ⁹²	2009	Good	Good	Good	Good	Good	Good	Good

Table G1. Quality assessment criteria for quantitative studies (continued)

Author	Year	Adequate Randomization (for RCTs) or appropriateness of the comparison groups or time periods?	How similar are groups at baseline or how well did the analysis control for differences?	How well does the design or analyses account for important potential confounding?	How well does the study rule out any impact from an unintended exposure or a concurrent intervention or that might bias results?	How well are all potential outcomes prespecified and are the prespecified outcomes reported?	How well are primary outcomes assessed? Were valid and reliable measures used and implemented consistently across all study participants/groups?	Overall QA
Werner ⁹³	2009	Good	Good	Good	Good	Good	Good	Good
Werner ⁹⁴	2010	Good	Good	Fair	Good	Good	Good	Good
Werner ⁹⁵	2011	Good	Fair	Good	Good	Good	Good	Good
Werner ⁹⁶	2012	Fair	Good	Good	Good	Good	Good	Good
Zinn ⁹⁷	2005	Good	Good	Fair	NA post only	Good	Good	Fair
Zinn ⁹⁸	2008	Good	Good	Good	Good	Good	Fair	Good
Zinn ⁹⁹	2010	NA	Fair	Good	Unclear	Good	Fair	Fair

Abbreviations: NA, not applicable; NR, not reported; QA, quality assessment; RCT, randomized controlled trial.

Appendix H. Hospitals: Quantitative Evidence

Section A

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Apolito 2008 ³ (Good)	To investigate the management and outcomes of patients with AMI complicated by cardiogenic shock in New York and other states enrolled in the SHOCK registry. H1: (Public) Reporting system may have a negative influence on the management of these patients.	New York	Comparison Groups (s) Post test Only	American patients in the SHOCK registry with AMI complicated by cardiogenic shock primarily due to left ventricular pump failure (n= 545)	Public Report: Patients treated at 11 participating New York centers (n=220) No Public Report: Patients treated at 12 non-New York centers (n=325)	rates of cardiac catheterization, revascularization (PCI and/or CABG), and in-hospital mortality	NY CSRS	New York hospitals required to report; other hospitals not required/no public reporting for them. Risk-adjusted mortality rates above the confidence interval for the statewide mean in NY results in audits by the NYSDOH and can include penalties and probation.

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Baker 2002 ⁵ (Fair)	To examine temporal trends in risk-adjusted mortality between 1991 and 1997 for Medicare patients hospitalized in Northeast Ohio for six medical conditions: acute MI, CHR, gastrointestinal hemorrhage, COPD, pneumonia, and stroke.	Northeast Ohio/Cleveland metropolitan area	Interrupted Time Series (this article doesn't say, another does. CHQC public reporting started 1993)	Hospitals in Northeast Ohio	30 nonfederal hospitals in Cleveland, OH were compared on 3 measures of mortality rates (In hospital death, 30 day death, and Early post discharge death) of Medicare patients across multiple years.	Mortality: In-hospital death: Death during the index admission 30-day death: Death within 30 days of admission (including in-hospital and post discharge deaths) Early post discharge death: Discharged alive after the index hospitalization but dying within 30-days of admission.	Cleveland Health Quality Choice (CHQC)	None
Baker 2003 ⁴ (Fair)	(1) To examine whether hospitals that were identified as mortality outliers were more likely to lose or gain market share compared with hospitals with average mortality. (2) To examine whether hospitals with higher than expected mortality had greater declines in 30-day mortality over time compared with hospitals with average mortality rates.	Cleveland, OH	Interrupted Time Series	Nonfederal Hospitals, N=30(Outliers, n=17) participating in the Cleveland health Quality Choice public reporting program.	12 six-month CHQC study periods between July 1991 and December 1997 (no data for January-June 1992). Comparison: Change in market share during outlier time period vs. non-outlier time period.	Market Share: The number of discharges for 6 general medical conditions at a hospital divided by the total number of general medical admissions at all hospitals participating in CHQC.	Cleveland Health Quality Choice (CHQC)	30 hospitals, with 12 six-month periods of mortality data.

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Bridgewater 2007 ⁶ (Good)	To study changes in coronary artery surgery in years spanning publication of cardiac surgery mortality data in the UK.	Northwest England	Interrupted Time Series	Data collected on 25,730 consecutive patients undergoing adult cardiac surgery (isolated coronary artery surgery) between April 1, 1997 and March 31, 2005 in the northwest of England.	Pre-public reporting period: April 1997 to March 2001; Post-public reporting period: April 2001-March 2005	<p>Observed Mortality: Any in-hospital death Predicted Mortality: Risk adjusted mortality based on EuroSCORE.</p> <p>Changes in the number of very high risk patients undergoing coronary artery surgery: Stratified risk spectrum of patients undergoing surgery: low risk <6 EuroSCORE, high risk >=6 EuroSCORE, and very high risk >=11 EuroSCORE</p>	Multiple Reports on named Surgeon and Hospital outcomes in UK	Policy requiring public reporting of hospital specific morality data
Carey 2006 ⁷ (Fair)	To study the impact of public reporting and changes in the incidence of PCI and CABG procedures in California.	California	One Group Pretest Posttest	Hospitals in California performing CABG and PCI operations	<p>Pre public report: 1998-2002 Post public report: 2003-2004 Hospitals in both groups: N = 115</p> <p>Hospitals performing CABG and PCI: N~120 (6 stopped performing during study period and 7 started performing sometime during study period)</p>	<p>Mortality: In-hospital death and 30 day mortality or readmission for repeat procedure</p> <p>Volume: Number of given procedures (CABG vs PCI)</p>	California Coronary Artery Bypass Graft Mortality Reporting Program	Public reporting prior to 2002 voluntary, after mandatory in CA

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Caron 1999 ⁹ (Poor)	To identify whether hospitals in the Cleveland, Ohio area have responded to public concern about improving their cesarean section and VBAC rates.	Greater Cleveland, OH	One Group, Post Only	Hospitals after publication of CHQC, with 3 in depth case reports, n=18. Also survey of quality management directors or personnel deemed appropriate by the director, obstetricians, or labor and delivery nurses.	Cesarean rates after CHQC report	Cesarean section rates, VBAC rates	Cleveland Health Quality Choice (CHQC)	None
Caron 2004 ⁸ (Fair)	To assess whether improvement in one clinical area was associated with improvements in other areas.	Greater Cleveland, OH	Time Series post only	Hospitals in the Greater Cleveland area. n=27 hospitals for non-obstetrics outcomes. n=20 for obstetrics outcomes.	Comparison across 4 or 5 time points on CHQC outcomes: Acute MI: Length of stay, Mortality; CHF: Length of stay, Mortality; Stroke: Length of stay, Mortality; Obstetrics: Total caesarean delivery rate, primary caesarean delivery rate, vaginal birth after caesarean delivery rate	Acute MI: Length of stay, Mortality; CHF: Length of stay, Mortality; Stroke: Length of stay, Mortality; Obstetrics: Total caesarean delivery rate, primary caesarean delivery rate, vaginal birth after caesarean delivery rate.	CHQC	None
Clough 2002 (Fair) ¹⁰	To determine whether the CHQC had a beneficial effect on inpatient mortality in Cleveland.	Cleveland, OH vs. rest of Ohio	Comparison Group (s) Interrupted Time Series	Hospital mortality rates in Cleveland and Hospital mortality rates in the rest of Ohio	30 hospitals in Cleveland area participated in CHQC vs. hospitals in the rest of Ohio that did not participate in public reporting. Mortality data from 1992 to 1995.	Inpatient mortality	CHQC	None

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Cutler 2004 ¹¹ (Fair)	To examine the impact of report cards on the allocation of patients across hospitals.	New York	Time Series post only	Cardiac surgery hospitals on New York states report card	Mortality level of hospitals in high-mortality and low-mortality hospitals.	CABG cases performed, risk-adjusted mortality rate (RAMR)	NY CSRS	None
Dranove 2003 ¹³ (Good)	To develop a framework and test three potential effects of report cards on the treatment of cardiac illness.	New York and Pennsylvania	Interrupted Time Series	Cohorts of Acute Myocardial Infarction (AMI) patients and patients receiving CABG in New York and Pennsylvania from 1987-1994	Assuming NY introduced report cards in 1991 and PA in 1993: NY: 4 years Pre and 3 years Post PA: 6 years Pre and 1 year Post Also Compare NY to other states that do not have public reporting.	Hospital Level Analysis: 1. Mean of the illness severity before admission or treatment of hospital. This outcome is estimated by: A. Mean of Patient's total hospital expenditures one year prior to admission B. Mean of patients' total days in hospital one year prior to admission Patient Level Analysis: 1. Illness severity in the year prior to treatment 2. Overall intensity of treatment in the year after admission 3. Whether patients received CABG, PTCA or Cath in the year after admission with AMI	NY CSRS and PA CABG Guide	None

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
						4. All-case mortality and cardiac complications such as readmission for heart failure in the year after admission		
Dranove 2008 ¹² (Good)	To propose and implement a methodology to assess the effectiveness of the “news” that report cards provide to the market.	New York	Interrupted Time Series	Hospitals (n=18) in the NYC metropolitan area and CABG patients from the counties in the same area (1989, n=6978; 1990, n=7916; 1991, n=8960).	Hospital demand pre and post report card implementation; Pre: 1989, Post: 1991	Hospital Demand	NY CSRS	None
Elliott 2010 ¹⁴ (Good)	To assess how patients’ experiences with inpatient care are changing since public reporting	Across USA	One Group Pretest Posttest	Hospitals reporting on the Hospital Compare website between 2006 and 2008 with reporting in 2008 and 2009	1) Reporting at 2008 vs. reporting at 2009 2) Newly participating hospitals vs. original participating hospitals 3) Hospitals with <100 beds vs. hospitals with >100 beds	HCAHPS survey completed by patients	HCAHPS	Annual reporting, 2008 and 2009 All hospitals participating

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Evans 1997 ¹⁵ (Fair)	To document responses of Pennsylvania hospitals to the public dissemination by the Pennsylvania Health Care Cost Containment Council (PHC4) of mandated hospital disclosures of financial and nonfinancial information.	Pennsylvania	One Group Posttest Only	All Pennsylvania acute care hospitals	One year to another: 1990 vs. 1992	Change in hospital efficiency measures (length of stay and charges) Changes in outcome measures	PHC4: HER	None
Foreman 1995 ¹⁶ (Poor)	To examine whether Pennsylvania's Health Care Cost Containment Council (PHC4) public reports led to market changes. Specifically, to determine whether hospitals that received high or low quality ratings experienced growth or decline in patient admissions	Pennsylvania	One Group Posttest Only	Hospitals in Pennsylvania n=156 (27 of 183 excluded due to missing data)	Pre: fully released data (for 1989 or 1990, released in 1991 or 1992) Post: Publicly released data (for 1990, released in 1992) Note: not all data in the post group were public.	Change in Yearly Number of Hospital Patients by high or low quality (Quality determined by mortality rates)	Hospital Effectiveness Report (HER) Consumer Guide to Coronary Artery Bypass Graft Surgery (CABG Guide)	Only one year of publicly reported data for some of the hospitals. Other hospitals did not have any publicly reported data, but privately/internally reported data were available to physicians for referrals.

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Friedberg 2009 ¹⁷ (Good)	To determine whether public reporting has been associated with overdiagnosis of pneumonia, excessive antibiotic use, or inappropriate prioritization of patients with respiratory symptoms.	USA	Interrupted Time Series	Patients at least 18 years old visiting EDs between 2001-2005 with primary respiratory symptoms (excluding conditions limited to upper respiratory tract) at hospitals with Antibiotic Timing Scores for at least 25 observations	Pre-Public Report: Before January 1, 2004 Post-Public Report: After January 1, 2004	ED diagnosis: Pneumonia, Bronchitis, Congestive heart failure (CHF), Other Antibiotic use: first dose of antibiotics within 4 hours of hospital arrival; inappropriate use of antibiotics classified as antibiotic use in visits for asthma and CHF when pneumonia not present Waiting time to see a physician: not described	One of 10 Hospital-level performance measures reported by the Hospital Quality Alliance	Began public reporting in 2004; HQA receives performance data from more than 98% of US acute care hospitals

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Ghali, 1997 ¹⁸ (Fair)	To compare trends in mortality after CABG surgery in Massachusetts with the decreases in New York and northern New England	Massachusetts	Comparison Group (s) Time Series Post Only	All CABG cases from fiscal years 1990, 1992, and 1994 in Massachusetts at all 12 hospitals performing CABG surgeries: Case Selection from New York and northern New England included cases having undergone isolated CABG procedure. 1990 N=5395; 1992 N=5,818; 1994 N=5,915 from 12 hospitals	No Report: Massachusetts CABG patients Public report and outcomes feedback: New York and Northern New England CABG patients	Observed and risk-adjusted in-hospital mortality Changes in Patient Care linked to Performance Information	NY CSRS and Northern New England	None
Guru 2006 ¹⁹ (Fair)	To evaluate the differences in patient characteristics and outcomes observed during the transition from no reporting to confidential, and ultimately public perform report cards for CABG surgery in Ontario	Ontario, Canada	Interrupted Time Series	All patients undergoing isolated CABG surgery at 9 cardiac surgery institutions in Ontario between Sept. 1, 1991 and March 31, 2002 (n = 67,693)	No Report: 1991 to 1994 (n = 12691) Confidential Report: 1995-1998 (n = 32,272) Public Report: 1999-2001 (n = 22,730)	thirty-day adjusted mortality	Ontario Cardiac Reports	All CABG surgeons agreed to publicly report outcomes (i.e., not mandated, voluntary). Confidential reporting instituted prior to public reporting

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Hannan 1994 ²¹ (Good)	<p>1) To examine changes in the risk-adjusted CABG outcomes among providers that occurred during 1989-1992 as a function of the risk-adjusted mortality in 1989.</p> <p>2) To examine changes in the volume of patients undergoing CABG as a function of the performance of providers in 1989.</p>	New York	Interrupted Time Series	30 providers (hospitals and surgeons) performing CABG surgeries in New York state	Baseline: Three different groups of ten created using RAMR prior to public release. Then look at performance before and after public report.	<p>Intra-group changes in RAMR: RAMR for each tercile (Group 1= lowest RAMR, Group 2 = middle RAMR, Group 3 = Highest RAMR) in initial period (1989 for hospitals; 1989 to 1990 for surgeons) compared to RAMR for same tercile in 1992.</p> <p>For surgeons: Same breakdown of terciles, but groups 1 and 2 have an N of 32 each, while group 3 has an N of 31</p> <p>Outlier status (high outliers, non-outliers, and low outliers, with low outliers having significantly lower than expected mortality rates)</p> <p>Volume of procedures: tracked using same tercile and outlier groupings.</p>	NY CSRS	Public Reporting of CABG for Hospitals and Surgeons required in NY

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Hannan 1994b ²² (Good)	To assess changes in outcomes of CABG surgery in NY related to CABG report card from 1989 through 1992.	New York	Interrupted Time Series	30 New York Hospitals. 57,187 patients undergoing CABG surgery in New York between 1989 and 1992	Change over time after the release of report cards. Baseline: 1989	Risk-adjusted mortality rate, Expected mortality rate, CABG surgery volume, Relationship between hospital RAMR and average severity of illness of patients	NY CSRS	Public reporting mandatory
Hannan 2003 ²⁰ (Good)	To compare CABG mortality rates and changes in CABG mortality rates in regions with quality improvement/public dissemination efforts with the rest of the country	USA	Multiple Group Time Series	Outcomes of Medicare patients undergoing CABG procedures between 1994 and 1999 who were 65 or older (n=911,407)	Hospitals participating in public reporting efforts in NY, PA, NJ, and OH and internal quality improvement efforts in New England compared to the rest of the United States between 1994 and 1999	In-hospital, 30-day, and risk adjusted in-hospital/30-day mortality, changes in out-of-region CABG surgery	NYS CSRS; PA HC4; NJ Department of Health and Senior Services Registry; CHQC; Northern New England Cardiovascular Study Group (not public)	
Hibbard 2003 ²⁴ (Fair)	To evaluate the impact on quality improvement of reporting hospital performance publically versus privately back to the hospital.	Wisconsin	Comparison Groups (s) Pretest Posttest (2 of 3 groups Randomly Assigned)	Wisconsin hospitals -24 hospitals utilizing public reporting -98 hospitals randomized to either private reporting or no reporting	Public reporting hospitals (n=24) Private reporting hospitals (n=41) No reporting hospitals (n=46)	Increase in QI activities in obstetrics and cardiac care (0-7 possible QI activities) Public image perception (0-5 scale)	QualityCounts	None

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Hibbard 2005 ²³ (Fair)	To assess hospital's' performance in the 2 years following the release of the report	Wisconsin	Comparison Groups (s) Pretest Posttest (2 of 3 groups Randomly Assigned)	24 hospitals in south central Wisconsin. And survey on long term impacts among community members (n = 803).	Hospitals in report vs. hospitals given a report of just their performance vs. hospitals that received no report	Improvements in performance overall and in clinical areas	QualityCounts	None
Hollenbeak 2008 ²⁵ (Good)	To identify associations between intensive public reporting and in-hospital mortality.	Pennsylvania	Comparison Groups (s) Pretest Posttest	Patients treated for 6 acute conditions: AMI, congestive heart failure, hemorrhagic stroke, ischemic stroke, pneumonia, and sepsis.	Group 1, Time 1: Pennsylvania patients during period of 'limited' public reporting, from 1997-1999 (n=515,266; 206 hospitals) Group 1, Time 2: Pennsylvania patients during period of 'intensive' public reporting, from 2000-2003 (n=689,006; 200 hospitals) Comparison (Propensity matched to Pennsylvania): Group 2, Time 1: Patients in different states with limited public reporting, from 1997-1999 (propensity matched to Pennsylvania) (n=103,864; 53 hospitals) Group 2, Time 2: Patients in different states with limited public reporting, from 2000-2003	In-hospital mortality	PA Hospital Effectiveness/ Performance Report	None

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
					<p>(n=59,239; 34 hospitals) Group 3: Limited reporting in CO and TX, from 1997-1999 (only 3 outcomes measures: AMI, CHF, pneumonia; n=21,952; 8 hospitals) Group 4: Intensive reporting in CO, TX, and CA from 200-2003 (only 3 outcomes measures: AMI, CHF, Pneumonia; n=9,456; 7 Hospitals)</p> <p>4 Major comparisons: 1) Intensive Pennsylvania vs limited non-Pennsylvania 2) Limited Pennsylvania vs limited non-Pennsylvania (see note) 3) Limited PA vs Limited CO and TX (3 Outcomes) 4) Intensive PA vs Intensive CA, CO, TX (3 Outcomes)</p> <p>N=168,104 Matched patient pairs</p>			

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Howard 2006 ²⁶ (Fair)	To determine whether report cards influence the number of kidney transplant waiting list registrations and donor transplants at transplant hospitals.	USA	Time Series post only	Transplant Centers in the US	Post only data comparing patient transplant registrations and hospital performance across time Intervention: Internet reporting of the Scientific Registry of Transplant Recipients	Number of patients choosing transplant center during each report card period.	University Renal Research and Education Association semiannual reports on kidney transplant graph survival	Released every 6 months online.
Jang 2010 ²⁷ (Fair)	To assess the impact of reporting performance information on the readmission rate, length of stay and cost of hip hemiarthroplasty.	Korea	Pre-Post	Hip hemiarthroplasty cases in Korea from January 2006-April 2008 (n=22851 surgeries at 851 medical institutions)	Public report vs no report Pre: January 2006-December 2007 Post: December 2007-April 2008	Readmission rates Length of Stay Change in Cost Patient selection	Not named, Presented on National Health Insurance Corporation website and in press	None
Jang 2011 ²⁸ (Fair)	To evaluate the effect of Repeated Public Releases (RPR) for reducing adjusted cesarean section rates and to analyze the characteristics of institutions responsive to RPR.	Korea	One Group, Pre-Post	Korean hospitals that provide cesarean sections (N=1194)	Cesarean rate; Pre-report: August 2004-July 2005, Post-report: August 2005-June 2007	Cesarean rates	Cesarean section rates released by the Health Insurance Review and Assessment Service	None
Jha 2006 ²⁹ (Good)	To determine if high or low performance by surgeons or hospitals predicts performance in the period when data are most likely to be used by consumers. To determine	New York	Time Series post only	hospitals and cardiac surgeons in New York	Intervention: Public Release of Cardiac Performance for hospitals (yearly) and surgeons (released yearly for three year periods) Baseline: How well hospitals performed on report cards released in 1995 (performance data for	Performance: each hospital's or surgeon's RAMR. Market Share: number of cases of isolated CABG surgeries performed by a given surgeon or hospital in a given time period,	NY CSRS	Required publication of performance data for cardiac surgeries in NY

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
	<p>whether hospital or surgeon performance affects patient market share.</p> <p>To assess whether surgeon performance is associated with likelihood of ceasing practice.</p>				<p>1993); How well surgeons performed on the 1999 report card (performance Data for 1997) Post: How well hospitals performed in 1996 (a year after release); How well surgeons performed in 2000 (a year after release)</p> <p>(For Market Share) Pre: Hospital or surgeon market share prior to the release of report card Post: Hospital or surgeon market share one year after release of report card</p> <p>(For Surgeons Quitting) Pre: Performing surgeries prior to release Post: Discontinuing surgeries over the course of two years from release of public data</p>	<p>divided by the total number of isolated CABG surgeries performed by all surgeons/hospitals in NY during that period.</p> <p>Discontinuation of surgeries: Any surgeon who did not perform a single surgery in a given calendar year assumed to have left the system.</p>		

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Longo 1997 ³⁰ (Fair)	To examine the impact of an obstetrics consumer report developed and issued by the Missouri Department of Health on hospital behavior.	Missouri	One Group Pretest Posttest	Hospitals in Missouri, N=82. Response rate=93% (82/88).	Change after release of public report among 82 Hospitals listed in the Show Me Buyer's Guide: Obstetrical Services published in 1993. Data collected 1994.	Number of facilities that previously did not have service, but instituted service after guide published. Number of facilities with policies changed, planned to change, or with change under discussion. Obstetrical outcome trends.	ShowMe Buyers Guide: Obstetrical Services	None

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Mennemeyer 1997 ³¹ (Fair)	To examine whether the HCFA data releases had an impact on community hospital discharges over the period 1984 to 1992.	USA	Interrupted Time Series	All community hospitals with a standardized HCFA mortality rate of more than one standard deviation from the mean (outliers) in any year during the period 1984-2002. In addition, 50% sample of hospitals that were never outliers under this definition. Data from 1983 included for changes over time (baseline). Over 9 year period, n= 23,564.	Baseline/Pre-HCFA mortality release: 1983; Intervention: yearly release of HCFA mortality report. Change in hospital discharges attributed to HFCA release of information verses other sources such as: Media attention: Dummy variables relating to newspaper articles reporting either high or low mortality outlier at specific hospitals and whether presence of a favorable story, unfavorable story, government action, and unusual death.	Use of hospital: change in yearly discharges	HCFA mortality report	Media Coverage: whether or not the media (specifically newspapers) report rates and whether or not the media include stories that have positive or negative spins.

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Moscucci 2005 ³² (Fair)	To compare demographic data, indications, and in-hospital mortality from large multicenter PCI databases in Michigan, where public reporting is not mandated, and in New York where it is.	Michigan and New York	Comparison Groups (s) Post test Only	No public reporting: Hospitals in Michigan (n=8) performing 11,374 consecutive PCIs from 1998-1999 Public Reporting: Hospitals in New York (n=34) performing 69,048 consecutive PCIs during same time period.	No public reporting: Michigan Public Reporting: New York	In-hospital mortality	NY CSRS	None
Mukamel, 1998 ³³ (Fair)	To test the hypotheses that hospitals and surgeons with better outcomes reported in the NYS Cardiac Surgery Reports experience a relative increase in their market share and prices.	New York	One Group Posttest Only	Hospitals and surgeons in New York	Compare hospitals over different years (1990 vs. 1991 vs. 1992)	Market shares	NY CSRS	None

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Omoigui 1996 ³⁴ (Poor)	It has been suggested that this program played a significant role in the 41% decrease in the risk-adjusted mortality rate between 1989 and 1992. We hypothesized that some high-risk patients had migrated out of state for surgery. The purpose of this study was to determine whether cross-border risk-shifting resulted in changes in referral source case-mix and outcome from 1989 through 1993 at the Cleveland Clinic, a major regional, national, and international referral center located in the city of Cleveland, Ohio, 110 miles from the western border of New York state.	New York and Cleveland, OH	Multiple Group Time Series	n=9442 isolated CABG operations undertaken at the Cleveland clinic between Jan 1, 1989 to December 31, 1993.	Time trends of mortality, morbidity and referral case-mix at the Cleveland clinic. Post Only - 1989 to 1993	Mortality	NY CSRS	None

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Peterson 1998 ³⁵ (Good)	To examine the effects of provider profiling on bypass surgery access and outcomes in elderly patients in New York	New York	Interrupted Time Series	All Medicare patients age >=65 yrs who underwent bypass surgery between 1987 and 1992 in a US hospital. n=39,396 in NY Hospitals n=662,675 in non-NY (US)	2 yrs Pre-public reporting: 1987-89 2 yrs Post-public reporting: 1990-92	1. Percentage of patients going out-of-state for bypass surgery 2. Use of bypass surgery following a MI had declined in NY's elderly since the initiation of report cards 3. Whether bypass surgery outcomes were improving more rapidly in NY than in the rest of the nation.	NY CSRS	None
Pope 2009 ³⁶ (Fair)	Estimate the effect of the US News and World Report hospital rankings on both patient volume and hospital revenues.	CA and rest of USA	Time Series Post Test Only	All hospitalized Medicare patients in California (1998–2004) and a sample of other hospitals around the country (1994–2002) N=446	Comparing the USNWR ranking by specialty starting in 1993 to 1994–2002 in rest of the country and 1998 to 2004 in California.	Number of patients (volume) and revenue generated from patients.	USNWR has Specialty and Hospital-level data	None
Romano 2004 ³⁷ (Good)	To determine whether hospitals recognized as performance outliers (either lower or higher than expected) experience volume changes after publication of a report card. H1: Hospitals with lower-than-	New York and California	Times Series Post Only	Outlier hospitals in New York and California NY using CSRS report from December 1992, December 1993, and June 1995CA using CHOP report from December 1993 and from May 1996	Pre: monthly volume prior to report for each specific hospital Post: monthly volume for each specific hospital up to a year later	Volume: total number of patients with a topic condition or procedure, or related condition or procedure, who were admitted to a specific hospital in a specific calendar month. CA Hospitals volume by:	CHOP (CA) and CSRS (NY)	Both states require public reporting

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
	<p>expected mortality or complication rates experience significant volume increases, and hospitals with higher-than-expected mortality or complication rates experience significant volume decreases in the year after publication of a report card.</p> <p>H2: Hospitals with lower-than-expected mortality or complication rates attract more patients from long distances, or from outside their usual catchment areas, after a report is published. Labeled as “bypass effect,” and vice versa for higher-than-expected hospitals.</p>					<p>AMI, AMI-related procedures (CABG, Percutaneous coronary angioplasty, congestive heart failure), Cervical Discectomy, Lumbar Discectomy, Discectomy-related (Back or neck procedures, Medical back problems, Knee arthroplasty, Hip arthroplasty)</p> <p>NY Hospitals monthly volume by: CABG CABG-related procedures (AMI, Percutaneous coronary angioplasty, Congestive heart failure)</p>		

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Romano 2004 ³⁷ (Good) <i>Cont.</i>	<p>H3: Hospitals with lower-than-expected mortality or complication rates lead to an increased volume of clinically related conditions or procedures, and vice versa for higher-than-expected hospitals.</p> <p>H4: Certain sociodemographic groups are more likely to hear about the release of a hospital report card and are better able to more likely to use this information to select a hospital than other groups.</p>							
Romano, 2011 ³⁸ (Fair)	<p>To evaluate the impact of 3 reports from the voluntary CA CABG Mortality Reporting Program on hospital market share, hospital mortality, and patient selection for coronary artery bypass graft surgery.</p> <p>After Public Reporting: H1: Low mortality outliers would</p>	California	Multiple Group Time Series.	Hospitals in California that perform isolated CABG surgeries: 2001: N=79 hospitals 2003: N=70 2005: N=77	Pre and post public data reporting for three data release time points, July 2001, August 2003, and February 2005	Change in Hospital Market Share: The difference in each hospital's market share between the 6 month periods immediately after and before release of a report. Market share is determined by dividing its number of CABG surgery discharges by the total number of	California CABG Mortality Reporting Program reports risk adjusted operative mortality for surgeons and hospitals performing isolated CABG surgery.	None

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
	<p>experience increased CABG market share.</p> <p>H2: High mortality outliers would experience decreased risk adjusted inpatient CABG mortality (due to enhanced quality improvement efforts).</p> <p>H3: The CCMRP program would stimulate an overall decrease in risk adjusted inpatient CABG mortality for participants, without a parallel change in mean hospital severity of illness or high risk patient selection.</p>					<p>CABG discharges in nonfederal hospitals in California during the same period.</p> <p>Change in Hospital Mortality: Difference in risk-adjusted hospital mortality between specified periods after and before the release of each public report.</p>		
Rosenthal 1997 ³⁹ (Good)	To determine changes in hospital mortality that may have occurred in association with the Cleveland Health Quality Choice (CHQC) Program	Cleveland, OH	Interrupted Time Series	30 hospitals in Northern Ohio	Before reporting vs. after reporting	Changes in mortality rates	CHQC	None

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Shabino 2006 ⁴⁰ (Poor)	To report on CheckPoint progress and to propose new measures.	Wisconsin	One Group Pretest Posttest	Hospitals in Wisconsin, December 2004, n=115; September 2006, n=117	Changes in AMI, CHF, and Pneumonia outcomes between: Early post-public reporting (December 2004) and 2 years after public reporting (September 2006)	<p>Acute MI outcomes: % on aspirin at arrival, % on aspirin at discharge, % beta blocker at arrival, % beta blocker at discharge, % ACEI/ARB Left ventricular systolic dysfunction, smoking counseling.</p> <p>CHF outcomes: % Left ventricular function assessment, % ACEI/ARB Left ventricular function assessment, % Smoking counseling, % Discharge instructions</p> <p>Pneumonia outcomes: % Oxygen assessment, % pneumonia vaccine, % smoking counseling, % antibiotic within 4 hours</p>	Wisconsin CheckPoint	None

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Tu 2009 (Fair) ⁴¹	To evaluate whether the public release of data on cardiac quality indicators effectively stimulates hospitals to undertake quality improvement activities	Ontario, Canada	Randomized Delayed Intervention Trial (hospitals randomized to early public reporting, or reporting 21 months later)	Acute Care Hospitals in Ontario treating more than 15 patients with AMI per year.	Both groups receive feedback. One receives early feedback (January 2004) and then the data are publicly released and the media report the results; the other receives delayed feedback (September 2005) and then public release, but no media feedback.	<p>Primary: Mean performance on each of 2 composite process-of-care indicators: a) percentage of opportunities for applying each of 12 AMI indicators that were fulfilled b) CHF quality indicator “defined in a similar manner” using 6 CHF process-of-care indicators.</p> <p>Secondary: 1 year and 30 day Hospital mortality; individual indicators creating the primary composite indicators; hospital report card impact survey results.</p>	AMI and CHF Process Measures for acute care hospital	None

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Vladeck 1988 ⁴² (Poor)	Hypothesize that occupancy in hospitals with higher-than-expected death rates would decline after public release; occupancy in hospitals with as-expected death rates would not change; and occupancy in hospitals with lower-than-expected mortality would rise.	New York	One Group Pretest Posttest	Occupancy rates for all New York City general acute care hospitals; n=70	Group 1: NY Hospitals with higher-than-expected mortality rates (n=14); Group 2: NY Hospitals with as-expected mortality rates (n= 47); Group 3: NY Hospitals with lower-than-expected mortality rates (n=9) Pre: five calendar quarters preceding March 12, 1986 release of HCFA data Post: three calendar quarters following release	Occupancy rates	HCFA mortality report	New York City metropolitan hospitals overrepresented among 269 outlier hospitals: 45 were from New York City or from surrounding counties; two-thirds had higher than expected mortality, one-third had lower-than-expected rates.
Wang 2011 ⁴³ (Good)	Examines the impact of CABG report cards on a provider's aggregate volume and volume by patient severity and then employ a mixed logit model to investigate the matching between patients and providers	Pennsylvania	Times Series Post Only	PA residents (aged 30 and above) who were undergoing an isolated CABG procedure in PA hospitals and who were admitted between Q3 1998 and Q1 of 2006. N= 114,039)	Post Only: 1998 to 2006	Hospital Quarterly Volume Surgeon Quarterly Volume	PA CABG Guide	None

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Werner 2010 ⁴⁴ (Good)	To examine changes in hospital process performance in the first three years after Hospital Compare was initiated and test whether these changes in performance were correlated with changes in hospital mortality rates, length of stay, and readmission rates	USA	Times Series Post Only	3476 acute care non federal US hospitals that publicly reported quality information on the CMS Hospital Compare website from 2004-2006	Change in performance level between 2004 and 2006 of low vs. low-middle vs. middle-high vs. high performing hospitals	Performance on individual and composite performance measures Change in hospital performance from 2004 to 2006	CMS Hospital Compare	None

Table H1. Hospital quantitative studies: columns 1-8 of 18 (pages H-1 to H-18) (continued)

Author, Year (QA)	1. Study Purpose and/or a priori Hypothesis:	2. Geographic Location	3. Study design	4. Sample/ Population	5. Primary Comparison	6. Outcomes	7. Public Report Name and Description*	8. Context: Environment Characteristics
Wuebker 2008 ⁴⁵ (Fair)	<p>H1: The publication of quality information has reduced patient uncertainty. Therefore published hospitals extend their market share or case numbers when compared with competing- non-publishing-hospitals</p> <p>H2: From the total of publishing hospitals, those hospitals with overaverage quality tend to be preferred to competing hospitals with a quality below average. In other words: "good hospitals: should be able to extend their market shares or case numbers in comparison to "poor hospitals"</p>	Rhine-Ruhr area and Colgne-Bonn area, Germany	Multiple Groups, Time Series	157 German hospitals in two regions, Rhine-Ruhr (study group) and Cologne-Bonn (control group)	Case numbers, market share and quality before (2003-2005) and after public reporting (2005-2006)	<p>Case Numbers: Hospital case numbers</p> <p>Market share 35: Hospital market share for the market delineation of 35km; Market share 50: Hospital market share for the market delineation of 50km;</p> <p>Log_Distance: Average logarithmized distance of the treated patient to the hospital</p>	<p>Klinikfuhrer Rhein-Ruhr (Clinic Guide), 74 hospitals in the Rhine-Ruhr region voluntarily participated. Contains patient satisfaction, case numbers, process, and outcome indicators.</p>	None

* Public report descriptions are in Appendix E.

Section B

Table H2. C Hospital quantitative studies: Columns 9-13 of 18 (pages H-19 to H-39)

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
Apolito 2008 ³ (Good)	None	Patients for cardiac surgery	None	<p>New York vs Non-New York: Coronary Angiography (53.2% vs 68.9%, p<0.001); PCI (23.2% vs 38.2%, p<0.001) and PCI or CABG (35.5% vs 50.8%, p<0.001)</p> <p>Logistic Regression for Management of NY vs non-NY patients with predominant LV failure: (OR, 95% CI)</p> <p>Coronary angiography: .51***, .36-.73 Coronary angiography (propensity adjusted): .46***, .31-.68 PCI and/or CABG: .53***, .38-.76 PCI and/or CABG (propensity adjusted): .59**, .40-.87 PCI: .49***, .33-.72 PCI (propensity adjusted): .51**, .33-.77 CABG: .92, .57-1.50 CABG (propensity adjusted): 1.06, .62-1.82</p> <p>NY Vs non-NY propensity score-adjusted in-hospital mortality (overall, and by revascularization status) of patients with predominant LV failure: (OR, 95%CI)</p> <p>Unadjusted NY vs. non-NY: 1.30, .92-1.85 Adjusted by Propensity score: NY vs Non-NY: 1.5*, 1.01-2.21 Propensity score: .93, .85-1.02</p> <p>In-hospital mortality, adjusting for PCI/CABG, the interaction of PCI/CABG and NY status and Propensity score:</p>	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
				PCI and/or CABG by NY versus non-NY interaction: p=0.008 PCI and/or CABG: NY vs. Non-NY: .73, -4-1.32 No PCI and/or CABG: NY vs. non-NY: 2.12**, 1.2-3.75 Propensity score: .89*, .81-.98 *** p<0.001, **p<=.01, *p<=.05	
Baker 2002 ^b (Fair)	Patients or Payers	Selection of hospitals, however consequences are not dire.	Unadjusted results: RR for in hospital death: Acute MI: -20.2% (95% CI, -31.1 to -8.0) CHF: -4.7% (95% CI, -55.4 to -36.2) COPD: -49.6% (95% CI, -65.4 to -26.8) Pneumonia: -23.0% (95% CI, -32.1 to -12.1) GI hemorrhage or Stroke: NS RR for Early post discharge mortality rate: Acute MI: 100.1% (95% CI, 43.2 to 178.9) CHF: 57.4% (95% CI, 28.0 to 94.6) GI hemorrhage: 101.0% (95% CI, 13.7 to 189.0) Pneumonia: 85.8% (95% CI, 54.3 to 123.8) Stroke: 121.4% (95% CI, 71.1 to 184.7) COPD: NS RR for 30-day mortality: CHF: -12.4% (95% CI, -23.7 to 0.0) Stroke: 25.3 (95% CI, 10.0 to 42.3) Acute MI, GI hemorrhage, Pneumonia, COPD: NS Risk-adjusted mortality rates: In hospital mortality: Acute MI, GI hemorrhage, CHF, Pneumonia, COPD had significant declines. Stroke was NS. Post discharge mortality rates: Acute MI, GI hemorrhage, CHF, Pneumonia, Stroke had significant increases. COPD was NS. 30-day mortality rates:	None	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			CHF: absolute decline 1.4% (95% CI, -2.5 to -0.1) COPD: absolute decline 1.6% (95% CI, -2.8 to 0.0) Stroke: absolute increase 4.3% (95% CI, 1.8% to 7.1)		
Baker 2003 ⁴ (Fair)	Patients and Payers have access to the data.	Hospital selection for future use.	Hospital outlier status was not significantly related to changes in risk-adjusted 30-day mortality. Between 1991 and 1997, the absolute change in risk-adjusted 30-day mortality at "average" hospitals was -0.5% (95%CI: -1.8-1.0%). Risk adjusted mortality declined only slightly at hospitals classified as "below average" (-0.8%, 95%CI: -2.9-1.8%) and at hospitals classified as "worst" (-0.4%; 95%CI: -2.3-1.7)	None	None
Bridgewater 2007 ⁶ (Good)	Motivation to have better outcomes and possibly to avoid operating on high-risk patients	Patients selected by provider/surgeon.	Observed Mortality decreased from 2.4% in 1997-98 to 1.8% in 2004-5 (p=0.014) Expected Mortality increased from 3.0% in 1997-8 to 3.5% in 2004-5 (p<0.001) Observed to Expected Mortality decreased from .8 in 1997-8 to .51 in 2004-5 (p<0.05)	Average number of patients at low; high; and very high risk: Pre-public reporting: 2694 (84.6%); 449 (14.1%); 41 (1.3%) Post-public reporting: 2654 (81.7%); 547 (16.8%); 47 (1.4%) High risk patients underwent surgery more after public reporting: 13.3% in 1997-98 vs 16.6% in 2004-5 (p<0.001) No statistically significant change in very high risk after public reporting: 1.1% in 1997-8 vs 1.4% in 2004-5 (p=0.37)	None
Carey 2006 ⁷ (Fair)	None	Cardiac Surgery	Overall, the observed mortality to expected mortality ratio (O/E) declined after public reporting. Observed to Expected Ratio, by Procedure: [Pre-Public Reporting (1998-2002); Public Reporting (2003-2004)] CABG: 1.17; .97 PCI: 1.08; .98 CABG+: 1.07; .98 Valve: 1.13; .97	None	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
Caron 1999 ^a (Poor)	Patients and Payers have access to the data.	Hospital selection for future use.	Of 20 Participating hospitals, 16 improved their cesarean section rates and 15 their VBAC rates between 1992 and 1997.	None	<p>15 of 18 hospitals indicated that they currently have an initiative in place to reduce their cesarean section rate. Of 18 facilities, 17 had high scores pertaining to the prioritization of reducing and monitoring their cesarean section rates, and the same facilities also had high scores pertaining to organizational leadership.</p> <p>There was no significant correlation between organizational environment and predicted cesarean section rate.</p>
Caron 2004 ^b (Fair)	none	none	<p>Descriptive data: Means and Percentage Improvement, Time 1 vs Time 2 vs Time 3 vs Time 4 vs Time 5; % improved (lower scores are improvements for non-obstetric outcomes, higher scores are improvements for obstetric outcomes)</p> <p>Acute MI length of stay (LOS): 7.51 vs 7.04 vs 6.55 vs 6.15 vs 6.09; 93%</p> <p>Acute MI mortality: 10.79 vs 10.95 vs 11.30 vs 11.57 vs 10.27; 59%</p> <p>CHF LOS: 6.03 vs 5.80 vs 5.15 vs 4.95 vs 4.73; 100%</p> <p>CHF mortality: 6.18 vs 5.77 vs 5.02 vs 4.25 vs 4.05; 85%</p> <p>Stroke LOS: 7.41 vs 6.98 vs 6.07 vs 5.71 vs 5.30; 100%</p> <p>Stroke mortality: 9.95 vs 9.68 vs 8.72 vs 9.40 vs 9.59; 59%</p> <p>Primary caesarean delivery rate (not used in analyses): 15.95 vs 14.99 vs 13.36 vs 12.19; 76%</p> <p>VBAC delivery rate: 34.85 vs 40.16 vs 44.76 vs 46.52; 67%</p> <p>Total caesarean delivery rate: 20.20 vs 21.30 vs 19.72 vs 17.82; 67%</p> <p>----</p>	None	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			<p>Significant Bivariate Pearson's correlations between 7 outcomes from one year to the next (correlation; P): Acute MI LOS: Acute MI mortality (0.337; .000), CHF LOS (0.781; .000), CHF mortality (0.394; .000), Stroke LOS (0.757; .000), Stroke mortality (0.274; .005), VBAC and total caesarean delivery rate NS. Acute MI Mortality: CHF LOS (0.261; .007), CHF mortality (0.227; .020), Stroke LOS (0.208; .033), Stroke mortality, VBAC and total caesarean delivery rate NS. CHF LOS: CHF mortality (.477; 0.000), Stroke LOS (0.754; .000), Stroke mortality, VBAC and total caesarean delivery rate NS. CHF mortality: Stroke LOS (0.387; .000), Stroke mortality, VBAC and total caesarean delivery rate NS. Stroke LOS: Stroke mortality, VBAC and caesarean delivery rate NS. Stroke mortality: VBAC and total caesarean rate NS. VBAC delivery rate: total caesarean rate NS. *Positive correlations signify that hospitals that are doing well (mean value) in this year would also do well in the next year. --- Repeated measures ANOVA results: Between hospitals: 26 df, F=5.0096, p=0.0001 Time: 783 df, F=2.2157, p=0.0001 *Between hospitals significance indicates that while hospitals made improvements overall, their degree of success varied. This indicates that those hospitals that devoted more effort to an overall quality approach tended to be more successful. Time significance indicates that time was a contributor to both hospitals and outcomes.</p>		
Clough 2002 ¹⁰ (Fair)	Patients and Payers	Hospital use	<p>Overall rate of Change: Cleveland decline in mortality: slope, -.218% per 6 months (95%CI: -.278% to -.159%) Ohio decline in mortality: slope, -.188% per 6 months (95%CI: -.234% to -.143%)</p>	None	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			Difference in slopes, NS ($p=0.35$) Rates of Change by Diagnosis/Procedure: Cleveland vs. rest of Ohio, P-value Acute MI: $-.164$ vs. $-.309$, $p=0.29$ CHF: $-.338$ vs. $-.216$, $p=0.10$ Stroke: $-.249$ vs. $-.166$, $p=0.41$ Lower bowel resection: $-.487$ vs. $+.016$, $p=0.052$ CABG: $-.166$ vs. $-.105$, $p=0.31$ GI Hemorrhage: $-.128$ vs. $.74$, $p=0.53$ COPD: $-.130$ vs. $-.095$, $p=0.54$ Pneumonia: $-.333$ vs. $-.208$, $p=0.012$		
Cutler 2004 ¹¹ (Fair)	None	None	Change in CABG cases: High-mortality hospital vs. low-mortality hospital All patients 1-12 months after being flagged: -4.9 vs. 3.0 ($p<0.05$) 13-24 months after being flagged: -3.1 vs. -0.8 (NS) 25-36 months after being flagged: -3.7 vs. -1.8 (NS) >36 months after being flagged: -7.1 vs. -7.1 (NS) Low-severity patients 1-12 months after being flagged: -5.4 vs. 1.5 ($p<0.01$) 13-24 months after being flagged: -3.7 vs. -0.3 (NS) 25-36 months after being flagged: -4.0 vs. -1.9 (NS) >36 months after being flagged: -5.9 vs. -3.2 High-severity patients 1-12 months after being flagged: 0.6 vs. 1.5 (NS) 13-24 months after being flagged: 0.7 vs. -0.6 (NS) 25-36 months after being flagged: 0.4 vs. 0.0 (NS) >36 months after being flagged: -1.2 vs. -4.0 (NS) ---- Change in RAMR: High-mortality hospital vs. low-mortality hospital	None	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			1-12 months after being flagged: -1.2 vs. 0.2 (p<0.01) 13-24 months after being flagged: -1.3 vs. 0.3 (NS) 25-36 months after being flagged: -1.3 vs. 0.3 (p<0.01) >36 months after being flagged: -0.6 vs. 0.2 (NS)		
Dranove 2003 ¹³ (Good)	None	None	Baseline 1990 (prior to report card) vs 1994 (after report card): Prior year's expenditures for AMI patients in New York and PA increased roughly by 8.5%, whereas expenditures in all other states increased by 9.4%. There was no differential in increase of price. Hospital Level Analysis: A. Mean of Patient's total hospital expenditures one year prior to admission Beneficiaries with CABG (Report Card NY 1993 and PA 1993) anti-ln(-5.30)** Beneficiaries with AMI anti-ln(1.55) B. Mean of patients' total days in hospital one year prior to admission Beneficiaries with AMI anti-ln(-4.51)** Beneficiaries with AMI anti-ln(1.56)	None	None
Dranove 2008 ¹² (Good)	Patients, families, payers	Hospital choice. Not dire consequences for most decisions.	None	None	None
Elliott 2010 ¹⁴ (Good)	Patient/families	None	% of positive responses and difference in % change to responses to survey Reporting by year: 2008 vs. 2009 Nurse communication: 72.7 vs. 73.1; 0.4; p<0.001 Doctor communication: 79.1 vs. 79.0; -0.1; not significant Responsiveness of hospital staff: 59.9 vs. 60.8; 0.9; p<0.001	None	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			Pain management: 67.1 vs. 67.5; 0.4; p<0.001 Communication about medicines: 57.5 vs. 58.0; 0.5; p<0.001 Cleanliness of hospital: 67.9 vs. 68.3; 0.4; p<0.001 Quietness of hospital: 53.6 vs. 54.5; 0.8; p<0.001 Discharge information: 79.1 vs. 79.9; 0.8; p<0.001 Would recommend: 67.1 vs. 67.4; 0.3; p<0.05 ---- Report by participation status: original vs. new Nurse communication: 73.1 vs. 75.7; 2.6; p<0.01 Doctor communication: 79.0 vs. 81.9; 2.9; p<0.001 Responsiveness of hospital staff: 60.8 vs. 65.9; 5.0; p<0.001 Pain management: 67.5 vs. 69.9; 2.4; p<0.01 Communication about medicines: 58.0 vs. 61.1; 3.1; p<0.05 Cleanliness of hospital: 68.3 vs. 72.6; 4.3; p<0.001 Quietness of hospital: 54.5 vs. 61.2; 6.7; p<0.001 Discharge information: 79.9 vs. 80.0; 0.1; not significant Would recommend: 67.4 vs. 68.5; 1.1; not significant		
Evans 1997 ¹⁵ (Fair)	None	None	Change in Mortality and Change in Morbidity from 1990 to 1992 Actual mortality, less expected mortality divided by patient volume for 1990 for diagnostic related groups: -0.8518; p<0.01 and - Actual morbidity, less expected morbidity divided by patient volume for 1990 for diagnostic related groups: -- and -0.9452; p<0.01 Poor mortality in 1990: -0.013; p<0.05 and -- Poor morbidity in 1990: -- and -0.0003; NS	None	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			Poor operating margin ratio in 1990: 0.0013; p<0.01 and -0.0007; NS Economic impact of diagnostic related groups: -0.0019; NS and -0.0517; p<0.05 Herfindahl competition index: -0.0002; p<0.01 and 0.000; NS Size of hospital: 0.0089; p<0.01 and 0.0077; p<0.05 Teaching hospital: 0.0005; NS and 0.0001; NS		
Foreman 1995 ¹⁶ (Poor)	None	Hospitals	None	None	None
Friedberg 2009 ¹⁷ (Good)	None	None	None	ED Visits for Respiratory Symptoms: Diagnosis Rates, Antibiotic Administration, and Waiting Times to see a Physician, 2001-2005: [% of visits for pre-reporting: 2001, 2002, 2003; public reporting: 2004, 2005 (P value for trend)] Diagnosis: Pneumonia: 11, 9, 12; 11, 10 (.07) Bronchitis: 26, 25, 26; 23 26 (.47) CHF: 8, 10, 10; 9, 7 (.06) Antibiotic Use: With any ED diagnosis: 34, 31, 36; 35, 36 (.10) With an ED diagnosis of pneumonia: 66, 66, 78; 78, 78(.03) With no ED diagnosis of pneumonia: 27, 25, 27; 26, 28 (.68) With an inappropriate ED diagnosis: 22, 20, 21; 22, 26 (.45) Mean Waiting Times to See a Physician: Visits for respiratory symptoms: -, -, 39; 45, 56 (<.001) Visits not for respiratory symptoms: -, -, 47; 49, 58 (<.001) Difference, Respiratory symptom vs no respiratory symptom: -, -, 8; 4, 2 (.03)	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
				<p>[Pre-Reporting %; Public Reporting % (Adjusted P value for difference)]</p> <p>Diagnosis: Pneumonia: 10; 11 (.06) Bronchitis: 26; 25 (.17) CHF: 9; 8 (.40)</p> <p>Antibiotic Use: With any ED diagnosis: 34; 35 (.45) With an ED diagnosis of pneumonia: 70; 78 (.86) With no ED diagnosis of pneumonia: 26; 27 (.79) With an inappropriate ED diagnosis: 21; 24 (.80)</p> <p>Mean Waiting Times to See a Physician: Visits for respiratory symptoms: 39; 50 (.06) Visits not for respiratory symptoms: 47; 53 (.002) Difference, respiratory vs no respiratory symptom: 8; 3 (.06)</p>	
Ghali, 1997 ¹⁸ (Fair)	None	None	<p>Massachusetts CABG Cases, 1990-1994: Trends in Observed, Predicted, and Adjusted Mortality [Observed Mortality, % (95% CI); Predicted Mortality, % (95% CI); SMR (95% CI); Adjusted Mortality, % (95% CI)]</p> <p>1990 (baseline; n=5395): 4.7 (4.2-5.3); 4.7 (4.2-5.3); 1.00 (.78-1.2); 5.3 (4.1-6.4) 1992 (n=5818): 3.5 (3.0-3.9); 5.4 (4.8-6.0); .65 (.50-.82); .65 (.50-.82); 3.4 (2.6-4.3) 1994 (n=5915): 3.3 (2.8-3.8); 5.7(5.1-6.3); .58 (.45-.73); 3.1 (2.4-3.9)</p> <p>----</p> <p>CABG In-Hospital Mortality trends over time for Massachusetts, New York, and Northern New England: [Years Studied; Observed Mortality Reduction, % (Baseline; Final year); SMR</p>	None	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			Massachusetts: 1990-1994; 4.7; 3.3; .58 New York: 1989-1992; 3.5;2.8; .59 Northern New England: 1987-1993; 4.5; 3.6; .76 ---- Unadjusted Medicare 30-Day CABG Mortality Rates, by %: [United States; Massachusetts; New York; Northern New England] 1986: 6.0; 4.5; 4.2; 5.0 1990: 3.5; 3.6; 2.7; 3.1 1992: 4.3; 4.0; 3.3; 3.5		
Guru 2006 ¹⁹ (Fair)	Motivation for better outcomes	None	Change in Risk-Adjusted 30 Day Mortality: [%, (95% CI)] After Confidential Reporting: -29% (21-39) After Public Reporting: +2%, (-10-14)	None	None
Hannan 1994 ²¹ (Good)	Better outcomes	Patients can use data to determine quality of surgeons and hospitals that perform CABG operations	For Hospitals: Actual, Expected, and Risk-Adjusted Mortality in 1989-1992: Based on Hospitals' 1989 Risk-Adjusted Outlier Status: [Actual; Expected; Risk-Adjusted (95% CI)] 1989: Low Outliers: 2.54; 3.21; 2.46 (1.82-3.25) Non Outliers: 3.32; 2.52; 4.09 (3.64-4.57) High Outliers: 7.02; 2.43; 8.97 (7.06-11.25) 1990: Low Outliers: 2.74; 3.46; 2.46 (1.9-3.14) Non Outliers: 3.21; 2.90; 3.43 (3.08-3.82) High Outliers: 3.31; 2.60; 3.95 (2.77-5.47) 1991: Low Outliers: 3.00; 3.81; 2.44 (1.91-3.07) Non Outliers: 2.99; 3.06; 3.03 (2.71-3.37) High Outliers: 3.99; 2.78; 4.45 (3.35-5.81) 1992: Low Outliers: 2.89; 4.08; 2.20 (1.73-2.76) Non Outliers: 2.80; 3.52; 2.47 (2.21-2.75) High Outliers: 2.71; 3.01; 2.80 (1.99-3.83) ---- CABG Volume in 1989-1992: Based on	None	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			<p>Hospitals' RAMR Terciles in 1989: [1989 Volume #(%); 1990 Volume # (%); 1991 Volume #(%); 1992 Volume #(%)]</p> <p>Lowest Tercile: 2,617(21.3); 3,180(22.8); 3,446(23.2); 3,411(21.7) Middle Tercile: 5,463(44.5); 5,927(42.5); 6,465(43.3); 7,046(44.8) Highest Tercile: 4,189(34.1); 4,839(34.7); 5,013 (33.6); 5,276(33.5)</p> <p>CABG Volume in 1989-1992: Based on Hospitals' RAMR 1989 Outlier Status: [1989 Volume #(%); 1990 Volume # (%); 1991 Volume #(%); 1992 Volume #(%)]</p> <p>Low Outliers: 1,927(15.7); 2,332(16.7); 2,437(16.3); 2,559(16.3) Non Outliers: 9,274(75.6); 10,525(75.5); 11,152(74.6); 11,736 (74.6) High Outliers: 1,068(8.7); 1,089(7.8); 1,355(9.1); 1,438(9.1)</p>		
Hannan 1994b ²² (Good)	none	Hospital for cardiac surgery	<p>Volume, Actual, Expected and Risk-Adjusted Mortality rates for CABG Surgery in NY, 1989-1992: [1989; 1990; 1991; 1992 Total]</p> <p>Volume: 12269; 13946; 14944; 16028; 57,187 Actual Mortality Rate, %: 3.52; 3.14; 2.08; 2.78; 3.11 Expected Mortality Rate, %: 2.62; 2.97; 3.16; 3.54; NA Risk-Adjusted Morality Rate, %: 4.17; 3.28; 3.03; 2.45; NA</p>	None	None
Hannan 2003 ²⁰ (Good)	None	Hospitals for CABG surgeries	<p>Death in-hospital and/or within 30 days (%) [Remainder of U.S.; Northern New England; Northeastern OH; NJ; NY; PA]: 4.75; 4.18*; 4.14*; 4.79; 3.15*; 4.04* *p<0.05 when compared to remainder of U.S. ----- Adjusted OR (95% CI) for Medicare CABG</p>	<p>% of Out-of-Region CABG Procedures between 1994 and 1999 [Remainder of U.S.; Northern New England; Northeastern OH; NJ; NY; PA]: 1994: 10.5; 15.2**; 6.5**; 23.4** 9.9; 4.9** 1999: 10.5; 12.6**; 6.9**; 18.4**; 10.4; 4.9**</p>	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			Surgery Mortality - All Regions Compared with Remainder of U.S.: 1994:0.81 (0.73-0.89); 1995:0.80 (0.73-0.88); 1996:0.86 (0.78-0.94); 1997:0.77 (0.69-.085); 1998:0.74 (0.66-0.84); 1999:0.74 (0.66-0.82); Total:0.79 (0.73-0.85) All significant at p<0.05	% Change: 0.0; -17.1*; +6.2; -21.5*; 5.5; 0.0 *p<0.05 when compared to % out of region in 1994 and 1999 **p<0.05 when compared to remainder of U.S.	
Hibbard 2003 ²⁴ (Fair)	Patient/families	Future hospital care, mainly focused on obstetric and cardiac care	Public reporting vs. private reporting vs. no report Obstetric QI activities of worse than expected hospitals (mean estimated from graph, 0 to 7): 5.4 vs. 2.5 vs. 2; p<0.01 Cardiac QI activities of worse than expected hospitals (mean estimated from graph, 0 to 7): 3.3 vs. 2.2 vs. 1.5; not significant	None	Respondent's belief that public reporting will enhance or detract from hospitals' image (mean estimated from graph, 1=very likely to detract; 5=very likely to enhance) Worse than expected vs. as expected vs. better than expected Public reporting hospitals: 3 vs. 3.9 vs. 5; p<0.05 Private reporting hospitals: 3.8 vs. 3.5 vs. 3.6; not significant No reporting hospitals: 3.5 vs. 3.6 vs. 3.6; not significant
Hibbard 2005 ²³ (Fair)	None	None	Public reporting vs. private reporting vs. no report Percent with statistically significant improvements in obstetric performance (estimated from graph): 34% vs. 22% vs. 12% Percent with statistically significant declines in obstetric performance (estimated from graph): 5% vs. 14% vs. 12% Of hospitals with worse than expected baseline scores, percent with improved performance (estimated from graph): 87% vs. 33% vs. 42%; p=0.04	None	None
Hollenbeak 2008 ²⁵ (Good)	None	Hospital for 6 acute care conditions	Intensive public reporting (Pennsylvania) vs Limited public reporting (Non-Pennsylvania), 2000-2003: Odds ratios across all 6 conditions in Pennsylvania were lower than Non-Pennsylvania and statistically significant: OR range from .59 (95% CI: .46-.76) for	None	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			<p>hemorrhagic stroke to .70 (95% CI: .67-.94) for sepsis.</p> <p>----</p> <p>Limited Public reporting (Pennsylvania) vs Limited public reporting (Non-Pennsylvania), 1997-1999: Odds ratios for all 6 conditions in Pennsylvania were lower than Non-Pennsylvania; 1 (Ischemic stroke) not statistically significant): OR range from .72 (95% CI: .56-.93) for hemorrhagic stroke to .90 (95% CI: .78-1.03) for Ischemic stroke)</p> <p>----</p> <p>Intensive Public Reporting (Pennsylvania) vs Intensive Public Reporting (CO, CA, TX), three outcomes, 2000-2003:</p> <p>Odds Ratios for: AMI higher in Pennsylvania CHF: lower in Pennsylvania Pneumonia: slightly lower in Pennsylvania</p> <p>None were statistically significant</p> <p>----</p> <p>Limited Public Reporting (Pennsylvania) vs. Limited Public Reporting (CO, TX), three outcomes, 1997-1999:</p> <p>Odds Ratios for: AMI Higher in Pennsylvania; not statistically significant CHF: Lower in Pennsylvania; not statistically significant Pneumonia: ~.5 in Pennsylvania; statistically significant</p>		
Howard 2006 ²⁶ (Fair)	None	None	None	None	None
Jang 2010 ²⁷ (Fair)	None	None	<p>Length of Stay after Public Reporting Compared to before Public Reporting: $\beta = -0.102$ ($p < 0.01$). Overall, a 10% reduction in length of stay after public reporting = Approximate reduction from 33.3 days to 30 days.</p> <p>Length of Stay after Public Reporting for</p>	<p>Change in Cost</p> <p>Reduction in cost after public reporting not significant: $\beta = -0.01$ ($p = 0.27$)</p> <p>Post reporting at high-volume institutions compared to pre-reporting high volume institutions or low-volume</p>	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			<p>High-volume Institutions Compared to High-volume Institutions before Public Reporting or Low-volume institutions: $\beta = -0.0001$ ($p=0.97$)</p> <p>Odds Ratio of Readmission Rates for Hip Hemiarthroplasties after Public Reporting Compared to before Public Reporting: 0.49 (95% CI=0.25-0.95)</p> <p>Odds Ratio of Readmission Rates after Public Reporting for High-volume Institutions Compared to High-volume Institutions before Public Reporting or Low-volume institutions: 0.77 (95% CI=0.33-1.80)</p>	institutions also not significant: $\beta=0.05$ ($p=0.65$)	
Jang 2011 ²⁸ (Fair)	none	none	None	None	<p>Only the first public release was “effective”, $p<0.05$</p> <p>After public releases and feedback, cesarean section rates at institutions in the upper third (OR, 2.8; 95%CI 1.6 to 4.7) and middle third (OR, 1.9; 95%CI 1.3 to 2.9) of the annual number of deliveries decreased more than did rates at institutions in the lower third.</p> <p>The upper third (OR 4.7; 95%CI 3.1 to 7.1) and middle third (OR 1.9; 95%CI 1.3 to 2.5) of institutions had a greater decrease in baseline cesarean section rates.</p>
Jha 2006 ²⁹ (Good)	Patients and Surgeons	hospital and/or surgeon for CABG, a high risk surgery	<p>Top performing hospitals and surgeons at baseline continue to perform better in subsequent years.</p> <p>Hospital RAMR at 1996, 2002 and (all years summary): Top Decile, 1.82, 1.55 (1.59); Top quartile, 1.95, 2.03 (1.96); Bottom Quartile, 2.67, 2.13 (2.50); and Bottom decile, 2.89, 2.20 (2.78)</p> <p>Pearson correlation coefficients 0.10 for 1993 with 1996 reports, $p=0.60$; 0.12 for</p>	See Individual Providers	See Individual Providers

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			1994 with 1997 reports, p=0.53; 0.37 for 1995 with 1998 reports, p=0.04; 0.38 for 1996 with 1999 reports, p=0.04; 0.30 for 1997 with 2000 reports, p=0.10; and 0.36 for the 1998 and 2002 reports, p=0.04		
Longo 1997 ³⁰ (Fair)	Patients families and payers	Hospitals for obstetrical care. Consequences not necessarily dire, but could be.	<p>1994 Observed – Expected Obstetrical Outcomes, Difference O-E, P-value</p> <p>Ultrasound rates overall: 77.5-79.6, -2.1, .04 Hospitals with average rates: 60.0-57.2,+2.8, .58 Hospitals with high rates: 89.0-94.0, -5.0, .03</p> <p>VBAC rates, Hospitals with low rates: 21.6-14.4, +7.2, .01 Hospitals with average rates: 28.1-27.7, +.04, .76 Hospitals with high rates: 40.9-45.9, -5.0, .07 Total: 30.3-29.8, +0.5, .59</p> <p>Cesarean rates, Hospitals with low rates: 13.1-13.2, -0.1, .84 Hospitals with average rates: 21.5-21.8, -0.3, .11 Hospitals with high rates: 26.7-32.7, -6.0, .01 Total: 21.3-22.0, -0.7, .01</p>	None	<p>Number (%) of Facilities that did not previously have services, but instituted services after guide published:</p> <p>Car seat: 18/42 (43%) Follow-up services: 17/34(50) Formal transfer agreement: 13/33(39) Nurse educator for breast-feeding:6/18(33) Tubal ligation: 2/15(13) Total of above services: 56/142(39)</p> <p>Number (%) of Facilities with policies changed, planned to change, or with change under discussion, single facility in community vs. multiple facilities in community:</p> <p>Cesarean delivery: 5/36(14) vs. 14/41 (34) High-risk infant transfer: 5/35(14) vs. 6/40(15) Ultrasound rate: 1/33(3) vs. 3/37 (8) VBAC rate: 7/36(19) vs. 15/41 (37) VLBW rate: 2/33 (6) vs. 5/39(13) Newborn death rate: 2/34 (6) vs. 3/37 (8) Appropriateness of charges:</p>

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
					12/41 (29) vs. 12/41 (29) Satisfaction with: Billing: 6/34(18) vs. 12/40(30) Nurses: 8/37 (22) vs. 13/40 (33) Other staff: 7/35 (20) vs. 11/39(28) Physical facility: 6/35(17) vs. 10/40 (25) Physicians: 5/35(14) vs. 8/39(21)
Menemeyer 1997 ³¹ (Fair)	NA	Hospital	None	None	None
Moscucci 2005 ³² (Fair)	Patient/families	None	New York vs. Michigan in hospital outcomes Death: 0.83% vs. 1.54%; p<0.0001 - Cardiogenic shock: 37.9% vs. 31.3%; not significant - Acute MI, no cardiogenic shock: 2.97% vs. 2.28%; not significant - Any acute MI: 4.23% vs. 6.72%; p<0.0001 - Cardiac arrest: 32.8% vs. 20.1%; p=0.01 - Unadjusted OR for overall death: 0.54 (95% CI 0.45 to 0.63); p<0.0001 - Adjusted OR for overall death, adjusted for age and gender: 0.49 (95% CI 0.42 to 0.59); p<0.0001 - Adjusted OR for overall death, adjusted for age, gender, and historical and other risk variables: 1.07 995% CI 0.86 to 1.33); not significant - Adjusted OR for overall death, adjusted for age, gender, historical and other risk variables, and hospital volume (<400 procedures/y): 1.05 (95% CI 0.84 to 1.31); not significant MI: 1.95% vs. 2.04%; not significant Stroke/transient ischemic attack: 0.29% vs. 0.51%; p=0.0001 Emergency CABG: 0.38% vs. 0.85%; p<0.0001 Major adverse events: 3.165 vs. 4.45%; p<0.0001 Revascularization: 0.58% vs. 0.70%; not	None	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			significant Vascular complications: 0.54% vs. 1.99%; p<0.0001		
Mukamel, 1998 ³³ (Fair)	None	None	None	<p>Published RAMR changed prices charged by surgeons by (Regression coefficient)</p> <p>New York City: -0.01 Upstate: -1.3 -Albany County: -0.1 -Erie County: -1.7</p> <p>(none statistically significant; Erie county on the cusp: p=0.052)</p>	<p>Hospitals</p> <p>-Increase in RAMR of 1 percentage point = decrease in growth rate in market share of 1.8 percentage points</p> <p>-Median change in market share (all hospitals)=1.9 percentage points; median RAMR=4.2</p> <p>Individual surgeons</p> <p>-Increase in RAMR of 1 percentage point =decrease in growth rate of 7 percentage points</p> <p>-Median surgeon with 60 surgeries=loss of 4.2 patients due to a 1 percentage point increase in RAMR</p> <p>-Limiting analysis to physicians >10 cases in 1991, increase in RAMR of 1 percentage point= difference in mortality rates increased from 7 to 10 percentage points</p> <p>----</p> <p>By region:</p> <p>Published RAMR changed growth by</p> <p>New York City: -6.3 percentage points Upstate: -8.8 percentage points -Albany County: +8.0 percentage points -Erie County: -8.2 percentage points -Monroe County: -14.5 percentage point</p>

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
Omoigui 1996 ³⁴ (Poor)	None	None	None	<p>n=482 from NY, 6046 from OH, 1923 from Other States (OS) and 991 from Other Countries (OC).</p> <p>Overall Observed and Expected Death Rates Using Cleveland Clinic and New York Models</p> <p>Cohort</p> <ul style="list-style-type: none"> a. Obs death% b. Exp Death% CCF Model c. Exp Death% With NY Model <p>New York</p> <ul style="list-style-type: none"> a. 5.1 b. 3.7 c. 5.37 <p>Ohio</p> <ul style="list-style-type: none"> a. 2.84 b. 2.9 c. 3.91 <p>Other States</p> <ul style="list-style-type: none"> a. 3.2 b. 3.14 c. 4.29 <p>Other Countries</p> <ul style="list-style-type: none"> a. 1.4 b. 1.7 c. 2.12 <p>CCF indicates Cleveland Clinic Foundation; NY, New York. Patients from New York had a higher expected mortality than all other referral cohorts. On average, they were also at higher risk than the New York State-wide mix.</p>	None
				<p>Table 7. Comparison of Major Morbidity and Mortality</p> <p>Risk Factor</p> <ul style="list-style-type: none"> a. OH b. OS c. NY 	

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
				<p>d. OC e. P for OH vs NY f. P for OS vs NY</p> <p>Renal failure, % a. 1.6 b. 1.4 c. 3.7 d. 1.3 e. .001 f. .001</p> <p>Respiratory failure, % a. 9.4 b. 8.8 c. 11.6 d. 4.7 e. 0.110 f. 0.062</p> <p>Heart failure, % a. 4.3 b. 5.0 c. 7.3 d. 1.3 e. 0.003 f. 0.050</p> <p>In-hospital death, % a. 2.9 b. 3.1 c. 5.2 d. 1.4 e. 0.004 f. 0.028</p> <p>Relative to patients from Ohio, patients from New York had an odds ratio for death of 1.7 (95% confidence interval [CI], 1.1 to 2.7) beyond the risk of being from out of state.</p>	
Peterson 1998 ³⁵ (Good)	None	None	Whether bypass surgery outcomes were improving more rapidly in NY than in the rest of the nation.	2. Use of bypass surgery following a MI had declined in NY's elderly since the initiation of report cards	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			While, mortality rates fell significantly for both NY and non-NY groups from 1987 to 1992, the NY rates fell significantly faster than the rest of the nation. (p=0.005). That is, 30-day mortality rate following bypass declined in NY by 33% and for the rest of the nation by 19%. In a post-only analysis from 1989-1992, the decline was 22% in NY and 9% in non-NY (p<0.001)	NY MI patients were less likely to receive bypass surgery than non-NY but overall, %age of NY MI patients receiving surgery rose significantly from 3.4% in 1987 to 8.4% in 1992. There no evidence of harms.	
Pope 2009 ³⁶ (Fair)	None	None	None	None	None
Romano 2004 ³⁷ (Good)	Race: Black, White, Hispanic, Other Age: <55, 55-64, 65-74, >75 Insurance status: Medicare, Medicaid, private, HMO, uninsured, other Catchment Area: Air distance between geographic centroid of patient's Zip code and the hospital. Then hospital's Catchment area was the set of zip codes that contributed 60% of that facility's discharges, plus additional zip codes for which that hospital was the majority provider of inpatient, acute care before publication of the first report	Hospitals for different surgeries	None	None	None
Romano 2011 ³⁸ (Fair)	None	Hospitals and Surgeons for CABG surgery	Changes in Risk-adjusted Mortality, by Hospital Outlier Status and Participation Status: No statistically significant changes in risk-adjusted mortality among low-mortality	Percentage of Patients in the Top 5% and Bottom 5% of Overall Expected Mortality, According to a Risk-Adjustment Model Based on Clinical Data, By Hospital Outlier Status and	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			<p>outliers, high-mortality outliers, participating nonoutliers, or nonparticipating hospitals.</p> <p>Low-mortality outliers: N= 15; Pre-report vs. Post-report risk adjusted mortality (%): 2.086 vs. 2.278; Change, p= 0.57; Adjusted Change, p= 0.68</p> <p>High-mortality outliers: N=16; Pre-report vs. Post-report risk adjusted mortality (%):3.028 vs. 3.104; Change, p= 0.93; Adjusted Change, p= 0.71</p> <p>Participating nonoutliers: N=180; Pre-report vs. Post-report risk adjusted mortality (%): 2.536 vs. 2.825; Change, p=0.12; Adjusted Change, p= 0.22</p> <p>All participating: N= 211; Pre-report vs. Post-report risk adjusted mortality (%): 2.537 vs. 2.803; Change, p=0.12; Adjusted Change, p=0.43</p> <p>Nonparticipating: N= 129; Pre-report vs. Post-report risk adjusted mortality (%): 2.699 vs. 3.033; Change, p=0.28; Adjusted Change, p=0.14</p> <p>All hospitals: N= 340; Pre-report vs. Post-report risk adjusted mortality (%): 2.591 vs. 2.880; Change, p=0.06; Adjusted Change, p=0.26</p> <p>Overall, California hospitals experienced no change in mean expected mortality between pre-report and post-report periods. However, among high-mortality outliers, after adjustment for random hospital effects and temporal trends, there was a small but significant 0.785% decrease in expected mortality (relative decrease 25%, p=0.02). This was attributable to decreases in the prevalence of 2 important risk factors.</p>	<p>Participation Status: There was a slight and non significant decrease in the proportion of patients in the top 5% of expected mortality among low-mortality and high-mortality outlier hospitals. A confirmatory analysis of administrative data showed similar effects in all hospital groups.</p> <p>Highest Risk Patients: Prereport (%) vs. Postreport (%): Low-mortality outliers: 4.15 vs. 3.58, p= 0.16 High-mortality outliers: 6.02 vs. 4.43, p= 0.06 Participating nonoutliers: 4.76 vs. 5.07, p= 0.11 All participating: 4.73 vs. 4.82, p= 0.61 Nonparticipating: 5.75 vs. 5.49, p= 0.38</p> <p>Lowest Risk Patients: Prereport (%) vs. Postreport (%): Low-mortality outliers:5.10 vs. 5.12, p= 0.97 High-mortality outliers: 4.67 vs. 3.96, p= 0.36 Participating nonoutliers: 5.19 vs. 5.33, p= 0.46 All participating:5.15 vs. 5.24, p= 0.62 Nonparticipating: 4.56 vs. 4.37, p= 0.47</p>	
Rosenthal 1997 ³⁹ (Good)	None	None	<p>1991 vs. 1992 vs Jan-June 1993 vs. July-Dec 1993</p> <p>Observed mortality rates (%)</p> <p>All: 7.3 vs. 6.9 vs. 6.9 vs. 6.4; p<0.001</p> <p>Acute myocardial infarction: 11.1 vs. 10.1 vs., 11.4 vs. 10.4; NS</p>	None	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			<p>Coronary heart failure: 7.0 vs. 6.8 vs. 5.9 vs. 5.7; p<0.001 Pneumonia: 10.5 vs. 10.6 vs. 10.6 vs. 10.2; NS Stroke: 10.5 vs. 10.2 vs. 10.7 vs. 10.2; NS Obstructive airway disease: 2.8 vs. 2.3 vs. 2.7 vs. 2.5; NS Gastrointestinal hemorrhage: 5.2 vs. 4.2 vs. 4.2 vs. 4.2; NS Lower bowel resection: 5.9 vs. 4.5 vs. 4.8 vs. 3.7; p<0.05 CABG: 2.5 vs. 3.3 vs. 2.9 vs. 2.6; NS Risk-adjusted mortality rates (%) All: 7.3 vs. 6.8 vs. 6.8 vs. 6.5; weighted regression analysis: -0.30 (95% CI -0.58 to 0.06); p=0.06 Acute myocardial infarction: 11.1 vs. 10.2 vs. 10.8 vs. 11.0; weighted regression analysis: 0.00 (95% CI -0.90 to 0.90); p=0.98 Coronary heart failure: 7.1 vs. 6.6 vs. 6.0 vs. 5.6; weighted regression analysis: -0.50 (95% CI -0.61 to -0.39); p=0.002 Pneumonia: 11.1 vs. 10.4 vs. 10.2 vs. 9.9; weighted regression analysis: -0.38 (95% CI -0.66 to -0.09); p=0.03 Stroke: 10.9 vs. 10.0 vs. 10.4 vs. 9.8; weighted regression analysis: -0.36 (95% CI -1.12 to 0.39); p=0.17 Obstructive airway disease: 3.0 vs. 2.0 vs. 2.6 vs. 2.6; weighted regression analysis: -0.08 (95% CI -0.90 to 0.75); p=0.72 Gastrointestinal hemorrhage: 5.2 vs. 4.2 vs. 4.3 vs. 4.1; weighted regression analysis: -0.35 (95% CI -0.93 to 0.23); p=0.12 Lower bowel resection: 5.3 vs. 4.6 vs. 5.4 vs. 4.0; weighted regression analysis: -0.31 (95% CI -1.38 to 0.77); p=0.34 CABG: 3.0 vs. 3.2 vs. 2.5 vs. 2.4; weighted regression analysis: -0.21 (95% CI -0.90 to 0.48); p=0.18 Risk of in-hospital death 1992-1993 relative to 1991: OR (95% CI) Acute myocardial infarction: 0.94 (0.80 to 1.10); NS</p>		

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			Coronary heart failure: 0.81 (0.72 to 0.91); p<0.001 Pneumonia: 0.86 (0.76 to 0.98); p<0.05 Stroke: 0.84 (0.76 to 0.98); p<0.05 Obstructive airway disease: 0.76 (0.60 to 0.97); p<0.05 Gastrointestinal hemorrhage: 0.70 (0.54 to 0.92); p<0.01 Lower bowel resection: 0.82 (0.58 to 1.17); NS CABG: 0.89 (0.64 to 1.24); NS		
Shabino 2006 ⁴⁰ (Poor)	Patients and Families	Health care selection	December 2004 vs September 2006, Wisconsin state averages Acute MI outcomes: Aspirin on arrival: 96% vs 97% Aspirin at discharge: 97% vs 97% Beta blocker at arrival: 91% vs. 94% Beta blocker at discharge: 93% vs. 96% ACEI/ARB Left Ventricular Systolic Dysfunction: 80% vs. 85% Smoking Counseling: 86% vs. 95% CHF: Left ventricular function assessment: 86% vs. 91% ACEI/ARB Left Ventricular Systolic Dysfunction: 79% vs. 84% Smoking Counseling: 64% vs. 86% Discharge instructions: 53% vs. 64% Community acquired pneumonia: Oxygen assessment: 99% vs. 100% Pneumonia vaccine: 47% vs. 73% Smoking counseling: 61% vs. 83% Antibiotic within 4 hours: 2006 only: 84%	None	None
Tu 2009 ⁴¹ (Fair)	None	None	AMI Composite Indicators: Early Feedback Group: 8.2% Change between baseline and follow-up; 95% CI, 5.8%-10.7% Delayed Feedback Group: 7.1% Change between baseline and follow-up; 95% CI, 4.3%-10% Difference between groups: 1.5% change; 95% CI, -2.2%-5.1%; p=0.43	None	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			<p>CHF Composite Indicators: Early Feedback Group: -.2 change between baseline and follow-up; 95% CI, -5.0%-4.6% Delayed Feedback Group: 1.8% change between baseline and follow-up; 95% CI, -2.7-6.1, Difference between groups: .6% change; 95% CI, -4.5%-5.7%; p=0.81</p> <p>----</p> <p>(Exploratory Sub-group analysis) Absolute Difference for Early vs. Delayed Feedback in mean change for Hospital-Specific Mortality Rates After Publication of Report Cards: [% difference, (95% CI); P-value]</p> <p>AMI 30 Day: -2.5 (-4.9 to -.1); .045 AMI 1-year: -3.1 (-6.4 to .2); .06 STEMI 30 Day: -3.1 (-6.0 to -.2); .04 STEMI 1-year: -3.2(-7.3 to 1.0); .13 CHF 30 Day: -1.1 (-3.2 to .9); .26 CHF 1-year: -2.8(-6.0 to .5); .10 CHF and LV dysfunction 30 day: -1.2(-4.1 to 1.8); .44 CHF and LV dysfunction 1-year: -6.8(-11.6 to -2.0); .007</p>		
Vladeck 1988 ⁴² (Poor)	None	Hospital	None	None	None
Wang 2011 ⁴³ (Good)	None	None	None	None	None
Werner 2010 ⁴⁴ (Good)	None	None	<p>2004 vs. 2006: Mean performance score (%) Acute myocardial infarction Aspirin at admission: 93.9 vs. 95.7; p<0:001 Aspirin at discharge: 91.5 vs. 95.0 p<0:001 ACE inhibitor for left ventricular dysfunction: 79.6 vs. 87.0; p<0:001 Beta-blocker at admission: 88.8 vs. 92.5; p<0:001 Beta-blocker at discharge: 90.2 vs. 95.0; p<0:001 Composite score: 90.5 vs. 93.8; p<0:001 Heart failure Assessment of left ventricular function: 82.6 vs. 88.8; p<0:001</p>	None	None

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			<p>ACE inhibitor for left ventricular dysfunction: 75.8 vs. 85.3; p<0:001 Composite score: 79.5 vs. 87.1; p<0:001 Pneumonia Oxygenation assessment: 98.2 vs. 99.5; p<0:001 Pneumococcal vaccination: 46.8 vs. 73.3; p<0:001 Timing of initial antibiotic therapy: 73.2 vs. 80.5; p<0:001 Composite score: 77.7 vs. 86.5; p<0:001 ---- Mortality change (%) vs. length of stay (days) vs. readmission rates (%) Predicated change in hospital outcomes in repose to a 10-point improvement in performance Acute myocardial infarction: -0.6; p<0.05 vs. -0.19; p<0.0001 vs. -0.5; p<0.001 Heart failure: 0.04 vs. 0.01 vs. -0.2; p<0.001 Pneumonia: -0.2 vs. 0.3; p<0.001 vs. -0.1 Low vs. low-middle vs. middle-high vs. high Change in performance from 2004 to 2006 (% , estimated from graph, p values not reported) Acute myocardial infarction: 8 vs. 6 vs. 2 vs. -1 Heart failure: 15 vs. 7 vs. 6 vs. 5.5 Pneumonia: 15 vs. 11 vs. 7 vs. 3.5 ---- Estimated change in hospital outcomes for a 10-point improvement in performance Acute myocardial infarction Mortality: -0.9; p<0.01 vs. -1.2; p<0.000 vs. -0.7; p<0.05 vs., -0.1 Length of stay: -0.18; p<0.001 vs. -0.26; p<0.001 vs. -0.29; p<0.001 vs. -0.03 Readmission: -0.5 vs. -0.7 vs. -1.9; p<0.001 vs. 1.0 Heart failure Mortality: 0.0 vs. 0.0 vs. -0.2; p<0.05 vs. 0.0 Length of stay: 0.01 vs. -0.01 vs. -0.03 vs. 0.01 Readmission: -0.1 vs. -0.5; p<0.001 vs. -0.5;</p>		

Author, Year (QA)	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/Choice	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)
			<p>p<0.001 vs. 0.0 Pneumonia Mortality: -0.2; p<0.05 vs. -0.4; p<0.01 vs. -0.3; p<0.05 vs. 0.2 Length of stay: 0.14; p<0.001 vs. 0.15; p<0.001 vs. 0.10; p<0.01 vs. 0.11; p<0.05 Readmission: 0.0 vs. -0.2 vs. -0.5; p<0.05 vs. -0.2</p>		
Wuebker, 2008 ⁴⁵ (Fair)	None	NR	None	None	None

Section C

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Apolito 2008 ³ (Good)	None	None	None	<p>For management (undergoing PCI and/or CABG, having a coronary angiography), NY patients were approximately HALF AS LIKELY as non-NYers to undergo treatment, except for CABG, where it was much closer to non-NYers. Everything was statistically significant under the .01 level here except for CABG, both adjusted and unadjusted.</p> <p>Re: in-hospital mortality, before adjustment, NY patients were 1.3 times more likely to die, but there was no significance. However, with propensity score adjusted models, NY patents were 1.5 times more likely to die in-hospital than non-NYers and this was stat. significant (p=0.04)</p> <p>In addition, among patients who were not revascularized (no PCI or CABG), NYers were 2.12 times more likely to die in hospital (p=0.01), but among those undergoing PCI/CABG, there was not a statistically significant relationship.</p> <p>Author's conclusion: Case selection bias is evident in NY (but uses evidence in discussion that was not presented earlier on).</p>	Partially supported by grants from the National Heart, Lung, and blood Institute, Bethesda, MD

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Baker 2002 ⁵ (Fair)	None	None	None	Author's conclusion: We found that risk-adjusted 30-day mortality did not improve for three of six conditions and actually worsened for stroke. Although we cannot exclude a beneficial effect of the program because we observed favorable trends for COPD and CHF, it would be difficult to ascribe the observed trends for these conditions to the effects of CHQC.	AHRQ
Baker 2003 ⁴ (Fair)	<p>Mortality: Hospital outlier status (best, above average, below average, worst) was not significantly related to changes in market share for the 6 medical conditions (P value NR).</p> <p>During periods in which hospitals had higher than expected mortality with p<0.01 significance, the adjusted difference in market share was -0.22 absolute percentage points (95% CI: -0.73-0.29; p=0.40) lower than during periods in which the hospitals were not outliers.</p> <p>During the periods in which hospitals had higher than expected mortality with p<0.05 significance, the adjusted difference in market share was 0.21 absolute percentage points higher than for periods in which hospitals were not identified as outliers (95% CI: -0.14-0.56; p=0.24).</p>	None	None	Author's summary: No evidence that hospitals identified as high-mortality outliers lost market share or that hospitals with better than expected mortality gained market share.	AHRQ funded report

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Bridgewater 2007 ⁶ (Good)	None	None	None	In time period after public reporting, observed mortality decreased while expected mortality increased. Despite this, the observed to expected ratio decreased. Stratifying patients using the EuroSCORE to identify their level of risk shows that over time, low risk patients undergoing surgery decreased, high risk increased, and very high risk increased slightly, but this was not statistically significant.	5 authors are members of the steering group of the North West Quality Improvement Programme in Cardiac Interventions. 1 author is president of the British Cardiovascular Society. 1 author is president of the Society for Cardiothoracic Surgery of GB and Ireland and a member of the Healthcare Commission
Carey 2006 ⁷ (Fair)	CABG volume decreased after Public Reporting, PCI rates increased after Public reporting - Not really sure if this is part of the analysis or just a way the authors are performing a validity check	None	None	Mortality decreased overall between the pre-mandatory public reporting and the post public reporting. PCI volume increased and CABG volume decreased - could be a better procedure, but not sure	Not Reported
Caron 1999 ⁹ (Poor)	None	None	None	Author's summary: Hospitals in the greater Cleveland area responded to the imperative for public accountability to improve cesarean section and VBAC rates through internal organizational and specific quality improvement initiatives.	Not Reported

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Caron 2004 ⁸ (Fair)	None	None	None	Author's summary: Pearson's correlations indicate that improvements in clinical outcomes were correlated and sustained over time. In testing this approach, we predicted 28 correlations between the 7 outcome variables. 23 were in the predicted direction. These results suggest that organizations are attempting to support CQI and not focus efforts in one clinical domain.	Not Reported
Clough 2002 ¹⁰ (Fair)	None	None	None	Author's conclusion: The data here do not support the claim of a unique decline in mortality in Cleveland during the first 4 years of public data releases by CHQC.	Not Reported
Cutler 2004 ¹¹ (Fair)	None	None	None	Public reporting affected the volume of CABG cases and future quality at hospitals	NIA
Dranove 2003 ¹³ (Good)	None	None	Report Cards led to substantial selection by providers as the severity of patients receiving CABG declined. Second, hospitals in PA and NY experienced relative declines in the within-hospitals heterogeneity, i.e. teaching schools picked up most of the severe cases. Third, report cards led to higher levels of Medicare hospitals expenditures and greater rates of adverse health outcomes.		

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Dranove 2008 ¹² (Good)	<p>Demand Model Estimates: Eq1 Naive Model vs. Eq2 Correct Model vs. Eq3 Medicaid interactions vs. Eq4 Race interactions vs. Eq5 Asymmetric Model</p> <p>Report card news: Eq2 - 0.043 (P = 0.004) vs. Eq3 0.008 (P = 0.338) vs. Eq4 -0.062 (P = 0.062) Report card score: Eq1 0.021 (p=0.168) – News×Medicaid: Eq3 0.248 (P = 0.000) News×Medicare: Eq3 0.012 (P = 0.330) News×white: Eq4 0.113 (P = 0.002) News×black: Eq4 -0.002 (P = 0.973) Positive news: Eq5 -0.011 (P = 0.756) Negative news: Eq5 0.072 (P = 0.002) Time: Eq1 -0.105 (P = 0.000), Eq2 -0.105 (P = 0.000), Eq3 -0.105 (P = 0.000), Eq4 -0.105 (P = 0.000), Eq5 -0.104 (P = 0.000) Fixed effect: Eq2 - 0.065 (P = 0.015), Eq3 0.075 (P = 0.009), Eq4 0.060 (P = 0.060), Eq5 0.048 (P = 0.090) Observations: Eq 1 453016, Eq2 453016, Eq3 453016, Eq4 453016, Eq5 453016 Log likelihood: Eq1 -51705, Eq2 -51701, Eq3 -51691, Eq4 -51696, Eq5 -51700</p>	None	None	Author’s summary: When hospital report cards provide information that differs from patients’ prior beliefs, patients respond to this information by moving to higher-quality hospitals. We also showed that this effect is primarily due to shifting away from hospitals with negative news, rather than shifting towards hospitals with positive news.	Not Reported
Elliott 2010 ¹⁴ (Good)	None	None	None	Public reporting increased the hospitals scores on nursing communication, responsiveness of staff, pain management, communication about medications, cleanliness and quietness of hospital, discharge information and recommendation, but not on doctor communication using a survey one year after public reporting	CMS through a contract with Health Services Advisory Group and RAND (contract no. HHSM-500-2008-A29THC)
Evans 1997 ¹⁵ (Fair)	None	None	None		Institute for Industrial Competitiveness
Foreman 1995 ¹⁶ (Poor)	Number of Hospital Patients by Region and Quality a. High Quality Hospital Patient Growth %	None	None	The number of patient admissions for high quality hospitals grew in all but one	Not Reported

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
	b. Low Quality Hospital Patient Growth % c. Difference in Mean Growth % [^] Region 1 a. -10.5 b. -16.5 c. +6.0 Region 2 a. 7.6 b. -8.9 c. +16.5 Region 3 a. +9.2 b. 0.0 c. +9.2 Region 4 a. -3.8 b. – c. – Region 5 a. -1.8 b. -3.1 c. +1.3 Region 6 a. – b. -3.5 c. – Region 7 a. 10.7 b. -5.2 c. +15.9 Region 8 a. -4.7 b. 1.1 c. -5.8 Region 9 a. -3.7 b. -6.9 c. +3.2 ^positive numbers indicate high quality group had better			region after the public release of quality data, but there was no statistical significance with any of the changes.	

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
	<p>patient growth</p> <p>None of the changes were statistically significant (No P values or CIs reported).</p>				
Friedberg 2009 ¹⁷ (Good)	None	None	None	Essentially, no evidence that public reporting of antibiotic timing in pneumonia has changed/increased overdiagnosis of pneumonia, inappropriate use of antibiotics, or overprioritization of patients with respiratory symptoms as witnessed by waiting times. Some trends were statistically significant before adjusting for potential confounders, but after adjustment the only item that was statistically significant was mean waiting times for patients without respiratory symptoms.	Primary Care Teaching and Education Fund from corresponding author's hospital; National Research Service Award from the Health Resources and Services administration; and Career Development Award from AHRQ. No COIs stated.
Ghali, 1997 ¹⁸ (Fair)	None	None	None		Massachusetts health Data Consortium; Walnut Medical Charitable Trust; Dr. Ghali supported by grant from Alberta Heritage Foundation for Medical Research
Guru 2006 ¹⁹ (Fair)	None	None	None	Risk-adjusted 30 day mortality rates in Ontario decreased significantly after confidential reports. After Public Reporting, mortality increased slightly, but was not significant.	Heart and Stroke Foundation of Ontario

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Hannan 1994a ²¹ (Good)	None	None	None	<p>In hospitals, RAMR decreased in all outlier status categories, along with a concomitant numerical volume increase in all categories.</p> <p>For Surgeons, all tercile groups experienced reductions in their RAMR, with the highest RAMR in 1989 being reduced from 5.90 to 3.26 in 1992. Among outliers in the Surgeon category, only those who were the lowest outliers in 1989 (with an RAMR of .74) experienced a RAMR rise in 1992 (1.09). The largest reduction in RAMR was among the high outlying surgeons with 7.06% decrease between 1989-1990 and 1992.</p>	Partial grant from the Agency for Health Care Policy and Research of the US Department of Health and Human Services
Hannan 1994b ²² (Good)	None	None	None	CABG surgery volume increased over the years, and overall, the expected mortality rate increased while the RAMR decreased from 4.17 in 1989 to 2.45 in 1992.	Agency for Health Care Policy and Research of the US Department of Health and Human Services

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Hannan 2003 ²⁰ (Good)		None	None	When compared to regions without public reports or similar QI efforts regions and states with public reports experienced lower RAMRs during the period of 1994-1999. Northern New England and New Jersey also experienced statistically significant decreases in the % of patients going out of the region for CABG. Although not significant, OH and NY experienced slight increases while PA did not change. Overall, suggests that high-risk patients are not going out of state as some feared they would.	Department of Veterans Affairs
Hibbard 2003 ²⁴ (Fair)	None	None	None	Making performance information public stimulates quality improvements in areas where performance is rated low.	Robert Wood Johnson Foundation
Hibbard 2005 ²³ (Fair)	None	None	None		The Robert Wood Johnson Foundation's Changes in Health Care Funding and Organization Initiative

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Hollenbeak 2008 ²⁵ (Good)	None	None	None	Authors' conclusions: Public reporting is associated with better outcomes when measuring in-patient mortality as witnessed by Pennsylvania's better ORs compared to non-reporting or limited reporting states, in addition to the relative lack of statistical significance in differences between other states that also have public reporting.	COIs: Hollenbeak is a paid consultant to the PHC4. Gorto is officer and shareholder of APS Healthcare, and is a paid consultant for Bristol-Myers Squibb. Tabak is employee of Cardinal Health and own minor equity in the company. Jones was employee of PHC4, Milstein has no COI. Johannes is employee of Cardinal Health and owns equity in company totaling less than 1%.
Howard 2006 ²⁶ (Fair)	<p>Incident Rate Ratios: (*p<0.10, **p<0.05)</p> <p>Performance: actual graft survival rate - expected graft survival rate (numbers >1 indicate increased performance and increased patient demand; numbers <1 indicate increased performance and decreased patient demand):</p> <p>All registrants: No Fixed Effects: All centers:3.66 [1.69, 7.96]** Fixed Effects: All centers:1.10 [.77, 1.57]; >10 registrants: 1.07 [.73, 1.57]; >20 registrants: 1.14 [.75, 1.73]</p> <p>College degree: No Fixed Effects: All centers:6.01 [1.95, 18.56]** Fixed Effects: All centers: 1.84 [.76, 4.45]; >10 registrants: 1.98 [.74, 5.34]; >20 registrants 3.39 [1.09, 10.53]**</p> <p>Age 18–40: No Fixed Effects: All centers: 4.81 [1.96, 11.77]** Fixed Effects: All centers: 2.07 [1.27, 3.35]**; >10</p>	None	None	Author's summary: Some evidence that publicly reported outcome measures influence the choices of younger patients and patients with college degrees, but overall we are unable to detect an impact of report cards for kidney transplantation on demand.	National Institute of Diabetes and Digestive and Kidney Diseases of the National Institutes of Health

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
	<p>registrants: 2.03 [1.21, 3.40]**; >20 registrants: 2.35 [1.33, 4.13]**</p> <p>Private insurance: No Fixed Effects: All centers: 5.21 [2.11, 12.84]** Fixed Effects: All centers: 1.19 [.70, 2.03]; >10 registrants: 1.09 [.61, 1.97]; >20 registrants: 1.39 [.72, 2.67]</p> <p>Living donor No Fixed Effects: All centers: 2.90 [1.06, 7.93]** Fixed Effects: All centers: 1.34 [.83, 2.16]; >10 registrants: 1.37 [.82, 2.28]; >20 registrants: 1.13 [.65, 1.96]</p> <p>----</p> <p>Performance: actual graft survival rate(numbers >1 indicate increased performance and increased patient demand; numbers <1 indicate increased performance and decreased patient demand):</p> <p>All registrants: No Fixed Effects: All centers: 3.00 [1.50, 6.00]** Fixed Effects: All centers: 1.16 [.82, 1.63]; >10 registrants: 1.04 [.72, 1.52]; >20 registrants: 1.19 [.80, 1.77]</p> <p>College degree: No Fixed Effects: All centers: 4.04 [1.54, 10.58]** Fixed Effects: all centers: 1.50 [.64, 3.53]; >10 registrants: 1.59 [.61, 4.16]; >20 registrants: 2.98 [1.00, 8.84]**</p> <p>Age 18–40: No Fixed Effects: All centers: 3.83 [1.73, 8.49]** Fixed Effects: All centers 2.06 [1.30, 3.25]**; >10 registrants 1.92 [1.18, 3.12]**; >20 registrants 2.21 [1.30, 3.76]**</p> <p>Private insurance: No Fixed Effects: All centers: 4.39 [1.95, 9.85]** Fixed Effects: All centers: 1.23 [.74, 2.07]; >10</p>				

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
	registrants: 1.06 [.60, 1.88]; >20 registrants: 1.45 [.77, 2.72] Living donor: No Fixed Effects: All centers: 3.09 [1.27, 7.52]** Fixed Effects: All centers: 1.47 [.93, 2.32]*; >10 registrants: 1.42 [.87, 2.31]; >20 registrants: 1.24 [.73, 2.10]				

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Howard 2006 ²⁶ (Fair) <i>Cont.</i>	<p>Performance: observed/expected graft failure (numbers >1 indicate increased performance and DECREASED patient demand; numbers <1 indicate increased performance and INCREASED patient demand):</p> <p>All registrants: No Fixed Effects: All centers: .89 [.82, .96]**; Fixed Effects: All centers: .99 [.96, 1.03]; >10 registrants: 1.00 [.96, 1.04]; >20 registrants 1.00 [.96, 1.04]</p> <p>College degree: No Fixed Effects: All centers: .84 [.75, .94]** Fixed Effects: All centers: .95 [.87, 1.04]; >10 registrants: .96 [.87, 1.06]; >20 registrants: .93 [.83, 1.05]</p> <p>Age 18–40: No Fixed Effects: All centers: .87 [.79, .96]** Fixed Effects: all centers: .94 [.89, .98]**; >10 registrants: .94 [.89, .99]**; >20 registrants: .93 [.87, .98]**</p> <p>Private insurance: No Fixed Effects: All centers: .85 [.78, .94]** Fixed Effects: All centers: .97 [.92, 1.03]; >10 registrants: .99 [.93, 1.05]; >20 registrants: .97 [.91, 1.04]</p> <p>Living donor: No Fixed Effects: All centers: .93 [.84, 1.03] Fixed Effects: All centers: .99 [.94, 1.04]; >10 registrants: .98 [.93, 1.04]; >20 registrants: 1.00 [.94, 1.06]</p>				

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Jang 2010 ²⁷ (Fair)	Patient selection: 3.45% increase in proportion of hip hemiarthroplasties performed in high-volume institutions after public reporting (p=0.59)	None	None	Public reporting in Korea on hip surgeries improved length of stay by 10%, but when comparing high-volume hospitals after public reporting to pre-reporting high-volume or low-volume hospitals, the results were not significant. Overall probability for readmission after public reporting was 0.49 times that of pre-public reporting, although readmissions in sub-group analyses of high and low-volume institutions was not significant. There was not an associated change in cost for procedure. Finally, patient selection of high-volume hospitals (serving as a proxy for higher quality) after public reporting was marginally insignificant (p=0.059).	Health Insurance Review and Assessment Service for 2009
Jang 2011 ²⁸ (Fair)	None	None	None	Author's conclusions: It is clear that RPR were only mildly effective in decreasing the rates of cesarean section.	Health Insurance Review and Assessment Service for 2009

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Jha 2006 ²⁹ (Good)	<p>Hospital Market Share: no evidence that report cards affected subsequent market share</p> <p>Impact of Performance Reporting on Hospitals' Subsequent Surgical Market Share: All Years (1995, 1996, 1997, 1998, 2000, 2001 report releases): [Pre report Market share %; Post report Market share %; %-point change]</p> <p>Top 10 Percent Hospitals: 10.9; 10.5; -.4 Top Quartile Hospitals: 28.1; 27.9; -.2 Bottom Quartile Hospitals: 21.8; 21.9; .1 Bottom 10 Percent Hospitals: 8.0; 7.6; -.4 Parameter estimate (P-value) for all years: -.1%(.13)</p>	None	None	Baseline performance is associated with future performance (i.e. top performing hospitals at baseline continue to be top performing hospitals in subsequent years). There were no trends regarding report cards and market shares at either the hospital or individual surgeon levels. Lower performing surgeons were more likely to quit practicing in NY than top performing, although some of this may not be associated with the release of performance data.	NR
Longo 1997 ³⁰ (Fair)	None	None	None	Author's summary: It appears that although consumer reports were initially designed to assist patients in making better decisions about personal health care, they are influencing providers. Reports have been carefully evaluated by health care clinicians and delivery organizations.	Not Reported

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Mennemeyer 1997 ³¹ (Fair)	<p>Hospital discharges are used as a measure of patient and physician selection of hospitals.</p> <p>Several model specifications were tested and a partial fixed effects used that assumed the released information has an effect in its year of release selected DV=hospital discharges</p> <p>Standardized mortality rate: coefficient: -46.60 p<0.05</p> <p>Interpretation: a hospital with two actual deaths for each HCFA predicted death had within one year 46 fewer discharges, fewer than one less discharge per week.</p> <p>Lagged discharges: .60 p<0.001: Interpretation: 40% of the effect is in the first year, the rest after.</p> <p>Media stories related to hospital quality had no effect in another model specification (data not shown).</p> <p>A graphic analysis of the impact in a small number of cases of media reporting of a untoward event found that this resulted in an approximately 9% reduction in discharges.</p>	None	None	<p>Models find HCFA report has little impact on hospital selection: measured by discharges.</p> <p>Based on this: Author's conclusion/opinion: HCFA was justified in eliminating the mortality report because consumers were not using it to choose hospitals. HCFA mortality data had small effects on hospital discharges. Press reports on the findings did not have an influence on discharges, but press reports of 'easily understood, bad outcomes' influenced hospital volume. At an average hospital, a newspaper account of an unusual hospital death was associated with a 9% reduction in hospital use.</p>	Robert Wood Johnson Foundation. No COIs listed.
Moscucci 2005 ³² (Fair)	None	None	None	This data suggests that public reporting (in New York) decreased in-hospital mortality from PCI, however when adjustments are made these findings are washed out.	Blue Cross Blue Shield of Michigan
Mukamel, 1998 ³³ (Fair)	None	None			Not Reported

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Omoigui 1996 ³⁴ (Poor)	None	None	None	Patients referred from New York State for CABG since 1989 were at higher risk and experienced higher morbidity and mortality than other patients operated on at the Cleveland Clinic, beyond what was expected as a time-related function of increasingly adverse patient characteristics. Harm Confirmed.	Not Reported
Peterson 1998 ³⁵ (Good)	1. Out-of state procedure rate in 2 years pre-report cards ranged between 12.5% - 14.3%. After initiation, the rate declined to 11.3% in 1992. (p<0.001)	None	None	Since NY introduced provider profiling, bypass surgery outcomes have improved markedly without any evidence that access to care has declined.	AHRQ
Pope,2009 ³⁶ (Fair)	Patient volume is used as a measure of patient selection. Modeling the impact of the ranking on volume Finds that moving up one spot in the overall national rank results in a 0.7% increase in non-emergency Medicare volume p<0.05 Examining the increase by specialty finds 6 out of 7 are not significant, suggesting a specific specialty is not driving the increase. Heart /Cardiac is the only specialty where the change in rank is significant when analyzed separately. Analysis of lagged variables confirms that the rankings do not affect volume until they are released--suggesting patients don't already have this information.	None	None	Overall, the results from this analysis suggest that USNWR rankings of hospitals have a significant impact on consumer decisions.	Not reported
Romano 2004 ³⁷ (Good)	Significant mean differences in actual minus predicted monthly patient volume (95% CI) based on specific conditions California "better" outlier hospitals AMI patients Q3: 1.7 (0.2 to 3.1); p<0.05 AMI patients Q4: 2.8 (1.3 to 4.4); p<0.01 AMI-related patients Q1: -3.8 (-6.9 to -0.8); p<0.05 Discectomy-related patients Q3: -1.1 (-2.2 to -0.1); p<0.05 Using autoregressive model	None	None		AHRQ

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
	<p>Cervical diskectomy patients Q3: -1.6 (0.0 to 3.2); p<0.05 Lumbar diskectomy patients Q1: 0.6 (0.0 to 1.1); p<0.05 Lumbar diskectomy patients Q3: 0.8 (0.1 to 1.5); p<0.05 California "worse" outlier hospitals AMI-related patients Q1: 2.4 (0.1 to 4.6); p<0.05 Cervical diskectomy patients Q1: -1.1 (-2.2 to -0.1); p<0.05 Cervical diskectomy patients Q3: 1.4 (0.4 to 2.4); p<0.01 Diskectomy-related patients Q2: 1.1 (0.0 to 2.1); p<0.05 Diskectomy-related patients Q3: 1.1 (0.1 to 2.2); p<0.05 Diskectomy-related patients Q4: 1.2 (0.1 to 2.3); p<0.05 Using autoregressive model Diskectomy-related patients Q1: -1.4 (-2.4 to -0.4); p<0.01 New York "better" outlier hospitals CABG patients month 1: 13.4 (4.3 to 22.6); p<0.01 New York "worse" outlier hospitals CABG patients month 2: -7.1 (-12.3 to -1.9); p<0.01 CABG-related (AMI) patients month 1: -4.5 (-8.5 to - 0.6); p<0.05 CABG-related (AMI) patients month 4: -6.0 (-9.8 to - 2.2); p<0.01 ---- Significant mean differences in actual minus predicted monthly patient volume based on patient characteristics in hospitals lauded for low risk-adjusted postoperative complication rate or mortality after specific surgery (all significant at p<0.05) California. after lumbar diskectomy Medicaid patients Q2: -0.17 Hospital catchment area located inside Q4: 0.71 Black patients Q2: 0.14 Black patients Q4: 0.20 New York, after CABG 55-64 year old patients month 3: 4.65 65-74 year old patients month 1: 8.40 Commercial indemnity patients month 3: 7.49 Medicaid patients month 3: 2.12 Medicare patients month 1: 8.50</p>				

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
	<p>Medicare patients month 2: 7.30 Hispanic patients month 3: 2.55 White patients month 1: 10.91 ----- Significant mean differences in actual minus predicted monthly patient volume based on patient characteristics in New York hospital flagged for high risk-adjusted mortality after CABG (all significant at $p < 0.05$) HMO/PPO patients month 2: -2.59 Medicare patients month 1: -4.43 Medicare patients month 4: -4.18 Medicare patients month 5: -3.90 Black patients month 3: -1.13 White patients month 2: -5.62</p>				
Romano 2011 ³⁸ (Fair)	<p>Changes in Mean Statewide Market Share Before and After the Release of California CABG Mortality Reporting Program Public Reports, by Hospital Outlier Status and Participation Status: Low-mortality outliers experienced a significant increase in adjusted mean market share when compared to their pre-report market share. Increase also significant when compared with the changes in mean market share of high-mortality hospitals, nonoutlier hospitals, and nonparticipating hospitals.</p> <p>Low-mortality outliers: N= 15; Pre-report vs. Post-report Mean Market Share(%): 1.894 vs. 2.105; Adjusted Change in Mean market share: 0.168%; Relative change in Adjusted Mean Market Share: 8.9; $p = 0.002$ High-mortality outliers: N=16; Pre-report vs. Post-report Mean Market Share(%):0.617 vs. 0.607; Adjusted Change in Mean market share: 0.031; Relative change in Adjusted Mean Market Share: 5.0; $p = 0.47$</p> <p>Participating nonoutliers: N= 177; Pre-report vs. Post-report Mean Market Share(%):0.927 vs. 0.910; Adjusted Change in Mean market share: 0.016; Relative change in Adjusted Mean Market Share: 1.7; $p = 0.18$</p>	None	None	<p>Author's Conclusions: Hospitals labeled as low-mortality outliers experienced a statistically significant relative increase 8.9% in mean market share during the 6 months after publication of a report.</p> <p>Nonparticipating hospitals did not suffer a loss of market share.</p> <p>There was no association between the release of the CCMRP reports and risk-adjusted hospital mortality for any of the groups.</p> <p>After release of the CCMRP reports, high-mortality outlier hospitals tended to operate on less sick patients, as reflected by an adjusted reduction in expected mortality of 0.785% in absolute terms or 25% in relative terms ($p = 0.02$).</p>	California Office of Statewide Health Planning and Development

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
	<p>All participating: N= 208; Pre-report vs. Post-report Mean Market Share(%):0.973 vs. 0.972; Adjusted Change in Mean market share: 0.040; Relative change in Adjusted Mean Market Share: 4.1; p= 0.05</p> <p>Nonparticipating: N= 127; Pre-report vs. Post-report Mean Market Share(%):0.685 vs. 0.664; Adjusted Change in Mean market share: 0.016; Relative change in Adjusted Mean Market Share: 2.3; p= 0.27</p> <p>All hospitals: N= 335; Pre-report vs. Post-report Mean Market Share(%):0.864 vs. 0.855; Adjusted Change in Mean market share: 0.026; Relative change in Adjusted Mean Market Share: 3.0; p= 0.09</p>				
Rosenthal 1997 ³⁹ (Good)	None	None	None		Picker/ Commonwealth Scholars Award Career Development Award from the Health Services Research and Development Service, Department of VA
Shabino 2006 ⁴⁰ (Poor)	None	None	None		Not Reported
Tu 2009 ⁴¹ (Fair)	None	None	Not Studied	Authors' conclusion: This study demonstrated that a carefully designed publicly released report card based on high-quality clinical information did not result in a measurable system-wide improvement in 2 composite AMI or CHF process-of-care indicators at early feedback hospitals in Ontario	Not Reported

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Vladeck 1988 ⁴² (Poor)	<p>One-way ANOVA detected no significant differences in occupancy rates between study periods among the three groups: $F=1.046$, $p=0.357$, $df=2.67$</p> <p>No statistical significance and actual occupancy rates went in opposite directions than expected (i.e., Hospitals with higher-than-expected mortality rates experienced higher occupancy rates following public release while those with lower-than-expected mortality rates actually experienced slightly higher occupancy rates. Those with as-expected mortality rates experienced a relatively level occupancy rate, but there was a very slight decrease.</p>	Not Studied	Not Studied	Based on these results, the release of hospital mortality data in New York City did not impact consumers in expected directions. Moreover, based on ANOVA tests, there was no statistical significance among the three groups.	None Listed
Wang 2011 ⁴³ (Good)	<p>HOSPITAL: Hospital Quarterly Volume (n=1469 hospital quarters)</p> <p>Mean volume: All CABG cases - 76.5 Low-severity CABG cases - 45.5 High-Severity CABG cases - 30.3</p> <p>High Mortality Flag: All CABG cases -5.600 Low-severity CABG cases -4.477 High-Severity CABG cases -1.195</p> <p>Low Mortality Flag: All CABG cases 5.125 Low-severity CABG cases 4.669 High-Severity CABG cases 1.578</p>	None	None	Public reporting led to decrease in volume for unrated and poor performing surgeons, but interestingly, the volume of the high performing surgeons does not increase by an offsetting amount. They do not find statistically significant effect on hospital volume once we control for unobserved heterogeneity. Severity analysis results in similar results.	Not Reported
Werner 2010 ⁴⁴ (Good)	None	None	None		Pennsylvania Department of Health

Table H3. Hospital quantitative studies: Columns 14-18 of 18 (pages H-40 to H-51) (continued)

Author, Year (QA)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/Conclusion	18. Funder of Research/Report
Wuebker 2008 ⁴⁵ (Fair)	<p>Descriptive Statistics: Case Numbers: Average before publication vs. Average after publication, Growth rate %: Publishing hospitals: 748.61 vs. 781.34, +4.37% Non-publishing, Rhine-Ruhr: 460.84 vs. 471.14, +2.23% Non-publishing, Cologne-Bonn: 679.02 vs. 713.13, +5.00% Good hospitals (top 25%): 818.58 vs. 859.56, +5.01% Poor hospitals (bottom 25%): 649.49 vs. 670.54, +3.24%</p> <p>Fixed effects estimation coefficients between publication of quality information and the development of hospital case numbers (case numbers [SE]): After controlling for time trend, no significant difference between before and after publication (1.78 [3.74]) Significant increase for publishing hospitals vs. non-publishing (9.96[4.47], p<0.05) Significant increase for publishing hospitals vs. non-publishing Rhine-Ruhr only (20.27[5.11], p<0.01) Significant decrease for publishing hospitals Rhine-Ruhr vs. non-publishing Cologne-Bonn (-22.14[5.30], p<0.01) Significant increase for good publishing hospitals vs. poor publishing (19.50[7.92], p<0.05)</p> <p>(Absolute Market Share[SE]): Significant increase for publishing hospitals vs. non-publishing (0.029%[0.008], p<0.01), this corresponds to an average market share increase of 2.63%. Good publishing hospitals vs. above average poor hospitals (0.033%[0.012], p<0.05), this corresponds to an average increase of 3.00%</p>	None	None	<p>Author's Conclusions: 1. Hospitals voluntarily publishing their quality data measured on the basis of case numbers and market shares are in stronger demand than those not publishing their quality data while competing with the publishing hospitals. Consequently, the non-publishing hospitals in the Rhine-Ruhr region lose relative case numbers and market shares to their publishing competitors. 2. In the group containing publishing hospitals, the publication of quality information results in hospitals with below average quality to be selected less often than hospitals with above-average quality</p>	Not Reported

Abbreviations: CCMRP, California CABG Mortality Reporting Program; VBAC, vaginal birth after cesarean.

Appendix I. Hospitals: Qualitative Evidence

Section A

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Aryankhesal 2010 ¹⁰⁰	To assess the degree to which patients and GPs in Iran are aware of the grading system and actual hospital grading results as well as the extent to which this influences their choice of hospital.	Tehran, Iran	Survey (descriptive)	N=104 patients/families completed surveys (147 approached, 40 excluded, 3 refused). 72% male respondents, even though many patients were women. This is because the woman's relative chose the hospital and was therefore the person interviewed. 104/129 surveys of GPs (Response Rate=81%).	NA	Patients' awareness of hospital grading system, Patients' criteria for choosing their selected hospitals, Patients' reasons for not using the grading results in their hospital choice. General practitioners' awareness of the grading results, GPs criteria for choosing hospitals for referring their patients.		Not Studied	Not Studied

Table 11. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Barr 2006 ¹⁰¹	To explore the impact of statewide public reporting of hospital patient satisfaction on hospital quality improvement (QI), in Rhode Island.	Rhode Island	Interviews	42 people out of 52 identified(81%): four executives in each eligible hospital	Interviewees are asked what QI activities were implemented in response to the public reports and what processes and structures were in place to accomplish improvement related to patient satisfaction.	Quality Improvement Activities	Rhode Island: State Report	Not Studied	Not Studied
Bensimon 2004 ¹⁰²	To describe stakeholders' views about cardiac report cards	Canada	Interviews	58 Participants selected from 7 Canadian cities with major cardiac programs (Vancouver, Calgary, London, Toronto, Ottawa, Montreal, and Halifax) from six stakeholder groups: 15 administrators, 13 nurses, 12 cardiologists or internists, 7 outcomes researchers, 6 cardiac surgeons, 5 members of the media.	Open-ended interview questions to explore what participants think about cardiac report cards, what they believe report cards should contain, and how they would use cardiac report cards.	Perceived usefulness of performance data Opinions on content	Cardiac Report Cards: Generally	Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Bentley 1998 ¹⁰³	To determine whether performance data causes hospitals to change their policies and practices.	Pennsylvania and New Jersey	Survey (descriptive)	Hospitals conducting CABG surgery in New Jersey and Pennsylvania	Intervention: Public Reporting Group 1: Pennsylvania Hospitals (public reporting; n=21; 84% Response Rate) Group 2: New Jersey Hospitals (No public reporting; n=8; 62% Response Rate)	All Self-reported by employee most knowledgeable in respective department: Changes in Hospital Marketing linked to Performance Information Changes in Hospital Governance linked to Performance Information Changes in Patient Care linked to Performance Information	Consumer Guide to CABG Surgery	Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Berwick 1990 ¹⁰⁴	To explore hospital administrators reactions to the public release of HCFA mortality data.	US	Survey (descriptive)	195 (78% responses rates) hospital executives from a sample of 250 hospitals selected to represent hospitals with actual mortality lower, higher and near the center of the expected mortality as publicly reported by HCFA.	A12-item survey asked for opinions on the accuracy and value of the HCFA report on an 5 point excellent to poor scale (8 items) as well as items about whether the report was used by the hospital.	Accuracy and value of Report Use of Report	HCFA Mortality Repot	Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Chassin 2002 ¹⁰⁵	To summarize the CSRS experience by focusing on how physicians and hospitals responded to the program, what they did to improve, and what impacts the program had.	New York	Interviews	Interviews conducted with key physicians, hospital administrators, and state officials directly involved in quality improvement efforts at 4 (5?) hospitals identified in early reports as higher than average risk-adjusted mortality rate outliers: Winthrop Hospital, Erie County Medical Center, Strong Memorial Hospital, and Bellevue Hospital Center	NA	Quality Improvement Responses: open-ended	NYCSRS	Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
De Groot 2011 ¹⁰⁶	To assess the extent to which patients who have compared hospitals (considered more than one option) based their hospital choice on public information, and focused on different information than patients who have not compared hospitals	Netherlands	Survey and Hypothetical Choice	New surgical patients from three hospitals in the Western region of the Netherlands (n=337; 52.4% response rate)	Patients who compared hospitals prior to surgery (n=71; 21%) vs those who did not compare hospitals prior to surgery (n=266; 79%)	Self-reported use of quality information Self-reported relative importance of different quality measures	Hypothetical, based on multiple Dutch hospital public reports	Not Studied	Not Studied
Dijs-Elsinga 2010 ¹⁰⁷	To assess whether patients use information on quality of care (such as adverse outcomes) when choosing a hospital for surgery compared to more general hospital information.	Netherlands	Survey (descriptive)	Patients who underwent 1 of 6 (aorta reconstruction, cholecystectomy, colon resection, inguinal hernia repair, esophageal resection and thyroid surgery) surgical procedures in 2005-2006 in 3 hospitals. N=2122/ 1329 completed (62.6% response rate)	Survey asked what information people used to choose a hospital for their procedure in the past and what information they would use if they needed similar care in the future.	Use of information in choice of hospital (past and future)	Any available information; specific report not studied; hypothetical report card used to ask about format preferences	Not Studied	Female gender (compared to male) vs. <65 years (compared to >65 years) vs. Intermediate level of education (compared to low level of education) vs. high level of education (compared to low level of education) Information about quality

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
									<p>of care used in 2005-2006 to make decision about hospital: OR (95% CI) Percent of patients with adverse outcome after surgery: not significant for any comparison Percent of patients with little pain: 1.76 (0.59–5.25) vs. 5.69 (1.72–18.86); p<0.05 vs. 0.29 (0.12–0.72); p<0.05 vs. 0.26 (0.09–0.75); p<0.05 Percent of patients with pressure ulcers: not significant for any comparison Information about quality of care to be used in future</p>

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
									<p>to make decision about hospitals: OR (95% CI) Procedure-specific (adverse outcome) information: 1.30 (0.96–1.75) vs. 1.24 (0.96–1.60) vs. 1.36 (1.03–1.81); p<0.05 vs. 2.25 (1.65–3.06); p<0.05 The number of surgeries performed per year: 1.11 (0.82–1.51) vs. 1.60 (1.22–2.09); p<0.05 vs. 1.32 (0.98–1.79) vs. 2.40 (1.74–3.31); p<0.05</p>
Dijs-Elsinga 2010 ¹⁰⁷ <i>con't</i>									<p>Number of medication errors: 0.96 (0.70–1.31) vs. 1.56 (1.19–2.05); p<0.05 vs. 1.73 (1.27–2.35); p<0.05</p>

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
									vs. 2.51 (1.81–3.49); p<0.05 Percent of patients with wound infection: 1.16 (0.84– 1.61) vs. 1.24 (0.93–1.64) vs. 1.79 (1.29–2.48); p<0.05 vs. 2.39 (1.69– 3.38); p<0.05 Percent of patients with an adverse outcome after surgery: 1.00 (0.72– 1.38) vs. 1.53 (1.15–2.05); p<0.05 vs. 1.36 (0.98– 1.89) vs. 2.08 (1.47–2.93); p<0.05 Percent of patients with little pain: not significant for any comparison Percent of patients with pressure ulcers: 0.98 (0.62–1.55)

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
									vs. 0.83 (0.56–1.23) vs. 1.62 (1.01–2.59); p<0.05 vs. 1.73 (1.04– 2.88); p<0.05 Information about procedure- specific information to be used in future to make decision about hospitals: OR (95% CI) Not significant for any comparison

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Fasolo 2010 ¹⁰⁸	To understand how people interpret and use comparative quality information about hospitals.	England	Focus Groups	7 focus groups 44 participants recruited by flyers, and random-sampling mailing and phone calls	The focus group had 3 stages 1. open discussion about how participants would choose a hospital for a serious condition that required planned care 2. asked to sort cards with 16 indicators in order of importance and select 3 most important individually and after group discussion 3. based on mock score card, selected from among 3 hospitals	Comprehension Priorities among indicators Selection and decision processes	NHS Choices, Department of Health Website in England which included comparative hospital performance indicators.	Not Studied	Not Studied
Geraedts 2007 ¹⁰⁹	To determine patient and physician opinion of the relevance of the reported quality indicators or choosing or referring to a hospital.	Germany	Interviews	50 General practitioner patients. 50 General practitioners		Understandability of quality indicators	Nationally Mandated Hospital Report (Germany)	Not Studied	Not Studied

Table 11. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Ginsburg 2003 ¹¹⁰	To explore the factors that influence frontline and midlevel hospital managers' perceptions of usefulness of comparative reports of hospital performance.	Ontario, Canada	Survey (descriptive)	202 hospital managers in stroke or cardiac care out of 344 (59%) response rate, from 89 hospitals included in the public report.	Compares the impact of data characteristics, past experience with performance data and improvement culture on the perceived usefulness of the performance data	Perceived usefulness of performance data	Hospital Report '99	Not Studied	Not Studied
Gross 1989 ¹¹¹	Hypothesized that the majority of consumers still were judging quality by relational items and were not using government mortality statistics to influence their choice of hospital.	New York	Survey (descriptive)	186 Champus (military) health plan beneficiaries and 200 general respondent in NY	15-item questionnaire	Use of information on hospital quality	Not specified	Not Studied	Not Studied
Guru 2009 ¹¹²	To survey and understand concerns of Ontario cardiac surgeons regarding performance reports.	Ontario, Canada	Descriptive Survey	Cardiac surgeons in Ontario, Canada. N=52	NA	Self reported views on the positive and negative impact of public reports		Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Hannan 1997 ¹¹³	To determine the reaction of New York cardiologists to the New York CABG surgery reports.	New York	Survey (descriptive)	Surveys regarding cardiologists' opinions and use of the June 1995 NY CABG report were mailed to all (1267) NY cardiologists listed in the State Education Department's Physician master File as specializing in cardiology. 36% response rate (n=450).	NA	<p>All self-reported:</p> <p>Discussing information with patients: Yes or No</p> <p>The following use "Very much," "Somewhat," and "Not at all" scales: Accuracy of report Attitudes towards format of report Impact of report on referrals</p> <p>Usefulness in making referral decisions for patients needing CABG surgery: 5-point Likert scale: Not at all Useful (1-2); Somewhat useful (3); Extremely useful (4-5)</p>	New York CABG Report	Not Studied	Not Studied

Table 11. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Hibbard 2007 ¹¹⁴	To examine health literacy, numeracy and patient activation assessing the contribution of each to the comprehension of comparative health care performance reports and their use in making an informed choice.	US, Not specified	Lab-type Experiment	Convenience sample of 303 employed-age adults (18-64 years) Same respondents as 6054..	Participants were shown hospital performance data in report cards that varied in terms of the number of hospitals, the number or performance measures, and types of information included. They also completed test of health literacy, numeracy, and patient activation.	Health literacy, numeracy and patient activation	Hypothetical Hospital Reports	Not Studied	Not Studied
Kang 2009 ¹¹⁵	To assess the extent of consumer use of publicly released hospital performance information by the National Health Evaluation Program (HEP) in Korea.	Seoul, South Korea	Descriptive Survey	Patients who visited the outpatient department at 4 general hospitals in Seoul, between 8/20/09 and 9/1/06. N= 385 (385/400)		Consumer use of hospital performance information, Attitude toward the Hospital Evaluation Program, Degree of understanding of the evaluation criteria.	Hospital Report of the National Health Evaluation Program	Not Studied	Not Studied

Table 11. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Khang 2008 ¹¹⁶	To examine women's awareness of the public release of Cesarean section rates according to socio-demographic characteristics in South Korea.	South Korea	Survey (descriptive)	South Korean women aged 20-49 years old. 57.3% of those eligible completed surveys. N=505	Sample using proportionate quota and systematic random sampling. After calling 6224 numbers, 882 women were eligible.	Awareness of report: self-reported by respondent	Cesarean section rates in Korea	Not Studied	Not Studied
Laschober 2006 ¹¹⁷	To assess the impact of Hospital Compare on hospital quality improvement activities and identify barriers faced by hospital administrative leaders in making hospital improvements.	USA	Descriptive Survey	Stratified random sample of QI directors and senior executives at short-term acute care general and critical access hospitals that submitted data for Hospital Compare in 2005. N=664 QI directors; N=650 senior executives	Hospitals were stratified by hospital size, participation in CMS's Premier Hospital Quality Incentive Demonstration, and accreditation. 96% weighted response rate for QI directors and 89% weighted response rate for senior execs.	Identification of barriers to quality improvements and improving Hospital Compare Scores	Hospital Compare	Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Laschober 2007 ¹¹⁸	Explains how participation in public reporting programs has helped to spur changes in: the attention that management gives to quality; internal QI programs and documentation efforts; the level and type of staff effort devoted to QI; and quality scores.	USA	Survey (descriptive)	Senior executives and directors of QI department of 800 relevant U.S. hospitals		Quality Improvement and Awareness	Hospital Compare	Not Studied	Not Studied
Longo 2003 ¹¹⁹	To evaluate how patients view healthcare consumer reports, whether healthcare consumer reports lead to changes in patient behavior, and which aspects of reports are the most important/helpful to patients.	Colombia, Missouri	Surveys (descriptive)	Outpatients at UMHC clinics; N=925	Surveys administered to outpatients while waiting for appointment. Shown report and then asked to fill out questionnaire before leaving.	All self-reported on survey: Patient views on: Perceptions of report: single question Potential use of report Most helpful/important aspects of report	University of Missouri Health Sciences Center Consumer Report	Not Studied	Not Studied

Table 11. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Luce 1996 ¹²⁰	Studied how 17 acute care public hospitals in California used these Risk-adjusted mortality of outcomes (RAMO) data for quality improvement purposes following their initial distribution.	California	Survey (descriptive)	22 acute care public hospitals that are members of the California Association of Public Hospitals and Health systems		Use of the RAMO data relevant to their own hospitals.	CHOP and HCFA Mortality report	Not Studied	Not Studied
Magee 2003 ¹²¹	To investigate view of patients and members of the public of published information on healthcare providers	England	Focus Group	6 Focus groups each in a different location where the local acute care trusts had 3 or 0 star ratings. One groups was carers, one all ethnic minorities, and all with recent inpatient experience.	Participants were asked their views on measuring and comparing performance. Examples from the Department of Health and a commercial site (Dr. Foster) were reviewed and discussed.	Awareness of report cards Views on public reporting Assessment of different report cards	NHS Performance Report	Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Mannion 2003 ¹²²	To examine the impact of publication of Scottish (CRAG) clinical outcome indicators on four key stakeholder groups: health care providers, regional government health care purchasers, general practitioners and consumer advocacy agencies.	Scotland	Interviews and Focus Groups	8 hospitals were the subject of case studies 71 of 150 primary care randomly selected practitioners were surveyed 16 of 16 local health councils responded to a postal survey	Interviews and focus groups conducted over an extended period as part of a research and practice improvement collaboration	Awareness Types of Information used	Clinical Resource and Audit Group (CRAG) clinical outcome indicators for all hospital Trusts and Health Boards in Scotland	Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Mannion 2005 ¹²³	To explore the impact of the star ratings of acute care hospitals in England	England	Interviews	61 Interviews with managers and clinical staff at 6 sites from : 4 with low scores and 2 with high on the star ratings. Sites were randomly selected within rating strata. Interview subjects were purposefully selected.	Interviews included questions on organizational dynamics, perceptions and experience with performance measures, and the impact of the ratings on the organizations.	Responses to Star Ratings	Star ratings for English National Health Service	Not Studied	Unintended and dysfunctional responses included: 1. tunnel vision that focused on what is measured. 2. pressure to meet targets 3. low performing sites had trouble recruiting staff 4. site with high ratings did not feel the need to improve

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Mazor 2009 (a) ¹²⁴	To conduct interviews to explore patients' understanding of health care associated infections (HAIs) and public reporting of rates.	Worcester, MA	Interviews	59 people who responded to invitations sent to people selected from the residents of Worcester, MA	Interviewees were shown a 2006 PA report on HAIs and asked for reactions as well and suggestions for improvement. Later interviews included reviews of multiple versions of improved report cards and the last interviews included viewing web-based reports.	Reactions to reports Ability to select hospital based on information	Actual and revised reports on HAIs	Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Mazor 2009 (b) ¹²⁵	To evaluate different approaches to publicly reporting data on healthcare acquired infections (HAIs) and determine if this would influence hospital choice.	Worcester, MA	Survey (descriptive)	201 completed surveys (25% of all mailed or 34% of all sent to a deliverable address) sent to a random sample of residents selected from a list maintained by local government.	Eight versions of a report were assigned at random and mailed along with a questionnaire. Version varied in terms of consistency of the indicators, use of words vs. graphs, and whether confidence intervals were provided or not. The survey asked for ratings of understandability, importance in choice of hospital, comprehension of specific information, and demographic information.	Understandability Role of Information in Decision Making	Different versions of a fictional report on Healthcare Acquired Infections	Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Mehrotra 2003 ¹²⁶	To determine if hospital report cards created by employer coalitions prompt quality improvement	11 communities in the USA	Interviews	11 communities with employer driven hospital report cards produced through December 2001; 35 organizations and 44 interviewees included report card producers and hospital representatives	Interviewees were asked open-ended questions about the report card success and barriers to success.	QI activities	Various created by employer coalitions	Not Studied	Not Studied
Merle 2009 ¹²⁷	To assess what impact a mandatory report card on infection control activity could have on patients' hospital choice.	Upper Normandy France	Survey (descriptive)	381 total--133 Inpatients, 157 discharged patients, and 91 inpatient visitors in 5 reference hospitals and 24 others randomly selected from those in the area.	Survey included demographics, knowledge of infection control, personal past history of hospital infection. Respondents were asked if they wanted infection control information and were required to select 3 other reasons for selecting a hospital.	Factors Influencing Choice of Hospital	French mandatory report card on infection control activity (ICALIN)	Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Moser 2010 ¹²⁸	To gain insights into how patients make decisions using comparative consumer information	The Netherlands	Focus groups and interviews	18 people who had undergone a total hip or total knee replacement no longer than five years ago. Most were elderly--mean age 74	2 focus groups; one with 10 people; one with eight were interviewed individually before the group as well.	Role of report in decision making Decision process Views on Report Card	CAHPS--Dutch version for Hospitals	Not Studied	Not Studied
Peters 2007 ¹²⁹	To test the idea that all consumers, but the less numerate in particular, will benefit from careful attention to information presentation and to the potential cognitive burden imposed by comparative data, reducing this burden when possible, and highlighting the meaning of important information.	US (not sure it says)	Lab-type Experiment	303 adults 18-64; half with lower education and 55% without health insurance. Same respondents as 1414.	Participants were randomly assigned to receive easier to evaluate formats or common current formats of information about hospitals and health plans as well as a numeracy evaluation. This allowed three separate analyses/studies	Comprehension	NA	Not Studied	Not Studied

Table 11. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Pham 2006 ¹³⁰	To examine the impact of quality reporting on hospitals' data collection and review processes, feedback and accountability mechanisms, quality improvement activities, and resource allocation.	12 US Metropolitan Areas participating in the Community Tracking Study	Interviews	111 Interviews, 98 of which were with executives at the 2-4 largest hospital in each market. others were with hospital association representatives, and organizations that produce report cards.		Involvement in Public Reporting Activities Influence of Report Cards of Practice	Multiple	Not Studied	Not Studied
Putnam 2006 ¹³¹	To explore physicians perceptions of quality indicators for Acute MI and CHF.	Canada: Ontario and Nova Scotia	Focus Groups	6 focus groups with 6-8 participants. 3 in Ontario where hospital-specific data has been published and 3 in Nova Scotia where it has not. Participants were family and ER physicians, internists and cardiologists.	Participants were asked if having performance information that was public would help improve their care of patients.	Perceptions of Quality Indicators	Source of quality indicators not stated	Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Rainwater 1998 ¹³²	To explore the impact of reports from CHOP on efforts to improve quality of care and patient outcomes. Hypothesize that public dissemination of outcomes data would motivate providers to investigate ways to improve their quality of care.	California	Interviews	QI key informants at hospitals previously identified by hospital CEOs: 39 interviews		Patient responses to semi-structured interview questions re: overall views, usefulness, and limitations of CHOP	CHOP	Not Studied	Not Studied
Rainwater 2003 ¹³³	To explore whether health maintenance organization (HMO) executives in are familiar with hospital report cards, whether they find the report cards useful (and if not, why not), and how they weight such data relative to other factors in selection hospitals to contract with.	California	Survey (descriptive)	30 of 47 (63.8%) contacted representatives of all licensed HMOs in the state at the time of the study	Responding on paper or by phone, executives were asked to review a list of factors that might affect their contracting choices and rate on a 1 to 5 scale where 5 is extremely important; report what information they used in the past year, and whether they were aware of several public reports.	Factors considered in contracting with Hospitals	Several available in CA at the time.	Not Studied	Not Studied

Table 11. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Reeves 2008 ¹³⁴	To document the attitudes of NHS staff toward the national patient survey program and the drivers and barriers to the use of the results.	England	Interviews	24 completed interviews with lead persons for patient surveys at hospitals. 27 were selected from 169 to represent differences in performance, size and geographical location		Perceptions of Surveys Use Barriers to use	NHS National Survey Programme	Not Studied	Not Studied
Richard 2005 ¹³⁵	To describe cardiac patients' views about cardiac report cards	Canada	Interviews and focus groups	91 Cardiac patients selected from 7 Canadian cities with major cardiac programs: Vancouver (10), Calgary (13), Winnipeg (11), Toronto (22), Ottawa (14), Montreal (7), and Halifax (14). 63 individual interviews and 6 focus groups	Open ended questions about cardiac report cards.			Not Studied	Not Studied

Table 11. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Romano 1999 ¹³⁶	To determine whether state hospital report cards in CA and NY are viewed more favorably than HCFA efforts; whether a report based on clinical data is viewed more favorably than one based on administrative data, and whether attitudes toward report cards are related to hospital characteristics.	New York and California	Survey (descriptive)	Opinions and knowledge about state report cards by hospital chief executives in CA and in NY Total of 398 hospitals listed in 1996 CHOP report and 31 listed in 1996 CSRS report eligible for study. Total response rate for usable CA surveys = 66.6% (n=249), and for usable NY Surveys = 87.1% (n=27). Overall Response Rate = 73.3%	No Intervention Comparison Groups: CA hospitals vs NY hospitals listed in report cards on myocardial infarction and coronary bypass mortality	Overall Quality Rating: Self-reported average ordinal score of 6 questions Usefulness score: Self-reported agreement or disagreement with 4 statements regarding uses of states' outcomes data: improving the quality of care, improving quality of medical records coding; negotiating with health plans; marketing or public relations Knowledge score based on agreement or disagreement with factual statements regarding risk-adjustment methods. Opinions of Ease of Interpretation and Manner of Release	CHOP; NY CSRS	Not Studied	
Rosenthal 1998 ¹³⁷	To present four case studies of efforts that were initiated by	Greater Cleveland, OH	Case Studies	4 hospitals in Cleveland, OH	University Hospitals of Cleveland (UHC): January through	UHC: CABG patients' Mean observed length of stay, extubation	CHQC	UHC: Mean observed length of stay: January	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
	hospitals to improve patient outcomes, in response to data disseminated by CHQC.				<p>June 1993 vs. July through December 1995.</p> <p>LakeEast Hospital: 1996 vs January through June 1997</p> <p>Parma Community Hospital: January 1994 through December 1994 vs 1996 and 1997</p> <p>Allen Memorial Hospital: July 1993 through June 1995 vs 1996</p>	<p>time.</p> <p>LakeEast: overall rate of C-section deliveries, primary C-section rates (women without prior C-section), VBAC success rate, use of epidural anesthesia.</p> <p>Parma: C-section rates and VBAC success rates</p> <p>Allen: Pneumonia mortality</p>		<p>through June 1993=11.1 days, July through December 1995=7.6 days (p<0.01). Extubation within 8 hours of surgery: 1994=fewer than 10%, 1995= nearly 40%.</p> <p>LakeEast: Overall C-section rate: already declining prior to intervention: 1992=28.6%, 1993=23.7%, 1994=22.3%, 1995=21.4%. After intervention, 1996=17.1%, Jan-Jun 1997=13.0%. Primary C-section rates: 1996=10.3%, Jan-Jun 1997=8.6%. Successful VBAC per attempted VBAC: 1996=</p>	

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
								<p>74.8%, Jan-Jun 1997=81.0%. Use of epidural anesthesia: 1996=60%, Jan-Jun1997=62%.</p> <p>Parma: 1996: 79 patients identified as repeat C-section candidates. 42 (53%) underwent a trial of labor, 30 (38%) experienced successful VBAC deliveries. 1995: 22% VBAC rate (change, $p<0.05$). 1st quarter 1997: 40%. Overall C-section rate: 1994=22%, 1995=25%, 1996=21% and 1st Q 1997=18%.</p> <p>Allen: 1996 Predicted</p>	

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
								mortality: 4.7%, actual: 3.0%.	
Schneider 1996 ¹³⁸	To find out whether cardiologists and cardiac surgeons were aware of the Pennsylvania Consumer Guide to Coronary Artery Bypass Graft Surgery report, and if so, to determine their views on its usefulness, limitations and influence on providers.	Pennsylvania	Survey (descriptive)	Opinions and attitudes of Cardiac Surgeons and Cardiologists in Pennsylvania. Randomly selected sample of 50 percent of Pennsylvania cardiologists and cardiac surgeons. Total response rate out of 697 physicians was 65%. 64% response overall response rate among cardiologists and 74% among cardiothoracic surgeons. After excluding incomplete surveys or ineligible physicians, n=337 (279 cardiologists and 58 cardiac surgeons)	NA	All self reported: Awareness of the guide Opinion of usefulness: importance of risk-adjusted mortality; importance of clinical outcomes other than mortality; Importance of Consumer Guide Ratings; Influence of consumer guide rating on referral recommendations; Discussed Consumer Guide with percentage of patients. Opinion of limitations: multiple questions related to potential limitations Influence on providers/Access to Care: 5 Point Likert scale, for surgeons:	Consumer Guide to Coronary Artery Bypass Graft Surgery	Not Studied	Difficulty Finding a Surgeon Willing to Operate in Most Severe Cases (for Cardiologists, by % responding to each option): Much More Difficult: 18 More Difficult:41 No Change: 31 Less Difficult: 8 Much less difficult: 2 Willingness to Operate in Most Severe Cases (For Cardiac Surgeons, by % responding to each option): Much Less Willing: 35 Less Willing: 28 No Change:

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
						Willingness to operate; for cardiologists: difficulty finding surgeons willing to operate			37 More Willing: 0 Much More Willing: 0
Schneider 1998 ¹³⁹	To examine the awareness and use of a statewide consumer guide that provides risk-adjusted, in-hospital mortality ratings of hospitals providing cardiac surgery.	Pennsylvania	Survey (descriptive)	Random selection of patients who underwent CABG surgery during the previous year at 1 of 4 hospitals (Sampled 196 from each hospital). 60% completed telephone surveys; Of eligible patients, 70.4% response rate (n=474). Hospitals chosen all performed 400 or more CABG operations and were located in different regions of the state.	Case Study: All patients had CABG surgery	All Self-Reported: Awareness of Consumer Guide: extent of awareness before or after undergoing cardiac surgery Use of Consumer Guide: knowledge of how the Consumer Guide's mortality rating had ranked their hospital, surgical group, or surgeon; did patient discuss mortality rating with health professionals General Interest in Performance Reports: 3 measures of patient interest: a) described the report and gauged interest; would they change choice if they needed another CABG surgery;	Pennsylvania Consumer Guide to CABG Surgery	Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
						willingness to pay for the guide Constraints or Barriers limiting patients' Use of Consumer Guide: 5 potentially important constraints: time, distance to hospital, opportunity to leave hospital between decision and actual operation, cost, and restrictions imposed by insurance companies/health plans			

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Schwartz 2005 ¹⁴⁰	To learn how Medicare patients made decisions about where to undergo major surgery and how they would make future decisions.	USA	Survey (descriptive)	510 randomly selected Medicare beneficiaries having undergone an elective, high risk procedure about 3 years before for abdominal aneurysm repair (n=103), heart valve replacement surgery (n=96), or resection of the bladder (n=119), lung (n=128) or stomach (n=64) for cancer. Of eligible respondents (n=751) 68% response rate (n= 510)		All self reported: Experiences with major surgery: how the respondent decided where to have surgery, what factors influenced this choice; Respondents' awareness and reaction to surgical performance data: work volume, patient mortality, nurse:patient ratios; Two Hypothetical scenarios: what advice to a friend undergoing surgery and reactions to Medicare publishing a list of best hospitals for different surgeries.	NA	Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Sofaer 2005 ¹⁴¹	To identify the domains and items in CAHPS for hospitals that are of greatest interest to patients	Baltimore, Los Angeles, Phoenix, and Orlando	Focus groups	16 focus groups: homogenous by type of health care coverage (Medicare, non-Medicare), and type of recent hospital experience (urgent admission, elective admission, maternity admission, no admission)	People who were admitted in the past were asked to describe aspects of the experience and all groups started with an open-ended discussion of the quality they associate with a high quality hospital. Then they were given the original CAHPS items and were asked to indicate and discuss what items were and were not important and finally to circle the two most important.	Importance of Domains Value related to hospital choice	CAHPS	Not Studied	Not Studied

Table I1. Hospital qualitative studies: columns 1-9 of 15 (pages I-1 to I-18) (continued)

Author, Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population	5. Procedure/ Additional Description if Needed	6. Outcomes	7. Name of Public Report or Subject Matter	8. KQ1: Results	9. KQ2: Results
Tu 2003 ¹⁴²	To determine the impact of Canada's first report featuring hospital-specific AMI performance measures.	Ontario, Canada	Survey (descriptive)	Opinions and reported hospital-level responses to public report. Mailed surveys to all hospitals in Ontario (n=121 eligible hospitals) for the surgeon most responsible for cardiac care to respond. 51 completed surveys; response rate = 41%		All self reported by hospital cardiac surgeon: Changes in AMI care made at hospitals Limitations of the Cardiac Atlas Views on the impact of the cardiac atlas	ICES Atlas (Ontario Cardiac Surgery Report Card)	Not Studied	Not Studied

Section B

Table I2. Hospital qualitative studies: Columns 10-15 of 15 (pages I-19 to I-51)

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Aryankhesal 2010 ¹⁰⁰	<p>8/104 (7.7%) patients were aware of the existence of the hospital grading system. 6/104 (5.8%) knew their chosen hospital's grade. 3 of these patients confused grade and rank and thought that a grade of 1 meant that the hospital was the top of all country's hospitals. No statistically significant difference between men and women's awareness.</p> <p>Patients' criteria for choosing their selected hospitals (frequency, %): Suggestion from relatives about the hospital: 23, 18.1% Patient's health insurance types: 22, 17.3% Patient's former experiences in the hospital: 21, 16.5% Low hospital charges: 21, 16.5% Patient's former experiences with the physician: 17, 13.4% Suggestion of the relatives about the physician: 14, 11% Patient or relatives work there: 6, 4.7% Poor experience in other hospitals: 2, 1.6% Hospital's reputation: 1, 0.8% Hospital's grade: 0, 0%</p> <p>GPs awareness of grading results: 12/103 (11.7%)</p> <p>Ranking of GPs criteria for choosing hospitals for referring their patients: 1. Patient economic situation 2. Patient insurance type 3. Hospital quality of care</p>	Not Studied	Not Studied	Not Studied	Awareness of the Iranian hospital grading system and its results was low among both patients and GPs	Iranian Ministry of Health and Medical Education and Iran University of Medical Sciences

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
	4. Hospital specialists 5. Patient preference 6. Travel distance 7. Hospital reputation					
Barr 2006 ¹⁰¹	Survey Domains # Hospitals with Quality Improvement (QI) Activity Admitting 9 Patient education 9 Nursing care 8 Treatment results 8 Food service 8 Other staff courtesy 6 Physician care 5 Comfort/cleanliness 4 Patient loyalty 1 Hospitals also mentioned quality initiatives that were not related to survey domains such as customer service or ER waiting. Hospital identified a person/position as the leader for QI reported general high levels of support from key personnel. Barriers included staff commitment and buy-in, staffing issues and insufficient infrastructure.	Not Studied	Not Studied	Not Studied	RI's experience suggests public reporting can be used to identify opportunities for improvement in and across hospitals and in this case led to statewide initiatives.	State of RI
Bensimon 2004 ¹⁰²	Report cards should be used to improve the quality of care, and this should be the primary purpose of the report card.	Not Studied	A majority of interviewees believe that the purpose of cardiac report cards should be to increase accountability of quality care. This also would facilitate a way of 'correcting' surgeons and hospitals that do not perform 'within the expected norms.' "Several" respondents emphasized the utility of cardiac reports as a means of educating the	Not Studied	Interviewed various stakeholders (though omitted cardiac patients) about their opinions about cardiac report cards and how they would be used. Majority felt that they should be used for quality improvement and for public education/decisionmaking. There was not wholesale agreement about whether they should include institutional and individual	The Heart and Stroke Foundation of Canada; The Canadian Institutes for Health Research's Interdisciplinary Health Research Team Program to the Canadian Cardiovascular

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
			<p>public so that they have informed decisionmaking. ---- Re: what the report cards should contain: Stakeholders agreed that providing patient factors (e.g., co-morbidities), clinical factors (e.g., high quality surgeons with high mortality rates due to tackling more difficult cases), and institutional contextual factors (e.g., quality assurance committees, values, etc.) in cardiac report cards is essential ---- Majority felt it was important to provide both institutional and individual surgeon data. Others thought it better to only use institutional data because surgeons do not work alone. Some worried that public disclosure at the individual level would lead to hysteria in the public, bad reputations for surgeons, too much detail for the general public, would violate surgeons' privacy, and would be unnecessary for improving the quality of care. ----- Risk-adjustment is important for adequate comparison. Majority</p>		<p>level data or only institutional. Potential concerns included accuracy of data, timeliness of release, and ability for the public to understand the data.</p>	<p>Outcomes Research Team. One author supported by Ontario Ministry of Health and Long-term Care Career Scientist Award</p>

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
			<p>were skeptical of the validity and reliability of the clinical data. Report Cards should include both health outcomes and process measures. They should show recent data. Report cards should be easy to understand by the general public.</p> <p>-----</p> <p>Re: Dissemination: Best way to release data is via the Internet and through the media.</p>			
Bentley 1998 ¹⁰³	<p>Percent Responding with 'Yes' to Sources of Performance Information that Became a Factor in Hospital</p> <p>Marketing, Governance, or Patient Care Changes: [Change Linked to Performance Info: PA, NJ; Of those making changes due to Performance Info, Government Agency was the Source: PA, NJ]</p> <p>Hospital Marketing Changes:% hospitals using performance information to recruit staff thoracic surgeons and/or residents: 38, 0; 88, 0</p> <p>Hospital Governance Changes: % hospitals establishing administration mechanisms that use performance information to monitor heart surgeons and hospital support staff: 77, 88; 60, 14 % hospitals with governing board requesting comparative reports for hospital outcomes and charges for heart surgery within a given market</p>	Not Studied	Not Studied	Not Studied	<p>The authors use the generic terminology of "information from a government agency" as an indicator of public reports and see what percentage of hospitals in Penn, where public reporting exists use this to improve marketing, governance and patient care. They also have two other categories for source of information: a)Private Consultant; b) Internal Department. They present the top 5 answers in each category (I only abstracted the ones relevant to our review) and compare these percentages with hospitals reporting in New Jersey where there is not any public reporting (however, NJ is right next to both PA and NY, two states with</p>	Pennsylvania and New Jersey

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
	<p>area: 57, 50; 92, 75</p> <p>Hospital Patient Care: % hospitals starting a continuous quality improvement program to improve practice patterns in deliver of heart surgery: 62, 100; 39, 38 % hospitals using performance info which identifies heart surgeons or groups by names to improve coding of medical records: 29, 13; 17, 0 % hospitals devoting a larger share of its financial resources to improving the quality of its heart surgery program: 38, 56; 0, 56 % hospitals hiring consultant to improve outcomes and/or control costs of heart surgery: 43, 38; 56, 0 % hospitals using information identifying surgeons and surgeon groups to devote more financial resources for keeping medical records: 43, 38; 78,33</p> <p>Note: other sources of performance information included Private Consultant of Hospital Association and Internal Department</p>				<p>PR). In general, Pennsylvania hospitals reported using performance information more than NJ, but not in all questions. Further, in some instances, NJ hospitals indicated that they used “government agency” information. The authors attribute this to using Penn’s and NY’s report cards for benchmarking, but there is certainly the possibility that the use of “government agency” was ambiguous.</p>	

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Berwick 1990 ¹⁰⁴	<p>All hospitals regardless of their rating held very negative views of the HCFA report.</p> <p>The lowest possible rating (poor) was given by 70% of the respondents on the question of usefulness of the data to the hospital, by 54% on accuracy of the data, and by 85% on usefulness of the data to consumers. Only 31% of the respondents said that they had used the data at all for internal purposes and 20% reported that the data release had caused problems for the hospital. Hospitals in the high-mortality group were more likely than others to report both use of the data and problems from its release.</p>	Not Studied	Not Studied	Not Studied	Views of the report are generally negative and few report using it. There is general resistance to the data and public reporting that needs to be overcome if public reporting is to lead to improved performance.	Harvard Community Health Plan Foundation
Chassin 2002 ¹⁰⁵	<p>Winthrop University Hospital: QI attempts by the hospital's first full-time cardiac surgery chief: Concentrated cardiac surgery on a single floor of the hospital, added new nurse specialists and physician assistants dedicated to cardiac surgery, and installed a dedicated cardiac anesthesia service. Risk-adjusted mortality fell from 9.2% in 1989 to 4.6% in 1990, and to 2.3% in 1991. In 1998, Winthrop had lowest risk-adjusted mortality rate at .82%.</p> <p>-----</p> <p>Erie County Medical Center: Suspended services in January 1990 to reorganize. Changes included: establishing cardiac surgery specific QA program, credentialing and continuous evaluation of surgeon performance, training dedicated cardiac anesthesiologists, agreeing to create</p>	Not Studied	Not Studied	Not Studied	Hospitals that had higher than the state average risk-adjusted mortality rates improved dramatically by taking nuanced, case-specific approaches to quality improvement.	Not Reported

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
	<p>designated cardiac surgery intensive care beds and to recruit a permanent, full-time service chief. Hospital resumed surgeries under probation in April 1990. Full-time service chief hired in 1993 and new staff were hired, previous surgeons stopped performing cardiac surgery, chief introduced operating microscope to cardiac surgery and had weekly teaching conferences. From 1989-1991, RAMR was 7.31%; from 1993-1995, RAMR was 2.51%; RAMR fell to 1.77% from 1996-1998. Volume also increased over time.</p> <p>----</p> <p>St. Peter's Hospital: In 1992, had an average overall RAMR, but RAMR for emergency cases was 26% (vs. 7% state average). A multidisciplinary review of emergency case management revealed that physicians did not take enough time to stabilize patients before surgery. Major management changes in emergency patients led to a 0% mortality rate among emergency cases in 1993.</p> <p>----</p> <p>Strong Memorial Hospital: Individual doctors had differing rates.</p>					

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Chassin 2002 ¹⁰⁵ <i>con't</i>	<p>Review determined that the chief surgeon was often booked with elective cases and not available for emergency cases. Another doctor often called in for these cases, but was not qualified in adult cardiac surgery. Another doctor specializing in adult cardiac surgery was hired and the chief surgeon rearranged his schedule to be available for difficult cases and other doctors quit performing CABG surgery. Sustained improvements resulted.</p> <p>----</p> <p>Bellevue Hospital: Voluntarily suspended cardiac surgery in 2000 due to high RAMRs. Numerous changes included: redesign of service with objective of creating a fluid, multidisciplinary team, hiring nurse practitioners and physician assistants dedicated to caring for cardiovascular surgery patients, hiring a new team of perfusionists, retraining of nurses, limiting the number of surgeons from a neighboring hospital, and hiring first, full-time cardiac surgeon.</p>					
De Groot 2011 ¹⁰⁶	Not Studied	Based on the Relative Importance (RI) Scale in future selection that the authors constructed, patients who compared hospitals prior to surgery vs those who did not both ranked the report card grade regarding physician's expertise as most important (RI = 20.17 vs 16.52, respectively; 17.29 combined groups). The second most important	Not Studied	Not Studied	A majority of patients chose their hospital deliberately, but only 21% of them reported comparing hospitals prior to their surgery. Among issues that were important in their choice of hospital, most patients based their decision on personal experiences and experiences of acquaintances, not on publicly reported quality data.	Netherlands Organization for Health, Research Development

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
		<p>aspect for choice was the waiting time for outpatient clinic appointments (RI = 15.12 vs 15.55, respectively; 15.46 combined). The third ranked was waiting time for surgery (RI= 6.97 vs 8.06, respectively; 7.83 combined).</p> <p>“Overall report card grade” had an RI of 1.34 among patients who compared hospitals, 1.85 among those who did not, and 1.74 combined. Report card grade regarding the quality of care was just above this with RIs of 2.65 (did compare), 1.91(did not compare) and 2.07 combined.</p> <p>The majority of respondents chose their hospital deliberately (94.4% of patients who compared hospitals prior to surgery vs 74.4% of those who did not). The main issues that played a role in their choice was their own previous experience (47.9% vs 43.2%). The second was the experience of others (31% vs 13.2%). Public information in the media was last (12.7% vs 1.5%).</p>			<p>While the public information on physician experience was most important to everyone, other aspects, such as wait time and physician communication had higher relative importance than other public report grades for both groups of patients.</p>	

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
		<p>50.7% of patients who compared hospitals vs 60.9% of those who did not indicated that they were aware of information to compare hospitals. 77.8% and 67.9%, respectively, knew where they could find this information. When asked whether they looked up information on more than one hospital, 45.12% vs 73.3% said that they did not while 18.3% and 4.1%, respectively, said that they compared hospitals and then made a choice.</p>				
Dijs-Elsinga 2010 ¹⁰⁷	Not reported	Not reported	Not reported	<p>Female gender (compared to male) vs. <65 years (compared to >65 years) vs. Intermediate level of education (compared to low level of education) vs. high level of education (compared to low level of education) General hospital information used in 2005-2006 to make decision about hospital: OR (95% CI) Hospital has a good reputation: 0.63 (0.46-0.86);</p>	<p>In past choices patients relied primarily on hospital reputation. Participants say they would use more information in future decisions, but previous experience is the most frequently mentioned (25.3%) and the most frequently identified quality information for future use are 'experience with procedure in the presence of cancer' (9.2%) and 'percentage of patients with textbook outcomes (5.3%),. Younger and more educated people are more likely to say they will use quality in the future, but no differences were found by</p>	Not reported

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
				<p>p<0.05 vs. 0.98 (0.75–1.28) vs. 0.82 (0.61–1.10) vs. 0.88 (0.63–1.23) Hospital atmosphere is friendly: 0.88 (0.65–1.20) vs. 0.69 (0.53–0.89); p<0.05 vs. 0.81 (0.60–1.08) vs. 0.69 (0.50–0.94); p<0.05 Easy access by public/own transportation: 0.99 (0.74–1.32) vs. 0.60 (0.47–0.77); p<0.05 vs. 0.99 (0.76–1.30) vs. 0.92 (0.68–1.25) Distance to hospital: 0.99 (0.74–1.32) vs. 0.84 (0.66–1.08) vs. 1.44 (1.09–1.90); p<0.05 vs. 1.63 (1.21–2.21); p<0.05 Good parking: 0.90 (0.67–1.21) vs. 0.48 (0.37–0.61); p<0.05 vs. 0.84 (0.64–1.10) vs. 0.48 (0.35–0.65); p<0.05 Rooms equipped with personal facilities: 1.00 (0.74–1.35) vs. 0.54 (0.42–0.69); p<0.05 vs. 0.64</p>	<p>gender. In choosing formats, 36.5% preferred stars and 50.5% preferred an overall hospital score as well as specific indicators.</p>	

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
				<p>(0.49–0.84) ; p<0.05 vs. 0.35 (0.25–0.48); p<0.05 Already treated in that hospital: not significant for any comparison Waiting time for surgery: 1.52 (1.03–2.24); p<0.05 vs. 1.14 (0.84– 1.56) vs. 1.05 (0.74–1.48) vs. 1.14 (0.78–1.64 General hospital information to be used in future to make decision about hospitals: OR (95% CI) Hospital has good reputation: not significant for any comparison Previous experience with that hospital: 0.84 (0.60–1.18) vs. 0.90 (0.68–1.19) vs. 1.27 (0.94– 1.73) vs. 1.69 (1.20–2.40); p<0.05 Hospital atmosphere is friendly: not significant difference for any comparison Information given during stay is sufficient and comprehensible: 0.90 (0.65–1.23)</p>		

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
				vs. 1.16 (0.88–1.52) vs. 1.60 (1.19–2.15); p<0.05 vs. 1.46 (1.06–2.03); p<0.05		
Dijs-Elsinga 2010 ¹⁰⁷ <i>con't</i>				Easy access by public/own transportation: 1.12 (0.84–1.48)vs. 0.68 (0.53–0.87); p<0.05 vs. 1.10 (0.84–1.44) vs. 1.05 (0.78–1.41) Parking near hospital: 1.09 (0.82–1.45) vs. 0.66 (0.51–0.84); p<0.05 vs. 1.08 (0.83–1.42) vs. 0.75 (0.56–1.01) Hospital rooms are equipped with personal facilities: 1.16 (0.87–1.54) vs. 0.72 (0.56–0.92); p<0.05 vs. 0.96 (0.73–1.25) vs. 0.68 (0.50–0.91); p<0.05 Distance to the hospital: not significant for any comparison Waiting time for surgery: 0.97 (0.73–1.29) vs. 1.33 (1.04–1.70); p<0.05 vs. 1.54 (1.17–2.01); p<0.05 vs. 1.88 (1.40–2.54); p<0.05 Number of canceled surgeries:		

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
				0.98 (0.64–1.49) vs. 1.63 (1.11– 2.40); p<0.05 vs. 0.95 (0.62–1.46) vs. 1.69 (1.10– 2.59); p<0.05		

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Fasolo 2010 ¹⁰⁸	Not Studied	<p>In response to the open ended probe about what is important the top three responses were 1. quality of doctors, 2. availability of specialists, and 3. distance to hospital. When given cards with indicators, the three selected were waiting times, cleanliness and treatment with respect and dignity. After discussion as a group these changed to waiting times, survival rate and risk of MFSA infection. When selecting from report card the most important were 1. waiting times, 2. risk of MSRA infection and 3. overall quality of service.</p>	<p>Order the indicators were presented in the report card mattered. Waiting time and proportion of people reporting improvement were switched between 1st and 7th on the report card and when waiting time was first it was rated as more important.</p> <p>Participants used indicators provided on report card even if they said they were not important at earlier stage and did not consider some they said were important. The looked for patterns across the indicators and preferred a summary score, particularly participants who were older and less literate.</p> <p>Participants said they understood the indicators, but when asked to explain them, they often gave incorrect definitions.</p> <p>Most wanted some type of color or graphic label, but multiple labels were confusing. Missing data was considered suspicious.</p>	Not Studied	The findings are that preferences can be constructed or influenced by discussion or additional information. Order (more attention paid to first) and layout matter. And clear labels, consistent format and summative measure are likely to reduce cognitive burden.	Not Reported

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Geraedts 2007 ¹⁰⁹	<p>22/29 indicators were understandable for more than 40 patients. Only 5 were understood by the entire group of patients. In the physician group, one indicator was suitable for all of the interviewed doctors and only 11/29 indicators were suitable for more than 80% of them. Four indicators were judged as not understandable by more than half of the patients compared to seven indicators deemed not suitable in the group of physicians.</p> <p>NOTE: Additional data available in Table 2 that I could not access. See first sentence of results section.</p>	Not Studied	Not Studied	Not Studied		Not Reported
Ginsburg 2003 ¹¹⁰	35% of respondents were not at all familiar with report or results	Not Studied	Data characteristics including complexity, relevance and quality explain 28.7% (p<0.01) of the perceived usefulness of the performance data	Organizational variables explain 40% (p<0.01) of the perceived usefulness of the performance data. Improvement culture is positively associated with perceived usefulness and interacts with data quality, such that in very strong improvement cultures, the data is perceived as useful even when it is less relevant.	Over 1/3 of managers are not familiar with the report. Both data characteristics and improvement culture are related as expected to perceived usefulness. However at the extreme, the relationship changes.	Not Reported
Gross 1989 ¹¹¹	Not Studied	I would use the government mortality data to judge hospital quality Yes: Champus - 67, General - 59	Not Studied	Not Studied	As hypothesized, in the two years during which mortality data had been available, consumers continued to rely on personal	Humana Inc.

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
		<p>No: Champus - 30, General - 31 Don't know: Champus - 3, General - 10</p> <p>Assuming your physician does not participate at the hospital you feel has the highest quality in town, how likely are you to change physicians in order to use that hospital? Very likely: Champus - 25, General - 27 Somewhat likely: Champus - 33, General - 28 Not very likely: Champus - 21, General - 25 Unlikely: Champus - 18, General - 17 Don't know: Champus - 3, General - 5</p> <p>Please assume that you were scheduled for surgery and your physician gave you the choice of two hospitals. Assume these hospitals are very similar and there is no price difference. How likely are you to use the government statistics to help make your decision? Very likely: Champus - 34, General - 30 Somewhat likely: Champus - 39, General - 28</p>			<p>assessments of hospital care as a means of judging quality. A significant majority of the individual consumers questioned were unaware of published government mortality data or reports such as the Consumers' Guide to Hospitals (Center for the Study of Services 1988).</p>	

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
		<p>Not very likely: Champus - 12, General - 22 Unlikely: Champus - 14, General - 16 Don't know: Champus - 1, General - 5</p> <p>If the hospital that you currently use is reported to have a high mortality rate, would you discontinue using that hospital Yes: Champus - 55, General - 55 No: Champus - 41, General - 41 Don't know: Champus - 4 General - 4</p>				
Guru 2009 ¹¹²	Not Studied	<p>Views of cardiac surgeons in Ontario vs Pennsylvania regarding reporting of outcomes for coronary artery bypass graft surgery: Ontario vs. Pennsylvania: %</p> <p>Do you support the public release of hospital-specific outcomes? (Yes): 51 vs. NR Do you support the public release of surgeon-specific outcomes? (Yes): 26 vs. NR Do you find reporting of risk-adjusted in-hospital mortality rates useful in monitoring quality of</p>	Not Studied	Not Studied	<p>In general, cardiac surgeons in Ontario had higher levels of support for some aspects of public reporting compared to those from Pennsylvania. They were also more likely to believe that the report influence referral and patient choice Author's summary: We found a generally higher level of support for some aspects of public reporting than was reported previously in Pennsylvania.</p>	Cardiac Care Network

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
		<p>care? (useful): 73 vs. 86 How important are risk-adjusted mortality rates in assessing the relative surgeon performance? (important): 83 vs. 32 Do you think that public reporting is important in influencing referral patterns of cardiologists? (important): 84 vs. 13 Do you think that public reporting is important in influencing patients choosing a cardiac surgeon? (important): 80 vs. NR Do you slot high-risk patients to those surgeons who have better results or are more senior? (often): 66 vs. NR What responses have you made in your practice in response to the institutional report cards? Improved record keeping: 17 vs. NR Standing orders/care maps: 10 vs. NR Created a database: 8 vs. NR Audited charts to ensure evidence-based practices: 6 vs. NR Revised standing orders: 6 vs. NR</p>				

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Hannan 1997 ¹¹³	<p>Responses to Questionnaire:</p> <p>Do you routinely discuss the information in the cardiac report with your patients: Yes (89) 22%; No 310 (78%)</p> <p>For the following: Very much (%); Somewhat(%); Not at all(%)</p> <p>Do you feel the information is accurate: 27(7%); 235(60%); 130(33%)</p> <p>How much do you feel that the report:</p> <p>Is too technical: 11(3%); 84(23%); 272(74%)</p> <p>Has too many graphs: 8(2%); 86(23%); 274(75%)</p> <p>Has too many charts: 8(2%); 88(24%); 270(74%)</p> <p>Is misleading in interpretation of records of physician and hospital: 139(37%); 175(46%); 63(17%)</p> <p>how often has the information affected your choice when referring your patients to cardiac surgeons: 25(6%); 129(32%); 248(62%)</p> <p>For the following: Not at all useful; Somewhat useful; Extremely useful; Average (scale of 1-5)</p> <p>How useful do you consider this information in making referral decisions for patients needing CABG surgery: 215(53%); 127(31%); 65(16%); 2.40</p>	Not Studied	Not Studied	Not Studied	<p>Primary results regarding how cardiologists feel about the NY Cardiac Report show that a large majority (93%) have at least some reservations about the accuracy of the data in the report. As far as formatting, they appear to be comfortable with the report, but a large portion (83%) are at least somewhat hesitant about the reports being misleading. Moreover, only 22% discuss the information with their patients, and most (62%) claim that the information has not affected their choices when referring patients at all. Finally, more than half say they do not consider the information useful at all when making referral decisions for patients needing CABG surgery, and only 16% claim it to be extremely useful. In sum, the cardiologists do not use the information very frequently and feel that the data may be inaccurate and the interpretation misleading.</p>	Partial support from the Agency for Health Care Policy and Research of the U.S. Department of Health and Human Services
Hibbard 2007 ¹¹⁴	Not Studied	<p>Health Literacy vs. Numeracy vs. Activation</p> <p>Correlations between demographics</p> <p>Age: .03 vs. .02 vs. .09</p> <p>Income: .03 vs. .11 vs. .12; p<0.05</p>	Not Studied	Not Studied	<p>People who are more activated better comprehend and use comparative information even when they have lower skill levels. When trade-offs are required</p>	Blue Cross Blue Shield

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
		<p>Self-rated health: .08 vs. .24; p<0.001 vs. .38; p<0.001</p> <p>Education: .28; p<0.001 vs. .45; p<0.001 vs. .23; p<0.001</p> <p>SF8 Physical: .09 vs. .26; p<0.001 vs. .23; p<0.001</p> <p>SF8 Mental: .03 vs. .18; p<0.01 vs. .26; p<0.001</p> <p>Gender: .13; p<0.05 vs. .08 vs. .11</p> <p>Health literacy : 1.0 vs. .51; p<0.001 vs. .11</p> <p>Numeracy: .51; p<0.001 vs. 1.0 vs. .16; p<0.01</p> <p>Comprehension vs. quality choice</p> <p>Correlations between predictor variables</p> <p>Health literacy: .59; p<0.001 vs. .30; p<0.001</p> <p>Numeracy: .66; p<0.001 vs. .35; p<0.001</p> <p>Activation: .20; p<0.001 vs. .25; p<0.001</p> <p>Comprehension: 1.0 vs. .51; p<0.001</p> <p>Low patient activation vs. high patient activation</p> <p>Proportion of correct response on comprehension scale</p> <p>Low health literacy: 71.9% vs. 81.6%; p<0.05</p> <p>High health literacy: 86.6% vs. 88.2%; NS</p> <p>Low numeracy: 67.7% vs. 76.3%; p<0.05</p> <p>High numeracy: 90.2%</p>			among characteristics of hospitals, people with higher levels of activation are more likely to trade other characteristics for higher quality hospitals.	

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		vs. 90.7%; NS Proportion of high quality choices Low health literacy: 51.3% vs. 70.0%; p<0.001 High health literacy: 68.5% vs. 75.3%; p<0.05 Low numeracy: 53.0% vs. 66.8%; p<0.05 High numeracy: 66.3% vs. 77.0%; p<0.001				

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Kang 2009 ¹¹⁵	<p>Over 50% of the respondents expressed their intention to use the hospital performance information; 53% to switch hospitals based on performance data; 54% to retain hospital performance data; and 75% to recommend hospitals with high performance to relatives and friends.</p> <p>Average self-assessed understanding of the 18 evaluation criteria=3.15 (Fair=3). Highest understanding was for: Patient rights and convenience (3.34), nutrition (3.31), facility and safety management (3.30), and quality improvement (3.26). Lowest understanding: Maternal and infant care (2.92), intensive care unit (2.95), radiation test (2.9), and medical care systems: 3.10</p> <p>For the respondents who agreed what the effectiveness of HEP in improving the quality of national health care, the likelihood of using the performance information was significantly increased by an odds ratio (OR) of 1.684 (95%CI=1.143-2.483) for recommending hospitals with good performance; OR=1.630 for switching hospitals with good performance. OR=2.297 for keeping performance data for future use.</p>	Not Studied	Not Studied	Not Studied	Author's summary: More than half of the respondents expressed their intention to use the hospital performance information generated by the new HEP system.	Not Reported
Khang 2008 ¹¹⁶	Not Studied	Not Studied	Not Studied	<p>OF 505 respondents, only 228 were aware of the report.</p> <p>Odds ratios of awareness by age and parity (95% CI):</p>	Younger women, those with higher education and those who have an interest in health related media were most likely to be aware of the Cesarean reports.	None reported

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
				<p>Age: 20-24: 1.00 (reference) 25-29: 2.8 (1.39- 5.61) 30-34: 2.46 (1.11- 5.46) 35-39: 2.98 (1.30- 6.83) 40-44: 2.28 (.96- 5.44) 45-49: 1.49 (.61- 3.66)</p> <p>Parity: none: 1.00 (reference) One: 2.00 (1.01- 3.93) Two: 1.05 (.53- 2.06) Three or more: 1.06 (.45-2.50)</p> <p>Adjusting for age and parity, odds ratios found that education [compared to middle school or less - High school: 2.08 (1.05-4.11); College or higher: 3.53 (1.67-7.46)] had an affect on awareness as did monthly income of >2001 USD [1.77 OR (1.07-2.91) compared to <1200 USD], and how frequently respondents watch</p>		

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
				<p>or read health related media: Rarely=reference; sometimes: 2.13(1.05-4.33); very often: 4.80 (2.31-10.00); Always: 4.27 (1.54-11.79)</p> <p>Aspects that were not related to awareness were Occupation, Marital status, Religion, and Residence (urbanicity)</p>		

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Laschober 2006 ¹¹⁷	<p>Survey respondents reported that most common barriers to improving Hospital Compare scores in hospitals with >1 measure scored below the 50% benchmark were: 1) Inaccurate documentation and missing data (identified by 90% of both QI directors and senior executives); 2) Failure to involve physicians (identified by 83% of QI directors and 76% of senior executives); 3) Financial resource constraints (identified by 76% and 70%, respectively); and 4) Insufficient QI staff (identified by 64% of both QI directors and senior executives).</p> <p>>50% of respondents indicated their hospitals increased the number of staff dedicated to reporting quality data and focusing on QI. They also increased the amount of staff time devoted to QI efforts. Approximately 60% said their hospitals had invested in new computer hardware or software to improve measurement and reporting. 95% of QI directors said their hospitals implemented new/enhanced QI efforts.</p>	None	None	None	QI directors and senior executives identified challenges to improving Hospital Compare scores in the areas of data collection and reporting, lack of physician involvement, financial challenges, and lack of staffing. The majority indicated that they made QI related investments designed to improve their Hospital Compare ratings.	CMS
Laschober 2007 ¹¹⁸	<p>Senior executives Responses:</p> <p>More Frequent Internal Requests for Information about Quality Performance 85.8</p> <p>More Discussion of Quality Performance in Hospital's Strategic Planning Process 93.6</p> <p>Heightened Attention to Improving Quality by a Larger Group of Hospital Staff 96.5</p>	Not Studied	Not Studied	Not Studied	Authors suggest that public reporting may be substantially impacting hospital QI and reporting efforts. This includes Leadership attention to QI efforts.	Mathematical Policy Research
Longo 2003 ¹¹⁹	Not Studied	Overall Perspectives on Consumer Reports:	Not Studied	Not Studied	Overall, large percentages of respondents said that	Missouri Department of

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
		<p>An effective means of comparing different hospitals and/or healthcare providers: 59.9%</p> <p>Useful resource to have for healthcare decisionmaking: 55.2%</p> <p>"Nice-to-know" info, but does not make a difference in actions: 34.1%</p> <p>Hospital advertising or public relations: 30.2%</p> <p>A waster of time: 8.4%</p> <p>Based on Information in report, how likely to: [by %, Very likely; Somewhat likely; Not too likely; Not likely at all; Don't know]</p> <p>May change doctors or hospitals: 4.1; 8.1; 30.4; 47.4; 10.1</p> <p>May use info to make decision re: medical procedure at our medical center: 21.9; 31.9; 18.1; 14.7; 13.4</p> <p>Keep this report for future reference: 24.6; 22.2; 19.6; 21.3; 12.3</p> <p>Highest ranking most important and/or helpful sections of report by presence of chronic Disease in Respondent and/or Family Member: [Disease Present: Section most helpful; % Respondents with</p>			<p>they believed the reports were effective in comparing different hospitals and health care providers. Just over a third said that it didn't really make a difference to them, and 8.4% said it was really just a waste of time. Almost half said that they were not at all likely to change doctors or hospitals due to the reports, but slightly over half said they were at least somewhat likely to use the information to decide whether or not to have certain medical procedures there.</p> <p>Respondents were more likely to say that the most interesting and/or helpful part of the report were sections pertaining to chronic illnesses that they or their family members had</p>	<p>Health; Department of Family and Community Medicine, University of Missouri-Columbia School of Medicine; No COIs listed</p>

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
		disease] Strokes: Heart Disease; 74.6 and Strokes; 64.4 Diabetes: Diabetes; 74.4 Breast Cancer: Breast Cancer; 68.9 Other Cancer: Heart Disease; 54.7 and Other Cancer: 49.3 No Chronic Disease: Comparisons to National Average; 50.4 Heart Disease: Heart Disease; 79.8 Alzheimer's: Heart Disease: 52.6 (no Alzheimer's section in report) High Blood Pressure: Heart Disease: 60.8% Overall: Heart Disease; 50.5%				
Luce 1996 ¹²⁰	Use of HCFA Mortality Data and OSHPD RAMO data: Hospital Review of Data Release: Yes - 16, No - 1 Hospital Medical Record Review for Individual patients: Yes - 7, No - 10 Values of data release to hospitals (scale 0-10): Median - 3 (0-10) Quality Improvement activities initiated – 3	Not Studied	Not Studied	Not Studied	Study showed that public hospitals in California made generally little use of the RAMO data provided by OSHPD in the first year after distribution of the data to the hospitals or in the seven months following their public release.	Pew Charitable Trusts

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Magee 2003 ¹²¹	Not Studied	Awareness of ratings of local trust was very low. Government ratings were mistrusted and the format of the commercial information was preferred. People did not use the information because they did not feel they really had a choice and some did not like the idea of shopping around--they expect high quality everywhere. Despite this there was general consensus that the information should be public, that people had the right to know.	Not Studied	Not Studied	Early response (pre wide spread use of ratings on Health Department web site) find slittle use or confidence in measure and a preference for commercially produced overviews over this public report.	Commission for Health Improvement

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report																																								
Mannion 2003 ¹²²	<p>Data have raised awareness of issues but are not integrated into clinical governance. Reports were not well disseminated in the hospital and many staff were unaware of them. Other senior staff did not view them as credible. Some staff preferred process indicators as they felt these were more amenable to improvement.</p> <p>The Health Boards only used the reports when they had an outlier in their area. They were discussed at the board level but not disseminated.</p> <p>78% of GPS knew about the data but only 46% recalled seeing the most recent report. While they used the data they also had other sources:</p> <p>Types of published information used by Scottish GPs to make assessments of local hospital services</p> <table border="1"> <thead> <tr> <th></th> <th>Yes %</th> <th>n</th> <th>No %</th> <th>n</th> </tr> </thead> <tbody> <tr> <td>Waiting times data</td> <td>73</td> <td>51</td> <td>27</td> <td>19</td> </tr> <tr> <td>Other national published data</td> <td>1</td> <td>1</td> <td>99</td> <td>68</td> </tr> <tr> <td>Reports from professional bodies</td> <td>24</td> <td>17</td> <td>76</td> <td>54</td> </tr> <tr> <td>CRAG indicators</td> <td>23</td> <td>16</td> <td>77</td> <td>55</td> </tr> <tr> <td>Local audit reports</td> <td>42</td> <td>30</td> <td>58</td> <td>41</td> </tr> <tr> <td>Trust annual reports</td> <td>13</td> <td>9</td> <td>87</td> <td>62</td> </tr> <tr> <td>Other</td> <td>8</td> <td>5</td> <td>92</td> <td>59</td> </tr> </tbody> </table>		Yes %	n	No %	n	Waiting times data	73	51	27	19	Other national published data	1	1	99	68	Reports from professional bodies	24	17	76	54	CRAG indicators	23	16	77	55	Local audit reports	42	30	58	41	Trust annual reports	13	9	87	62	Other	8	5	92	59	Local Health Councils reported no enquires about the CRAG indicators and report that consumers use other sources, primarily family, GPS, and past experience. They report that the CRAG receives limited publicity.	Not Studied	Not Studied	Overall the indicators were rarely used by consumers or professionals. The reasons for this may be limited dissemination, lack of credibility and lack of formal incentives.	UK Department of Health
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Mannion 2005 ¹²³	Star ratings were not seen as adequately representing their organizations, not relevant given local issues, based on inaccurate data, and subject to gaming. Beneficial responses included providing a basis on which to align local performance with national targets and develop new reporting systems.	Not Studied	Not Studied	Not Studied	Reaction is negative, but some use of reports is in line with the intentions. Negative consequences of public reporting are often cited by staff as a concern	Not Reported
Mazor 2009 (a) ¹²⁴	Not Studied	Responses and reactions to reporting Most people were not aware of HCAs and distressed to know they occurred Public reporting about this one thing was seen as unlikely to affect hospital choice as people use other information and said other factors were more important.	Recommendations on content Provide an introduction to the topic Provide information on prevention Present only the most important data Present cases per X, not absolute number of cases Indicate the time period covered by the report Indicate whether performance is changing over time Help consumers integrate information from multiple indicators Provide a summary score or brief text to aid interpretation Recommendations on format Use numbers rather than symbols to convey numeric or statistical information Place definitions or explanations of indicators near data Order hospitals (or other	Not Studied	Public reporting of HCI is becoming more common, but consumers seem unaware of this issue and when made aware are unlikely to choose a hospital based on this.	Not Reported

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
			<p>reporting units) from best to worst Label whether a high or low number is better for each indicator Omit confidence intervals and details of risk adjustment (or report in separate technical section) Avoid abbreviations Use color sparingly to capture attention Keep print reports brief</p>			
Mazor 2009 (b) ¹²⁵	Not Studied	<p>Reporting on HAI may have an impact on choice but the other factors including MD recommendations, prior experience and insurance are likely to be more important. Among the indicators reported people are more influenced by the safe practices score than infection or mortality rate.</p>	<p>Reports were generally easy to understand (85-90% selecting 4 or 5 where 5 is very easy). The section of the report that explained the risk adjustment and confidence intervals was the more difficult. Consistency, presentation type or presence of confidence intervals did not affect understandability.</p>	Not Studied	<p>Most consumers seem able to understand information presented on HAIs in a report card format; however these are unlikely to be the major influence on hospital choice.</p>	Massachusetts Department of Health
Mehrotra 2003 ¹²⁶	<p>Most report cards included in-hospital mortality and length of stay, either overall or by diagnosis. Report cards were considered a success if they prompted or increased QI, and by this definition, most were not.</p>	Not Studied	<p>Barrier to report card use Ambiguity of goals Conflicts over how to measure quality Conflicts over the utility of public release No economic incentives Lack of collaborative planning</p>	Not Studied	<p>The perceived impact of the reports was variable with some viewed as successful and other have less impact. The major barriers were disagreements among the business coalitions who produced the reports and the hospitals.</p>	Robert Wood Johnson Foundation

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Merle 2009 ¹²⁷	Not Studied	77% of respondents were interested in ICALIN. ICALIN was ranked 6th is a ranking of reasons to choose a hospital. If a hospital had a low ICALIN score 24.1% said they would refuse admission and 54.9% would seek advice from their GP, 12.1 % would be concerned but would accept admission.	Not Studied	Not Studied	Authors conclude this type of report card could have an effect on choice of hospital, but the patients rely on their GP to interpret this information.	Not Reported
Moser 2010 ¹²⁸	Not Studied	Decision making theme: report card information was interpreted in the context of personal experience. Some people added scores while other used specific exclusion criteria including not knowing the hospital from personal experience or stories from family and friends. The report card was perceived as a supplementary source of information and reported that it increased their awareness of quality of care.	The reports were viewed as not specific enough: too vague, too general and not enough difference among hospitals. They also wanted information not included in the report card. Participants wanted to understand what was behind the ratings and worried they would be making decisions based on outdated information.	Not Studied	Decisions are individual and context specific and people did not have a consistent strategy. The report card is not the primary source of information for the choice.	Netherlands Organization for Health Research and Development

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Peters 2007 ¹²⁹	Not Studied	Not Studied	<p>1. Study one found that people presented with ordered information about quality only as opposed unordered information that included a mixture of quality and other information, were more likely to pick the higher quality hospital.</p> <p>2. Different presentation formats did not have a significant impact on comprehension, but more people chose the lower death rate hospital when this information was presented in a way that was easier to evaluate.</p> <p>3. Comprehension and choices improved when higher was always better in the presentation of ratings.</p>	Not Studied	The overall conclusion is that less is more when presenting health information. People with lower numeracy had better comprehension and made better choices when presented with simplified formats.	Blue Cross Blue Shield Association and NSF

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Pham 2006 ¹³⁰	<p>Hospitals are involved in multiple reporting programs (mean 3.3; range 1 to 7) that vary according to sponsorship, program type, mandatory versus voluntary, incentives, quality improvement support and inclusion of clinical measures.</p> <p>Hospital Participation In Quality-Reporting Programs, By Program Characteristics, 2004–05</p> <p>Program characteristic Number of hospitals participating</p> <p>Sponsorship</p> <p>National public (CMS, JCAHO, Premier) 36</p> <p>National private (IHI, Leapfrog, NQF) 26</p> <p>Local public (state, QIO) 19</p> <p>Local private (health plans, purchasers) 17</p> <p>Local/regional consortia (academic) 11</p> <p>Professional societies (ACC, STS) 12</p> <p>Other 4</p>	Not Studied	Not Studied	Not Studied	<p>Hospitals engaged in more reporting programs do not seem to differ from those involved in fewer. 38 different programs show that reporting is pervasive , although their impact on hospital operations varied. Better coordination would reduce burden and could increase impact.</p>	Robert Wood Johnson Foundation Center for Studying Health System Change

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Pham 2006 ¹³⁰ <i>con't</i>	<p>Program type Public reporting using primary data 36 Private benchmarking of primary data 20 Sole use of secondary data 7</p> <p>Programs involving quality improvement support (IHI, ACS, STS, ADHERE, VHA, QIO) 21</p> <p>Programs were not perceived as influencing patient choice, but they were credited with improving physicians' attitudes toward quality measurement and improvement.</p> <p>Program focus on a limited number of objectives was believed to shift attention and focus from other areas, but others reported there was spillover.</p> <p>IT was view as a factor in the costs associated with reporting</p>					

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Putnam 2006 ¹³¹	Not Studied	Not Studied	For AMI: Over half the indicators (29) presented were rated as useful and credible. 17 were rated reasonable in principle, needing caution in interpretation. Only 1 was considered unacceptable (length of stay in ER). For CHF: 18 useful as it; 14 reasonable in principle, and 2 unacceptable	Physicians felt some measures are influenced by system and patient factors outside their control such as physician shortages that may make follow-up difficult or fragmentation of care that make it hard to coordinate or assign responsibility or patient preferences or resistance to taking medications.	The quality indicators are generally acceptable to physicians, though they voiced the opinion that they need to be interpreted in terms of the local context and patient factors.	Canadian Institutes for Health Research and the Heart and Stroke Foundation of Canada
Rainwater 1998 ¹³²	<p>~3/4 of respondents found at least some aspect of the CHOP report useful, most frequently, as a means for benchmarking performance. It was also useful in improving and educating physicians about importance of coding.</p> <p>Regarding the least useful aspects, most common answer was that the report was not timely and the data did not reflect current practices. Other complaints included: use of outcomes data without process of care info; poorly standardized coding, excessive complexity and technical detail, attribution of deaths after transfer, inclusion of superfluous information.</p> <p>Most respondents disseminated report within hospital</p> <p>~2/3 of respondents said the report did not lead to any specific changes.</p>	Not Studied	Not Studied	Not Studied	<p>Both NY and CA say report cards are distributed. Leaders at high mortality hospitals were especially critical. Recent hospital report cards were rated better than pioneering federal efforts. A report based on clinical data was rated better, understood better, and disseminated more often to key staff than one that was based on administrative data.</p> <p>Barriers to constructive use of outcomes data persist, especially at high mortality hospitals.</p>	U.S. Agency for Health Care Policy and Research; No COIs

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Rainwater 1998 ¹³² <i>con't</i>	<p>~1/2 made specific suggestions re: improvements that could be made: need for more timely data, suggested using easier to understand presentation with better graphics, it should be shorter. Others wanted to know what process-of-care factors correlated with better-than-expected outcomes.</p> <p>Regarding release to public, almost all said it should be released but with caveats, saying it was too complex and overly detailed for general use and that the measures should be more widely accepted and validated.</p>					
Rainwater 2003 ¹³³	Not Studied	<p>The top three factors states as important were accreditation, location, and price. Ratings of the importance of specific quality indicators and well as groups of indicators averages 3.03 to 3.67.</p> <p>70% reported viewing at least one public report.</p> <p>33% reported that plans conducted their own internal studies of comparative hospital quality.</p>	Not Studied	Not Studied	There are high levels of awareness and interest in public reports, but little evidence that these influence choices for contracts.	AHRQ

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Reeves 2008 ¹³⁴	<p>Barriers to using survey results Data were not specific enough to wards, departments or specialties Lack of time and resources Not knowing what to do about the survey results Lack of statistical expertise</p> <p>Facilitators for using survey results Survey results made an important contribution to the organization's performance ratings A patient-centered organizational culture Detailed and clear benchmark information Repetition of the same surveys, facilitating longitudinal comparisons</p>	Not Studied	<p>Recommendations for improving patient survey programs Repeat the same surveys at regular intervals Run regular workshops to facilitate networking and educate survey leads Disseminate information about the basic statistics relevant to patient surveys Gather data on smaller units and/or encourage organizations to analyze their existing results by smaller units Give patient surveys prominence in performance-management systems Continue to publish benchmark charts in a "traffic light" format Ensure that results are published quickly after completion of surveys Ensure that a section for patient comments is included in questionnaires Consider collecting patient survey data at more regular</p>	Not Studied	General responses to the surveys were favorable. The most common barrier to using the survey is that the findings were not specific enough to units where change could happen	Health and Social Care Information Center
Richard 2005 ¹³⁵	Not Studied	Not Studied	<p>Four Major Themes Emerged: Overall Views, Purpose, Content and Dissemination: Overall Views:</p>	Not Studied	Four emergent themes arose: overall views, purpose, content and dissemination. All but one respondent had positive views about cardiac report	The Heart and Stroke Foundation of Canada; The Canadian Institutes for

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
			<p>Nearly all were positive about cardiac reports. Some thought it best to measure cardiac units and institutions as they work as teams. Some thought that report cards would help improve quality of care. ----</p> <p>Purpose: Should be used to improve cardiac care and could be used to track quality of care over time, provide feedback to practitioners, and develop strategies to improve care and identify barriers to change. Report cards are also a way of evaluating and standardizing care at both physician and institutional levels. Majority said they would use cardiac report cards for informed decisionmaking; some did not comment about using them, but none said that they would not use the report cards. ----</p> <p>Content: Majority wanted feedback from other cardiac patients. Also wanted the following categories to be included: Patient Experience: Patient involvement in care, Opportunity for patient interaction,</p>		cards.	Health Research Interdisciplinary Health Research Team Program to the Canadian Cardiovascular Outcomes Research Team.

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
			<p>Continuity of Care, Follow-up, Communication, Patient Narratives; Access to Care: Distance, Waiting times Physicians: Education, Experience, Number of procedures performed, medical outcomes, Average time spent with patients, # of reported medical errors; Hospitals: Average length of stay, Physician:Patient and Nurse:Patient ratios Procedures conducted, Diagnostic tests available, Rehab services, Research interest, Availability of beds Regions: Comparison with other institutions w/in same region, Physician:Patient ratio ---- Dissemination: Participants wanted reports to be brief and understandable. Some thought a ranking would be inappropriate. They listed a number of potentially effective ways of releasing data: the Internet, newspapers, magazines, medical journals, telephone requests, e-mails, television, radio, mail, posters, government</p>			

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
			offices, libraries, pharmacies, waiting rooms and patient-focused foundations. They also felt family physicians and cardiologist played an important role in dissemination.			
Romano 1999 ¹³⁶	<p>Mean score of Respondent Rating of RAMR (measured through scale of 0=poor, 1=fair, 2=good, 3=very good, 4=Excellent): [CA; NY; HCFA]</p> <p>Usefulness in improving hospital quality: 1.1; 1.9; 0.4 Accuracy in describing hospital performance: 1.4; 2.0; 0.7 Completeness of case-mix adjustment model: 1.6; 1.6; 0.6 Ease of interpretation: 1.7; 2.5; 0.9 Usefulness to consumers: .9; 1.3; 0.2 Manner of release to hospital and public: 1.5; 1.7; 1.0 Overall mean score: 1.4; 1.8; 0.6</p> <p>Mean Score of Perceived Usefulness of RAMR Reports in CA and NY (4 Indicators: 0= All respondents disagreed with all statements, 4= All respondents agreed with all statements; Statements of usefulness: a)Improving quality of care, b)Improving quality of coding (NA in CA), c) Negotiating with health plans, d)Marketing and Public Relations):</p> <p>CA (n=2.49): 1.9 NY (n=27): 2.8</p>	Not Studied	Not Studied	Not Studied		AHRQ

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Rosenthal 1998 ¹³⁷	<p>Descriptive reports:</p> <p>UHC: In response to 1994 CHQC report indicating LOS of patients undergoing CABG during Jan through June 1993 was longer than predicted (actual mean: 11.1 days, predicted: 10.2 days), developed and implemented care pathways for both intra-operative care and ICU stays.</p> <p>LakeEast: Established institutional targets for overall C-section rate and VBAC success rate. Also developed peer review of management practices, development of clinical protocols to improve the management of labor and analgesia, and practitioner and patient education.</p> <p>Parma: Developed explicit and attainable targets for C-section rates, practice guidelines, peer review, physician feedback, and practitioner and patient education.</p> <p>Allen: Developed interdisciplinary working group to investigate and standardize care for pneumonia. Developed a critical pathway for managing pneumonia.</p>	Not Studied	Not Studied	Not Studied	Author's summary: Common to all case studies was the creation of interdisciplinary work groups, and undertook detailed review of current clinical practices.	Career Development Award from the Health Services Research and Development SerJice, and the VA
Schneider 1996 ¹³⁸	<p>Aware of Cardiac Guide: Cardiologists: 82% Surgeons: 100%</p> <p>Views on Importance of Outcomes and the Consumer Guide in Assessing the Quality of a Cardiac Surgeon's Performance: [#,(%) for Cardiologists; #,(%)for Cardiac Surgeons]</p>	Not Studied	Not Studied	Not Studied	All cardiac surgeons were aware of the report and most of the cardiologists were. Overall, both groups thought there were some limitations to the report, but the biggest impact seemed to be in access to care for highest risk patients; 63% of surgeons said that they were less	Henry J. Kaiser Family Foundation.

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
	<p>Importance of risk-adjusted mortality***: Minimally or not important: 11(5); 8(14) Moderately Important: 32(12); 15(26) Very or extremely important: 227(84); 35(60)</p> <p>Importance of clinical outcomes other than mortality**: Minimally or not important: 3(1); 3(5) Moderately important: 31(12); 12(21) Very or extremely important: 236(87); 423(74)</p> <p>Importance of Consumer Guide Ratings: Minimally or not important: 158(70); 39(68) Moderately important: 49(22); 12(21) Very or extremely important: 20(9); 6(11)</p> <p>Influence of Consumer Guide ratings on referrals (only cardiologists): none: 1240(62) Minimal: 57(25) Moderate: 25(11) Substantial: 5(2)</p> <p>Percentage of patients with whom respondent discussed Consumer Guide in past year: 0: 149(66); 33(57) 1-10: 54(24); 22(38) >10: 24(11); 3(5)</p> <hr/> <p>Limitations of the Consumer Guide Rated by Respondents as Very or Extremely Important: [#, (%) for Cardiologists; #, (%) for Cardiac Surgeons]</p>				<p>willing or much less willing to operate. None were more willing. Of the cardiologists, a majority (59%) said it was at least somewhat more difficult to find surgeons willing to operate on their most severe cases. Of note, 10% stated it was easier to find surgeons willing to operate. Only 30% of cardiologists said the Consumer Guide had a moderate to substantial influence on their referrals.</p>	

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
	<p>Important factors other than mortality rates not included: 171(78); 45(78) Risk-adjustment methods inadequate to compare surgeons fairly: 169(77); 49(85) Mortality rates are an incomplete indicator of surgeon's quality: 162(74); 49(85)</p>					
Schneider 1996 ¹³⁸ <i>con't</i>	<p>Surgeons and hospitals can manipulate data: 113(52); 33(57) Ratings are based on out-of-date information: 93(43); 20(35) A higher mortality rate is probably due to chance alone: (49(23); 16(28) Few surgeons and hospitals report mortality rates that are higher or lower than expected: 39(18); 11(20) Rating are inaccurate for surgeons with small caseloads: 31(15); 11(20) Differences between two groups ***p<0.001; **p<0.01</p>					
Schneider 1998 ¹³⁹	Not Studied	<p>Awareness, Knowledge and Use of Consumer Guide: [#,(%)] Aware: 93(20) Aware before surgery: 56(12) Heard of it: 37(8) Seen a copy: 19(4) Report knowledge of hospital rankings: 18(4) Information was a major or moderate influence in choice: 11(2) Report correct rating of hospital: 4(1)</p> <p>Individual Surgeons: Report knowledge of surgeon or surgical group rating: 7(2)</p>	Not Studied	<p>Characteristics of Individuals Aware of the Consumer Guide before Most Recent Open Heart Procedures: (dichotomous variables)[Odds Ratio; 95% CI]</p> <p>Age: <65: 2.00; 1.14-3.51* Sex: Male: 2.03; .96-4.27 Education: Some College-Advanced Degree: 2.10; 1.19-3.70*</p>	<p>55% of respondents in Pennsylvania having undergone CABG surgery are interested in quality reports, but only 20% of respondents were aware of the Consumer Guide at the time of the survey, and even less, (12%) were aware before surgery. 28% were not at all interested in the report. Only 4 percent had seen a copy of the report. 1/3 were unwilling to pay anything for the report, but 8% said they would pay at least \$50 for it. The largest barrier to use (66%) of the report was</p>	<p>Grant from Henry J. Kaiser Family Foundation; National Research Service Award from Dept of Health and Human Services. No COIs listed.</p>

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
		<p>Information was a major or moderate influence in choice: 4(1) Report correct rating of surgeon or surgical group: 4(1) Discussed guide with surgeon or other physician: 6(1) ----- Patient Interest in Consumer Information on Cardiac Surgery: [#,(%)] Interest in obtaining the Consumer Guide: Don't know: 26(6) Not at all: 133 (28) Not very: 51(11) Somewhat: 106(22) Very: 158(33) Willingness to change surgeons: Don't Know: 78(16) Definitely would not: 51(11) Probably would not: 72(15) Probably would: 127(27) Definitely would: 146(31) Willingness to pay, \$: 0: 149(33) 5: 64(14) 10: 80(18) 20: 125(27) 50: 20(4) 100 or more: 18(4) ----- Barriers to Use: [#,(%)] Time <3 days between decision to operate and procedure: 178(38) Less than enough time</p>		<p>Income: >\$30,000: 1.81; .97-3.38 Health Status Prior to Operation: Fair or Poor: 1.88; 1.06-3.33* Prior Admission to hospital at which CABG was Performed: Yes: 1.14; .64-2.01 Hospital Rated Higher-Than-Expected Mortality: yes: 1.51; .82-2.79 Length of time with heart disease: ≥1 year: 1.91; 1.05-3.50* Days Between Decision and Operation: <3: 1.00; .56-1.77 *p<0.05</p>	<p>that distance was a factor in choice. Educated, younger patients with poorer health and longer heart conditions were the most likely to use the report.</p>	

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
		<p>to learn about surgeons and hospital: 58(12) No hospital in a reasonable distance: 157(33) Distance somewhat or very important in choosing a hospital: 311(66) Remained in same hospital between decision to operate and operation: 205(43) Cost affected choice: 8(2) Managed care or insurance restriction: 19(4)</p>				
Schwartz 2005 ¹⁴⁰	Not Studied	<p>Positive Responses to Questions Regarding Decisionmaking for Surgery and Reactions to Surgical Performance Data: [% (95% CI) of Respondents]</p> <p>Who made the decision to have your surgery at your hospital?: Mainly your doctor: 31 (27-35) Mainly you or you and your family: 24 (20-28) Both Equally: 41 (37-45) Some else (such as family members, other health professional): 4 (2-6) No answer: 1 (0-2)</p> <p>Did You try to find information that compared your hospital</p>	Not Studied	Not Studied	<p>Decisions on where to have surgery was largely influenced by doctors and only 24% said that they alone (or with family input) made the decision of where to get surgery. Only 11 percent of the respondents attempted to find comparative hospital information prior to their surgery. In the case of future surgeries, 27% of patients said they would not use a list of best hospitals, but 47% said they would be very likely to use such a list for future surgeries.</p>	<p>AHRQ COIs: JDB is a paid consultant and chair of the expert panel on evidence based hospital referral for the Leapfrog Group</p>

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
		<p>with other hospitals: 11 (8-14)</p> <p>Hospital and Surgeon Reputation: Did you think your hospital had a good reputation: 94 (92-96) If so, did you think your hospital had a good reputation because of: Hospital advertisements you saw: 16 (13-19) What your family or friends said: 31 (28-35) What your doctor said: 64 (60-68) Low number of people who died after surgery: 15 (12-18)</p> <p>Reactions to Performance Data: Medicare is considering publishing a list of best hospitals for different operations. What do you think is the main reason for creating this list: To help patients: 55 (51-59) To save money: 21 (17-25) Another reason: 10 (7-13) Don't know: 7 (5-9) No answer: 13 (10-16)</p> <p>If you needed another operation how likely would you be to use this list: Not likely: 27 (23-31)</p>				

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
		<p>A little: 21 (17-25) Very likely: 47 (43-51) no answer: 5 (3-7)</p> <p>Where would you prefer to get information about best hospitals for operations from: Only your doctor: 40 (36-44) Only other sources 2 (0-4) Both: 55 (51-59) No answer: 3 (1-5)</p>				
Sofaer 2005 ¹⁴¹	Not Studied	<p>Participants in open discussion raise some topics as important not included in CAHPS, but there were structural and outcome measures that might not be available from a patient survey such as nurse to patient ratio or being discharged too soon..</p> <p>In CAHPS domains patients are most interested in communication, responsiveness to needs and cleanliness. Within domains the most important items were Communication: Doctors' listening carefully; nurses listening carefully Responsiveness to needs: call button answered as soon and possible was important and see as subsuming</p>	Not Studied	Not Studied	Compared to experience with Health Plans patients appear able to attribute quality to the hospital and hold them accountable and this corresponds to their interest in quality information. The focus on communication, responsiveness and cleanliness were consist across participants from other backgrounds.	AHRQ and CMS

Author, Year	10. KQ3:Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
		<p>others/ Pain management: participants had difficulties picking one item Avoiding problems with medication: participants had widely different priorities Hospital Room: Cleanliness was most important. Post discharge: most people did not initially view this as the hospital responsibility although this changed as people provided examples.</p>				

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Tu 2003 ¹⁴²	<p>Changes in AMI Care Made at Hospitals in Response to Cardiac Atlas (n=48): (%) No Change: 46% Change: 54% Specific Changes of those that made changes, by % (n=26):</p> <p>Overview of thrombolytic use and door-to-needle times: 50 Review of medical records of AMI patients: 50 Conducted continuing medical education: 38 Improved health records coding: 35 Introduction of new critical pathways/standing orders: 23 Sharing of care maps/best practices with other local hospitals: 23 Planning for health care services: 23 revision of existing critical pathways/standing orders: 19 Budget decisions: 8 Reassigning medical staff for AMI patients: 4</p> <p>Respondent Views on the Impact of the Cardiac Atlas, by %: Media report on your hospital's performance (n=50) Yes: 62 No: 16 Don't know: 22</p>	Not Studied	<p>Limitations of Cardiac Atlas Rated Very or Extremely Important, by %(n=51):</p> <p>Hospital discharge data may be miscoded: 57 Risk-adjustment methods are inadequate to compare hospital mortality rates fairly: 43 Transferred patients assigned to admitting (first) hospital: 35 Lack of information on in-hospital drug use: 35 Timeliness of data: 33 No data included on drug contraindication: 33 Lack of drug use on the non-elderly: 29 Few hospitals had mortality rates higher or lower than expected: 26 Lacked important outcomes (e.g., patient satisfaction): 22</p>	Not Studied	<p>A slight majority (26 vs 22) of surgeons reported that their hospitals made specific changes within a year in response to the publication of the ICES Atlas.</p> <p>Surgeons had some reservations regarding certain limitations, in particular that the actual data used in the report may be miscoded, and therefore inaccurate.</p> <p>A fairly large majority (32 of 49) supported the public release of hospital-specific AMI mortality, but a large majority (84% of 50) said the report did not change the number of cardiac patients coming to their hospitals, and 81% of 32 said that no patients spoke with them about the findings during the previous year.</p> <p>The majority of surgeons felt that the media reported on their hospital's performance</p>	Operating grant from the Canadian Institutes for Health Research and a Canada Research Chair in Health Services Research

Author, Year	10. KQ3: Results	11. KQ4: Results	12. KQ5: Results	13. KQ6: Results	14. Summary	15. Funder of Research/ Report
Tu 2003 ¹⁴² <i>con't</i>	<p>Content of media coverage of those reporting media coverage (n=31) AMI mortality rates: 81 AMI procedure rates: 10 AMI secondary prevention rates: 7 Readmission rates: 7 AMI procedure waiting times: 3 Not sure: 10</p> <p>Impact of Atlas on reputation of your hospital (n=47): No Effect: 79 Improved: 15 Harmed: 6</p> <p>Proportion of cardiac patients going to your hospital after publication (n=50): Same: 84 Increased: 4 Decreased: 0 Don't know: 12</p> <p>Proportion of patients discussing any Atlas findings within past year (n=32): 0: 81 1-10: 19 >10: 0</p> <p>Do you support the public release of hospital-specific AMI mortality data (n=49): Yes: 65 No: 35 If no, why not (n=17)? Public does not understand data: 65 Data are misleading or inaccurate: 41 Potential harm to hospitals' reputation: 29</p>					

Appendix J. Individual Providers: Quantitative Evidence

Section A

Table J1. Individual provider quantitative studies: Columns 1-10 of 20 (pages J-1 to J-4)

Author Year (QA)	Study Purpose and/ or a priori Hypothesis	Geographic Location	Study Design/ Type	Sample Population/ Procedure	Primary Comparison	Outcomes	Public Report Name and Description*	Context: Environment Characteristics	Context: Decisionmaker Characteristics	Context: Type of Decision/ Choice
Bundorf 2009 ⁴⁶ (Good)	To examine the effects of report cards on consumers' choice of fertility clinics.	USA	One Group, Pre-Post	411 Fertility Clinics performed 127,977 Assisted Reproductive Therapies resulting in 36,760 live births of 49,458 infants.	2 years Pre: 1996 to 1998 5 years Post: 1998 to 2003	Clinic 1 yr lag birth rates and 3 year lagged birth rates.	Federally Mandated Report on success rates for fertility clinics maintain by the CDC.	None	None	None
Epstein 2010 ⁴⁷ (Fair)	To examine physician referral patterns to cardiac surgeons to assess whether publication of Pennsylvania's May 2002 <i>Guide to Coronary Artery Bypass Graft Surgery</i> added information to what physicians already knew about relative performance of surgeons.	PA and FL	Multiple Groups, Pre-Post	All CABG discharges in PA and FL at hospitals operating during pre- and post-publication periods.	Control: PA vs FL Pre: 2001 to 2002 Intervention: PA vs FL Post: 2002 to 2003 PA n=23655 FL n=38164	Probability of a surgeon being chosen given their rating.	PA Cardiac Report	None	None	None

Author Year (QA)	Study Purpose and/ or a priori Hypothesis	Geographic Location	Study Design/ Type	Sample Population/ Procedure	Primary Comparison	Outcomes	Public Report Name and Description*	Context: Environment Characteristics	Context: Decisionmaker Characteristics	Context: Type of Decision/ Choice
Glance 2008 ⁴⁸ (Fair)	To determine if high-quality surgeons are less likely to perform CABG surgery on high-risk patients compared with lower-risk patients.	NY	One Group, Post Only	Patients undergoing isolated CABG surgery in NYS who were discharged between 1997 and 1999. N=51750.	Low-risk patients vs. high-risk patients.	Association between surgeon observed-to-expected mortality ratio and patient predicted mortality	NY CSRS	None	none	none

Author Year (QA)	Study Purpose and/ or a priori Hypothesis	Geographic Location	Study Design/ Type	Sample Population/ Procedure	Primary Comparison	Outcomes	Public Report Name and Description*	Context: Environment Characteristics	Context: Decisionmaker Characteristics	Context: Type of Decision/ Choice
Hannan 1994 ²¹ (Good)	<p>1) To examine changes in the risk-adjusted CABG outcomes among providers that occurred during 1989-1992 as a function of the risk-adjusted mortality in 1989.</p> <p>2) To examine changes in the volume of patients undergoing CABG as a function of the performance of providers in 1989.</p>	NY	Interrupted Time Series	30 providers (hospitals and surgeons) performing CABG surgeries in NY state	<p>Baseline: Three different groups of ten created using RAMR prior to public release compared to RAMR 3 yrs after release</p> <p>Hospitals: Group 1= lowest RAMR, Group 2 = middle RAMR, Group 3 = Highest RAMR) in initial period (1989 for hospitals; 1989 to 1990 for surgeons compared to RAMR for same tercile in 1992.</p> <p>Surgeons: Same breakdown of terciles, but groups 1 and 2 have an N of 32 each, while group 3 has an N of 31</p>	<p>Intra-group changes in RAMR: RAMR for each tercile</p> <p>Outlier status (high outliers, non-outliers, and low outliers, with low outliers having significantly lower than expected mortality rates)</p> <p>Volume of procedures: tracked using same tercile and outlier groupings.</p>	NY CSRS	None	None	None

Author Year (QA)	Study Purpose and/ or a priori Hypothesis	Geographic Location	Study Design/ Type	Sample Population/ Procedure	Primary Comparison	Outcomes	Public Report Name and Description*	Context: Environment Characteristics	Context: Decisionmaker Characteristics	Context: Type of Decision/ Choice
Jha 2006 ²⁹ (Good)	<p>1) To determine if high or low performance by surgeons or hospitals predicts performance in the period when data are most likely to be used by consumers.</p> <p>2) To determine whether hospital or surgeon performance affects patient market share.</p> <p>3) To assess whether surgeon performance is associated with likelihood of ceasing practice.</p>	NY	Time series, post only	Cardiac surgeons in NY	<p>Intervention: Public release of cardiac performance for surgeons</p> <p>For Market Share: Market share pre release vs 1 year post release</p> <p>For Surgeons Quitting: Performing surgeries prior to public release vs two years post release of public data</p>	<p>1) Performance: each hospital's or surgeon's RAMR.</p> <p>2) Market Share</p> <p>3) Discontinuation of practice: Any surgeon who did not perform a single surgery in a given calendar year assumed to have left the system. Once identifying discontinuing surgeons, attempted to contact and ask whether they are practicing elsewhere and if they ceased to practice in NY due to the Report Card.</p>	NY CSRS	None	None	None

Author Year (QA)	Study Purpose and/ or a priori Hypothesis	Geographic Location	Study Design/ Type	Sample Population/ Procedure	Primary Comparison	Outcomes	Public Report Name and Description*	Context: Environment Characteristics	Context: Decisionmaker Characteristics	Context: Type of Decision/ Choice
Mukamel 1998 ³³ (Fair)	To examine whether hospitals and surgeons with better outcomes reported in the NYS CSRS experience a relative increase in their market share and prices.	NY	One group, Time Series	Hospitals and surgeons in NY	Compare outcomes over different years (1990 vs. 1991 vs. 1992)	Market Share Price Change	NY CSRS	None	None	None

Author Year (QA)	Study Purpose and/ or a priori Hypothesis	Geographic Location	Study Design/ Type	Sample Population/ Procedure	Primary Comparison	Outcomes	Public Report Name and Description*	Context: Environment Characteristics	Context: Decisionmaker Characteristics	Context: Type of Decision/ Choice
Mukamel 2000 ⁵⁰ (Fair)	<p>To determine if surgeons' quality, as reported in the NYS CSRS plays a role in MCO contracting decisions.</p> <p>Hypotheses: MCOs choose surgeons randomly with respect to:1) A surgeon's quality as measured by the surgeon's reported RAMR 2) A surgeon's designation in the report card as a low-quality outlier 3) A surgeon's designation in the report card as a high-quality outlier 4) A high procedure volume as defined by the report card (> 200 procedures in three preceding years).</p>	NY	One Group, Post Only	All HMOs, IPAs and PPOs licensed to operate in NY State and all cardiac surgeons offering CABG surgery.	Actual distribution of contracts with surgeons vs simulated random distribution of contracts. Comparison of survey responses re: influential in contracting decisions vs actual contract decisions.	MCO rankings of considerations when contracting with cardiac surgeons Contracting patterns by surgeon quality and volume	NY CSRS	None	None	None

Author Year (QA)	Study Purpose and/ or a priori Hypothesis	Geographic Location	Study Design/ Type	Sample Population/ Procedure	Primary Comparison	Outcomes	Public Report Name and Description*	Context: Environment Characteristics	Context: Decisionmaker Characteristics	Context: Type of Decision/ Choice
Mukamel 2002 ⁴⁹ (Fair)	To investigate the role of surgeon's quality in managed care organizations (MCO) contracting choices	NY	One Group, Post Only	Cardiac surgeons in NY State Report	High vs. low quality cardiac surgeons in NY CSRS	Contracting with MCO	NY CSRS	None	None	None
Mukamel 2004 ⁵¹ (Good)	To evaluate the effectiveness of quality report cards by examining the impact of the NYS CSRS on selection of cardiac surgeons.	NY	One Group, Pre-Post	All NYS Medicare fee-for-service (FFS) enrollees (age 65 or older) who had CABG procedures during 1991 and 1992	Compare surgeons' selection in a period without report cards (1991) and a period with report cards (1992).	Odds ratios of selecting a surgeon based on conditional logit model	NY CSRS	None	None	None
Ranganathan 2009 ⁵² (Fair)	To evaluate the extent to which use of a website offering physician-level data is affected by three parameters: invitation mode, employment status and invitation message tone.	MA	Randomized Trial	Active and retired employees of GE who resided in MA and received their medical insurance through GE benefits program. N= 19,285	1. Received invitation by US Mail (n=3000) vs Email (n=2111) and retirees (n=1500). 2. All were randomly assigned to receive a gain-focused message or one of two risk-focused messages.	Odds of registration to view the physician data.	Bridges to Excellence (A web site maintained by a nonprofit organization that reports physician performance data)	None	Retired vs Active Employees	None

Author Year (QA)	Study Purpose and/ or a priori Hypothesis	Geographic Location	Study Design/ Type	Sample Population/ Procedure	Primary Comparison	Outcomes	Public Report Name and Description*	Context: Environment Characteristics	Context: Decisionmaker Characteristics	Context: Type of Decision/ Choice
Wang 2011 ⁴³ (Good)	To examine the impact of CABG report cards on a provider's aggregate volume and volume by patient severity and to investigate the matching between patients and providers	PA	One Group, Post Only	PA residents (aged 30 and above) who were undergoing an isolated CABG procedure in PA hospitals and who were admitted between Q3 1998 and Q1 of 2006. N= 114,039	Post Only: 1998 to 2006	Hospital Quarterly Volume Surgeon Quarterly Volume	PA CABG	None	None	None

Author Year (QA)	Study Purpose and/ or a priori Hypothesis	Geographic Location	Study Design/ Type	Sample Population/ Procedure	Primary Comparison	Outcomes	Public Report Name and Description*	Context: Environment Characteristics	Context: Decisionmaker Characteristics	Context: Type of Decision/ Choice
Werner ⁵³ 2005 (Good)	To examine the impact of NY's surgeon-specific CABG report card on racial and ethnic disparities in receipt of CABG surgery.	NY	Multiple Groups Pre-Post	Patients admitted to hospitals with the principal diagnosis of AMI in NY and 11 comparison states between 1988 and 1995 (N=928,551)	Pre: 1988-1991 Post: 1992-1995; Intervention: Public Reporting of CABG in NY (N=310,412); Comparison: 11 states during same period without Public Reporting that reported race and ethnicity in the Nationwide Inpatient Sample from the Healthcare Cost and Utilization Project (N=618,139)	Racial and ethnic disparities (White vs. Black and Hispanic) in whether CABG was performed during hospitalization, use of cardiac catheterization, and use of PTCA	NY CSRS	None	None	None

Section B

Table J2. Individual provider quantitative studies: columns 10-20 of 20 (pages J-5 to J-15)

Author Year (QA)	Results: KQ1: (Health Care Outcomes)	Results: KQ2: (Harms)	Results: KQ3: (Provider Outcomes-QI and other behavior)	Results: KQ4: (Selection by Patients and Payers)	Results: KQ5: (Impact of Public Report Characteristics)	Results: KQ6: (Impact of Contextual Factors)	Summary/Conclusions	Funder of Research
Bundorf 2009 ⁴⁶ (Good)	None	None	None	<p>The differential effect of birth rates post- vs pre- report cards is positive and statistically significant, indicating that measured performance had larger, positive effect on choice when the information was publicly disseminated to consumers.</p> <p>3 yr lagged birth rate x after 1997: 0.602** 3 yr lagged birth rate: -0.047 (NS) 1 yr lagged birth rate x 1997: -0.466* 1 yr lagged birth rate: 1.177***</p> <p>*** p<0.01 **p<0.05</p>	None	Coefficient on interaction variable for states with mandated fertility treatment coverage after report card is significant at the 5% level in multivariate analyses.	Authors find that public reporting of quality affects clinic choice in a statistically significant way in the market for ART.	NR
Epstein 2010 ⁴⁷ (Fair)	None	None	None	Average marginal impacts of report card mortality rating	None	None	The analysis finds that referral patterns to cardiac surgeons responded to the May 2002 report card	University of Pennsylvania Research Foundation and AHRQ

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				<p>on surgeon choice, hospital + surgeon specification</p> <p>All Admissions: Marginal Impact of being rated "worse-than-average": PA Pre vs Post: -0.2 vs. -0.7; Diff: -0.4 FL Pre vs Post: -0.4 v. -0.5; Diff: -0.1 Diff in Diff:-0.3</p> <p>Marginal Impact of being rated "better-than-average": PA Pre vs Post: 1.2 vs 1.4; Diff: 0.2 FL Pre vs Post: 1.1 vs 1.3; Diff: 0.2 Diff in Diff:0.0</p> <p>Average Probability of selection (# of patients): PA Pre vs Post: 2.7 (17,241) vs 2.7 (6,414) FL Pre vs Post: 3.3 (27,844) vs 3.3 (10,320)</p>			<p>publication in PA in the directions consistent with a causal effect but the same trend occurred in FL.</p>	
Glance 2008 ⁴⁸ (Fair)	None	None	None	Association between Surgeon Observed-to-	None	None	High-risk patients are more likely to be treated by high-quality surgeons. High-quality	AHRQ

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				<p>Expected (O-to-E) Mortality Ratio and Patient Predicted Mortality:</p> <p>Patient predicted probability of death: Base Model: Coef: -0.338, p<.001; Added race and ethnicity: -0.342, p<.001; Added hospital indicators: -0.097, p=.006</p> <p>For every 10% increase in patient risk of death, there is an associated absolute reduction of 0.034 in the surgeon O-to-E ratio. After controlling for hospital fixed effects, the absolute reduction in surgeon O-to-E ratio drops to 0.01 for a 10%increase in patient risk of mortality.</p>			surgeons are not avoiding high-risk patients.	

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Hannan 1994 ²¹ (Good)	<p>For Individual Surgeons:</p> <p>Actual, Expected, and Risk-Adjusted Mortality in 1989-1992: Based on Surgeons' 1989-1990 RAMR Terciles: [Actual; Expected; Risk-Adjusted (95% CI)]</p> <p>1989-1990: Lowest Tercile (n=32): 1.95; 3.01; 2.01 (1.72-2.33) Middle Tercile (n=32): 3.20; 2.84; 3.50 (3.10-3.93) Highest Tercile (n=31): 4.81; 2.53; 5.90 (5.22-6.63) 1992: Lowest Tercile: 2.07; 3.52; 1.82 (1.49-2.21) Middle Tercile: 2.96; 3.89; 2.36 (1.99-2.79) Highest Tercile: 3.49; 3.26; 3.26 (2.68-3.92) ----- Actual, Expected, and Risk-Adjusted Mortality in 1989-1992: Based on Surgeons' 1989-1990 RAMR Outlier Status: [Actual; Expected; Risk-Adjusted (95% CI)]</p> <p>1989-1990: Low Outliers (n=6): .77; 3.23; .74 (.41-1.25)</p>	None	None	No impact of public reporting on volume for surgeons (data not reported)	None	None	<p>For surgeons, all tercile groups experienced reductions in their RAMR, with the highest RAMR in 1989 being reduced from 5.90 to 3.26 in 1992. Among outliers in the surgeon category, only those who were the lowest outliers in 1989 (with an RAMR of .74) experienced a RAMR rise in 1992 (1.09). The largest reduction in RAMR was among the high outlying surgeons with 7.06% decrease between 1989-1990 and 1992.</p>	Agency for Health Care Policy and Research of the US Department of Health and Human Services

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	<p>Non Outliers (n=84): 3.21; 2.81; 3.55 (3.29-3.83) High Outliers (n=5): 8.72; 2.29; 22.83 (8.49-16.05) 1992: Low Outliers (n=6): 1.31; 3.74; 1.09 (.52-2.00) Non Outliers (n=84): 2.77; 3.61; 2.38 (2.13-2.65) High Outliers (n=5): 4.88; 3.17; 4.77 (2.83-7.55)</p>							
Jha 2006 ²⁹ (Good)	<p>Top performing hospitals and surgeons at baseline continue to perform better in subsequent years.</p> <p>Hospital RAMR at 1996, 2002 and (all years summary): Top decile: 1.82, 1.55 (1.59); Top quartile: 1.95, 2.03 (1.96) Bottom quartile: 2.67, 2.13 (2.50); Bottom decile: 2.89, 2.20 (2.78)</p> <p>Pearson correlation coefficients 0.10 for 1993 with 1996 reports, p=.60; 0.12 for 1994 with 1997 reports, p=.53; 0.37 for 1995 with 1998 reports, p=.04; 0.38 for 1996 with 1999 reports, p=.04; 0.30 for 1997</p>	<p>2 surgeons (low-mortality) responding to survey stated they left b/c of pressure to reject high-risk patients and documentation made practicing surgery less enjoyable.</p>	<p>Surgeons Discontinuing Practice:</p> <p>Surgeons with poor performance were more likely than others to discontinue surgery in NY.</p> <p>Decreases in numbers, especially in bottom quartile, but not statistically significant except in an All Years Summary statistic:</p> <p>Top quartile surgeons at</p>	<p>Surgeon Market Share: no evidence that report cards affected subsequent market share</p> <p>Impact of Performance Reporting on Surgeons' Subsequent Market Share: All Years (1992, 1995, 1996, 1997, 1999 report releases): [Pre report Market share %; Post report Market share %; %-point change]</p> <p>Top 10 Percent Surgeons: 9.0;</p>	None	None	<p>Baseline performance is associated with future performance (i.e. top performing hospitals at baseline continue to be top performing hospitals in subsequent years). There were no trends regarding report cards and market shares at either the hospital or individual surgeon levels. Lower performing surgeons were more likely to quit practicing in NY than top performing, although some of this may not be associated with the release of performance data.</p>	NR

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	<p>with 2000 reports, $p=.10$; and 0.36 for the 1998 and 2002 reports, $p=.04$</p> <p>Surgeon RAMR at 1993-1995, 1999-2001, (and All years summary): Top Decile, 1.71, 1.60 (1.58); Top quartile, 1.94, 1.65 (1.64); Bottom quartile, 2.93, 2.92 (2.93); Bottom Decile, 3.80, 3.20 (3.20)</p> <p>Pearson correlation coefficients for the five sets of reports: .34 for reports from 1989–91 with 1994–96, $p=.005$; 0.42 for reports from 1991–93 with 1996–98, $p<.001$; 0.61 for reports from 1992–94 with those from 1997–99, $p<.001$; $r=.42$ for the reports from 1993–95 with those from 1998–2000, $p=.0001$; and $r=.14$ for the reports from 1994–96 with those from 1999–2001, $p=.17$</p>		<p>baseline: 5.1% (n=128) left; 2nd quartile at baseline: 6.7% (n=128) left; 3rd quartile: 8.0% (n=127) left; Bottom quartile: 21.3% left (n=127); OR (95% CI), p value: 3.5 (1.35,9.01), $p=.01$</p> <p>31 surgeons identified between 1989 and 1999 that ceased to perform surgery in NY: no info on 4 and 2 died. Of remaining 25: 9 practicing outside NY, 9 retired, 7 working in nonclinical positions</p> <p>Survey responses from 18 of 25: 10 said report card had no impact, 2 said it had a minimal impact, and 6 said moderate to substantial impact.</p>	<p>8.6; -.4 Top Quartile Surgeons: 25.0; 23.2; -1.8 Bottom Quartile Surgeons: 24.5; 23.8; -.7 Bottom 10 Percent Surgeons: 8.6; 8.8; .2 Parameter estimate (P-value) for all years: -.11%(.13)</p>				

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Mukamel 1998 ³³ (Fair)	None	Published RAMR changed prices charged by surgeons by (Regression coefficient) NY City: -0.01 Upstate: -1.3 -Albany County: -0.1 -Erie County: - 1.7	Individual surgeons -Increase in RAMR of 1 percentage point =decrease in growth rate of 7 percentage points -Median surgeon with 60 surgeries=loss of 4.2 patients due to a 1 percentage point increase in RAMR -Limiting analysis to physicians with >10 cases in 1991: increase in RAMR of 1 percentage point= mortality rates increased from 7 for the entire sample to 10 percentage points ---- By region Published RAMR changed growth by New York City: -6.3 percentage points Upstate: -8.8 percentage points -Albany	None	None	None	Surgeons' increasing RAMR corresponds with a loss in market share. Among higher volume surgeons. There was no significant effect of published RAMR on price changes.	NR

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			County: +8.0 percentage points -Erie County: -8.2 percentage points -Monroe County: -14.5 percentage point					
Mukamel 2000 ⁵⁰ (Fair)	None	None	None	<p><u>Survey responses:</u> Role in Contracting: Quality is the most (second most) important consideration: 60% (33%) Other Factors: Price is the most important consideration: 13% Geographic location: 13%</p> <p>Role of NYS CSRS: MCO has examined the reports: 64% MCO is willing to pay \$1,000 to obtain the reports: 43% For MCOs who examined the reports : * Report was a sole source: 0% * Report was a</p>	None	None	Author's conclusion: MCOs tend to prefer high-volume surgeons and surgeons designates as high-quality outliers. They do not, however, seem to make choices based on poor-quality outlier designation of actual RAMR. For the majority (over 80%) they did not find a systematic bias for either higher than or lower than average quality surgeons.	AHRQ

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				<p>major source: 32% (20% of all MCOs) * Report was a minor source: 58% (37% of all MCOs) * Report information had no effect on quality evaluation: 10%(6% of all MCOs)</p> <p><u>Actual contracting patterns:</u></p> <p>More MCOs contract with high-volume and high-quality outlier surgeons than predicted by chance</p> <p>No significant contracting preferences based on mean RAMR or low-quality outlier status</p>				
Mukamel 2002 ⁴⁹ (Fair)	None	None	High-quality vs. low-quality vs. low-volume surgeon vs. non-outlier: contract with MCO Upstate NY:	None	None	None	Low volume status decreases the probability of contracts. High quality status increases likelihood of contract, but is only significant in downstate NY. A standard	AHRQ

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			<p>85.3% vs. 78.9% vs. 67.7% vs. 46.8%</p> <p>Downstate NY: 88.9% vs. 76.56% vs. 53.3% vs. 37.7%</p> <p>Probability of MCO/Surgeon Contract (unadjusted vs. selectivity adjusted vs. Unadjusted; subsample of MCOs with Selectivity <80%)</p> <p>Excess RAMR: -0.43 vs. -1.10 vs. -0.45 (p<0.01)</p> <p>High-quality outlier: 1.63 vs. 3.20 vs. 1.81 (p<0.01)</p> <p>Low-quality outlier: -0.37 vs. -0.86 vs. -0.43 (NS)</p> <p>Low volume: -0.75 vs. -1.38 vs. -0.76 (p<0.01)</p> <p>Upstate excess RAMR: -0.13 vs. -0.37 vs. -0.19 (NS)</p> <p>Upstate high-quality outlier:</p>				<p>deviation increase in RAMR leads to a decrease in probability of a contract, but only in downstate NY.</p>	

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			<p>-1.43 vs. -3.91 vs. -1.83 (p<0.01) Upstate low-quality outlier: 0.32 vs. 2.22 vs. 0.66 Upstate low volume: -0.56 vs. -2.31 vs. -0.51 (p<0.05) For-profit excess RAMR: 0.01 vs. 0.15 vs. 0.03 (NS) PPO excess RAMR: -0.03 vs. -0.10 vs. -0.03 (NS)</p> <p>Staff model HMO excess RAMR: 0.02 vs. 0.24 vs. 0.01 (NS) Other MCO excess RAMR: -0.01 vs. 0.03 vs. -0.00 (NS) Surgeon's HHI excess RAMR: 4.48 vs. 9.16 vs. 4.62 (p<0.01)</p> <p>Number of observations: 1588 vs. 1588 vs. 1458 (NS)</p>					
Mukamel 2004 ⁵¹ (Good)	None	None	None	The inferred RAMR is significantly	None	None	The study offers evidence to indicate that report cards do have an	AHRQ, Commonwealth Fund, NIA, and

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				<p>associated with probability of selection in both periods - a higher RAMR (i.e. lower quality) lowers the surgeon's odds of being selected by about 7% to 8%. There was no significant change between two periods, indicating that the role of inferred quality has not changed with publication of the report cards.</p> <p>Inferred RAMR: 0.026 (NS) Inferred RAMR x Year 2: 0.164 (NS)</p> <p>The effect of other observable characteristics (price, years of experience) declines as public report comes out.</p>			impact on surgeon selection.	the National Center for Minority Health and Health Disparities
Ranganathan 2009 ⁵² (Fair)	None	None	None	None	Odds of Registration Rate: Email vs Mailed	Active vs Retired 0.37 (0.26, 0.52) p<0.001	The invitation mode affected subsequent registration with significantly higher rates	Robert Wood Johnson Foundation

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					<p>Information: 6.42 (4.82,8.54) $p < 0.001$ Moderate risk-focused vs Gain focused 0.97 (0.76, 1.25) $p = 0.818$ High risk-focused vs Gain focused 0.84 (0.65, 1.09) $p = 0.197$</p>		<p>among those who received email vs mailed invitations. Employment status affected subsequent registration with retired employees significantly more likely to register than active. The tone of the message was not significantly associated with registration rates.</p>	
Wang 2011 ⁴³ (Good)	None	None	None	<p>Surgeon Quarterly Volume (n=6586 patients) With Non-Rated Surgeons: Mean volume: All CABG cases: 21.9 Low-severity CABG cases: 13 High-Severity CABG cases: 8.7</p> <p>Change in Subsequent Surgeon Volume Based on High or Low Mortality in Reports: High Mortality Flag: All CABG cases: 4.762*** Low-severity CABG cases: 3.147***</p>	None	None	<p>Public reporting led to decrease in volume for unrated and poor performing surgeons, but the volume of high performing surgeons does not increase by an offsetting amount. There is not a statistically significant effect on hospital volume when controlling for unobserved heterogeneity. Severity analysis results in similar results.</p>	Martindale Center at Lehigh University

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				<p>High-Severity CABG cases:1.527**</p> <p>Low Mortality Flag: All CABG cases: 4.634 Low-severity CABG cases: 4.076** High-Severity CABG cases: 0.921</p> <p>Without Non-Rated Surgeons: Mean volume: All CABG cases: 25.1 Low-severity CABG cases: 14.8 High-Severity CABG cases: 10.1</p> <p>High Mortality Flag: All CABG cases:7.911*** Low-severity CABG cases: 4.946*** High-Severity CABG cases: 2.872**</p> <p>Low Mortality Flag: All CABG cases:</p>				

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				3.288 Low-severity CABG cases: 2.835** High-Severity CABG cases: 0.578				
Werner 2005 ⁵³ (Good)	None	1)Changes in % of Patients with AMI Undergoing CABG Surgery in NY and Comparison States Before and After NY's Public Release of CABG Report Card: [Before Public Report (95% CI); After Public report(95% CI); Change in Percentage (95% CI)] Disparity in CABG use between White and Black patients - NY: 2.7* (1.8-3.6); 5.0*** (3.8-6.2); 2.3*** (1.4-3.2) Comparison States: 3.4*** (2.6-4.3); 3.7*** (2.8-4.5); .2 (-.8-	None	None	None	None	The disparity in CABG surgery between White, Black, and Hispanic patients is greater in NY than in other states and suggests that public reporting contributes to growing racial disparities in care.	Leonard Davis Institute of Health Economics at the University of Pennsylvania, and National Research Service Awards from AHRQ

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		<p>1.3) Difference in Disparities between NY and Comparison States: -.7 (- 1.9-.4); 1.3 (- .2-2.9); 2.0** (.7-3.4)</p> <p>Disparity in CABG use between White and Hispanic patients - NY:0.7 (-.9- 2.2); 3.2*** (1.6-4.7); 2.5**(.7-4.3) Comparison States: 2.1*** (.9-3.3); 1.2 (- .4-2.8); -.9 (- 2.8-1.0) Difference in Disparities between NY and Comparison States: -1.4 (- 3.2-.4); 2.0 (- .4-4.4); 3.4** (.8-5.9)</p>						
Werner 2005 ⁵³ (Good) Cont.		2) Changes in % of Patients with AMI Undergoing Cardiac Catheterization and PTCA in NY and						

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		<p>Comparison States Before and After NY's Public Release of CABG Report Card: (White vs. Black and Hispanic) [Before Public Report (95% CI); After Public report(95% CI); Change in Percentage (95% CI)]</p> <p>Cardiac Catheterization for AMI Racial and Ethnic Disparity - NY: 5.3*** (2.6-7.9); 3.8** (1.1-6.5); -1.4 (-3.0-.2)</p> <p>Comparison States: 5.0***(2.1-8.0); 4.0** (1.5-6.5); -1(-5.0-2.9)</p> <p>Difference in Disparities between NY and Comparison States: .2(-4.1-4.6); -.2(-4.7-4.3); -.4 (-4.6-3.7)</p>						

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		PTCA for AMI Racial and Ethnic Disparity - NY: 3.0*** (1.5-4.6); 4.1*** (2.5-5.7); 1.1* (.1-2.0) Comparison States: 4.2*** (2.4-6.0); 4.1*** (2.2-6.0); -1 (-3.0-2.8) Difference in Disparities between NY and Comparison States: -1.1 (-3.2-1.0); 0.0 (-3.0-3.0); 1.1 (-1.8-4.1) *p<=.05, **p<=.01, ***p<=.001						

Appendix K. Individual Providers: Qualitative Evidence

Table K1. Individual provider qualitative studies: columns 1-9 of 9 (pages K1 to K14)

Author Year	1. Study Purpose and/or a priori Hypothesis	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population: Who or what is studied?	5. Outcomes	6. Name of Report or Subject Matter	7. Results	8. Summary	9. Funder of Research
Abraham 2011 ¹⁴³	To investigate the set of factors that consumers consider when selecting a provider	Minneapolis MN	Descriptive Survey	467 out of 699 (66.8%) patients during one week in April 2010 at 4 University of Minnesota clinics	Factors influencing patients' decisions in provider selection. Awareness and use of internet sources of information	Any available in MN	<p>Factors influencing patients' provider selection</p> <p>90.93% reputation of the organization</p> <p>90.09% reputation of physician</p> <p>83.26% MD in insurer's provider network</p> <p>72.20% appointment availability</p> <p>69.00% referral from MD</p> <p>65.01% recommendation from family or friends</p> <p>44.29% cost</p> <p>41.50% distance to clinic</p> <p>24.20% websites that report clinical quality data</p> <p>8.97% advertisements</p> <p>Awareness of internet sources</p> <p>36% reporting hearing of at least one source but the majority of these are Angie's List</p> <p>13% when Angie's List is excluded</p> <p>only 2% (9 respondents) indicated non Angie's list was important in selection</p>	<p>Only 13% of people reported awareness of specific websites once a general site, Angie's List was not included. Only 2% report the website was important in selection of a provider.</p> <p>Overall few consumers are aware of or use websites with quality information.</p> <p>Primary factor in decisions are reputation and trusted referral from another MD or family and friends.</p>	NR

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Barr 2008 ¹⁴⁴	To explore physicians' willingness to talk with patients about hospital quality and data reports as well as their views of such reports	Seven States/Regions	Interviews	56 physicians in seven geographic locations Round 1: North Carolina, Connecticut, and New York Round 2: Rhode Island, Wisconsin, Western New York, and Los Angeles, California	Physician views about communication with patients about Public reports	Hospital Compare	Physicians' responses to the patients in the scenarios can be categorized into four major themes: (a) rely on existing physician-patient relationships, (b) acknowledge and consider patient perspectives, (c) take actions to follow up on patient concerns, and (d) provide their perspectives on quality reports. Physicians in both rounds of interviews expressed their views about hospital quality reports. Three themes were identified from these responses: (a) perceived lack of methodological rigor in public reports, (b) content considerations for public reports, and (c) attitudes/experience regarding hospital quality reports, both internal and public.	The study findings suggest that physicians will be responsive to patients' inquiries about hospital quality and will discuss hospital public reports.	Centers for Medicare & Medicaid Services (CMS) to RTI International

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Burack 1999 ¹⁴⁵	To examine the effect of public reporting on the practice of cardiac surgery as perceived by surgeons	NY	Descriptive Survey	All active cardiac surgeons in NY in April 1997. n= 104 responded; 69.3% of 150	Opinion regarding the exposure to public reporting, change in overall practice, and areas needing improvement within the CSRS. Finally, based "primarily" on the CSRS, several questions examined the denial of treatment to high-risk cases.	NYS CSRS	<p>Most surgeons (67%) refused treatment to at least one high-risk CABG patient over the previous year (Fig 1). In New York State, high-risk patients with an ascending aortic dissection were more likely to go to the operating room than high-risk patients with coronary artery disease (p< 0.001).</p> <p>Some surgeons (30%) perceived a significant alteration in their own professional practice, and more (37%) felt that their peers had changed. Significant change was commonly specified as change in patient profile, change to a non-cardiac thoracic practice, relocation to another state, or retirement from cardiac operation. On a daily or weekly basis, surgeons were twice as likely to discuss data with a colleague (44%), than with a patient (29%). Only a small number of surgeons (9%) frequently used the CSRS software to calculate operative mortality before operation, and most (53%) never used the predictive model at any time.</p>	Harms Confirmed	NR

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Casalino 2007 ¹⁴⁶	To learn more about physicians' views about public reporting and financial incentives	USA	Descriptive Survey	General internists listed in AMA Physician Master file as working in one of 12 metro areas included in the Community Tracking Study of the Center for Studying Health System Change. N=556, adjusted response rate of 48%	Opinions regarding public reporting	General	<p>General Internists' Views on Public Reporting and Various Quality Measures [% strongly agree; % somewhat agree; % somewhat disagree; % strongly disagree (95% CIs)]:</p> <p>1) If accurate, measures of the quality of individual physicians' performance should be made public: 5(3-7); 27(23-31); 33(28-36); 35(31-39)</p> <p>2) If accurate, measures of the quality of individual medical groups' performance should be made public: 8(6-10); 37(33-41); 26(22-30); 29(25-3)</p> <p>3) At present, measures are not adequately adjusted for patients' medical conditions: 36(31-40); 52(48-56); 9(7-12); 3(2-5)</p> <p>4) At present, measures are not adequately adjusted for patients' socioeconomic status: 38(34-42); 47(43-52); 12(9-15); 3(1-4)</p> <p>5) Measuring quality will divert physicians' attention from important types of care for which quality is not measured: 22(18-25); 39(34-43); 29(25-33); 11(8-13)</p> <p>6) Measuring quality may lead physicians to avoid high-risk patients: 40(36-44); 42(38-46); 14(11-17); 4(2-5)</p>	Overall, general internists were against the public release of performance data, although they were more in favor of releasing individual medical group data than individual physician data (45% vs 32% in favor). A strong majority felt that measures were lacking in adequate adjustment for patient medical conditions and socioeconomic status. 61% felt that focusing on quality measures would divert attention from other important types of care that are not measured and 82% believed that measurement may lead physicians to avoid high-risk patients.	Chicago Center of Excellence in Health Promotion Economics, CDC

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Chen 2010 ¹⁴⁷	To investigate the Diabetes Mellitus (DM) providers' preferences towards four report card attributes: update frequency, risk adjustment, content information and display format.	Northern Taiwan	Descriptive Survey	236 Doctors, hospitals or clinics who treated more than 50 diabetic patients in the first half of 2007. Response rate: 236/814, 29%	Doctors' preferences for the attributes of the report card, rankings of attributes	General	The most preferred attribute mix is a one-year update frequency, risk adjustment, detailed scores of technical quality and interpersonal quality and a bar chart with evaluative cues. Risk adjustment for patient characteristics were the most important attribute (44.7%), followed by content information (25.2%), display format (18.3%), Update frequency (11.8%)	Author's summary: Among four attributes, they found that doctors' preferences are centered upon risk adjustment for patient characteristics, more detailed disclosure of quality information, a bar chart display and longer update frequency.	Ministry of Education
Cheng 2004 ¹⁴⁸	To understand the experience of consumers searching for physician performance information and to investigate the potential impact on their propensity to change doctors if hypothetically provided with physician specific performance information	Taiwan	Descriptive Survey	4015 adults aged over 20 years contacted by random digit dialing telephone calls.	If they have ever compared the quality of care provided by physicians in their area; if they would consult a performance report if it was available; if they would change doctors on the basis of information provided in the report.	NR	1. The overall proportion of subjects who had made comparisons between doctors on the basis of their quality of care was 49.6% (n=1844). 2. About 73% (n=2796) of the subjects interviewed stated that they would consult reports of doctors' training, specialist qualifications, and their attitude towards patients if they were available 3. A total of 2888 respondents (76.7%) said that they would change to another doctor if the doctors they usually consulted performed badly according to the reference data.	Authors conclude that providing physician performance information has a significant potential impact on consumers' choice of healthcare providers.	National Science Council, National Health Research Institutes
Donelan 2011 ¹⁴⁹	To better understand how the public	Massachusetts	Survey and Hypothetical Selection	Massachusetts residents were	Opinions about public reporting and	Hypothetical reports based on	Responses to importance of cardiac surgeon mortality data, by %:	Overall, respondents felt that mortality	NR

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	interprets publicly reported data for surgeons		Respondents were provided with four types of report formats that used text, charts, graphical indicators or quality and that included different information (RAMR alone, RAMR compared to the state average, 7 and 30 day mortality, readmissions and length of stay)	surveyed using an online questionnaire . Half were recruited by mail and half by Internet. Quotas were used meaning no response rate is available. N=337	presentation formats Hypothetical selection based on different formats	existing public reports showing cardiac surgeon mortality rates	<p>Absolutely Essential: 40%; Very Important: 42%; Somewhat Important: 15%; Not very Important: 3%</p> <p>96% stated that the public should definitely have or should probably have access to cardiac surgeon mortality data</p> <p>% Choosing Surgeon with Lowest RAMR Chart A: 16% (plurality chose surgeon with highest RAMR); Chart B: 53%; Chart C: 66% (Greatest # of respondents chose the surgeon with lowest RAMR for this chart); Chart D: 22%</p> <p>6.4% of respondents chose the surgeon with the lowest RAMR in all charts while 16.8% chose lowest RAMR surgeon in 3 of 4 displays.</p> <p>Which Chart is Most Useful for Selecting a Surgeon, by %: Chart A: 37%; Chart B: 19%; Chart C: 23%; Chart D: 21%</p> <p>Respondents consistently choosing surgeons with lowest RAMR were more likely to be male, college-educated and use the Internet to find health and medical information. Aspects not influential were prior experience with heart surgery, race/ethnicity, and heart disease or other chronic illnesses or disabilities.</p>	data on cardiac surgeons should be public and that this information is important in selecting a surgeon. As for selection, more respondents chose the surgeon with the lowest RAMR in formats that included charts or graphical indicators of the level of quality rather than text only. When asked to evaluate the format, however, the text only format was endorsed as most useful despite only 16% choosing the surgeon with the lowest RAMR based on this version.	
Fanjiang 2007 ¹⁵⁰	To evaluate the usefulness	California	Descriptive Survey	All patients newly joining	The odds of choosing a high	Web page with	51% of respondents cited the patient experience scores as the	Authors' conclusions:	Robert Wood Johnson

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	of web-based physician-level data for patients choosing a new primary care physician (PCP)			the practice and a random sample of existing patients n=382 visited site (17% of those sent invitation); 301 completed questionnaire	performing physician given a particular performance priority over that of choosing such a physician by chance after viewing a web site with physician information including patient experience scores.	physician information and patient experience ratings	<p>most important to their physician choice and this was significantly higher ($p < .001$) than other information such as office hours and location (39%), credentials (38%), advice from friends (24%). Interpersonal quality (37%) and other patients' willingness to recommend were the most frequently cited as specific measures key to choice.</p> <p>Odds of Choosing a Physician with High Performance on a Given Patient Experience Measure</p> <p>Patient experience measure cited as most important:</p> <ol style="list-style-type: none"> 1. Willingness to recommend physicians : 9.7 (3.3, 28.5) 2. Interpersonal quality: 9.5 (3.4, 26.6) 3. Appointment Access: 14.1 (1.6, 114.7) 4. Coordination of Care : 4.88 (0.9, 28.4) 	<ol style="list-style-type: none"> 1. With minimal outreach, one-sixth of patients seeking a new PCP and one quarter of those newly joining a practice used web-based physician-level information 2. Of the types of information presented, survey-based measures of physician performance were most frequently cited as important, and among survey-based measures, patients particularly valued measures of physician interpersonal quality and other patients' recommendations of the physician. 3. Patients using Web-based 	Foundation, Pacific Business Group on Health, AHRQ

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								quality information made choices that were well-aligned with their stated priorities.	
Friedberg 2010 ¹⁵¹	To examine whether and how physician groups are using patient experience data to improve given the public reports include these outcomes	Massachusetts	Interviews	72 out of 117 (62.5%) eligible leaders of Physician Groups in MA in 2007 having at least 3 physicians and providing primary care to adults.	Open-ended questions about improvement activities, probes about specific types of activities, improvement targets for the activity, level of engagement based on activities	MA Physician Group Report on Patient Experience	<p>Level of engagement</p> <p>1: 17% (not aware of reports and did not use)</p> <p>2: 22% (take one or more actions but focus on low performers)</p> <p>3: 61% (group-wide improvement activities)</p> <p>Level 3 group were more likely to be Integrated medical groups (p<.005); employ the majority of their physicians (p<.05); be network affiliated (p<.05)</p> <p>The most common targets of actions about level 3 were: 57% access; 48% communication with patients; 45% customer service</p> <p>The most common interventions were changes in check-in (70%), classes for admin. asst. 57%, EHR-based activities 50%, and reassign activities 45%.</p>	Majority of MN MD groups are working to improve patient experience (61%), though some report no efforts (17%). Improvements are targeting work flow and non clinician activities as opposed to physician performance or patient self-management education.	Commonwealth Fund

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Fung 2005 ¹⁵²	To assess patients' use of and preferences for information about technical and interpersonal quality when using simulated, computerized health care report cards to select a primary care provider (PCP)	Los Angeles County, CA	Lab-type experiment	304 participants who were 18 years of age or older, lived in Los Angeles County, and had a regular or primary care physician	Participant choice when presented with a choice of two physicians who differed in technical quality and interpersonal ratings	Hypothetical Report on General Practice	Principal Finding: participants use both technical and interpersonal quality ratings to select a physician from the choices offered 66% chose the physician who excelled in technical care 3 or more times out of 5 (95% CI: 62-72 %) 33% chose the physician who excelled in interpersonal care 3 or more times out of 5 (95% CI: 28-38 %) From follow up questionnaire: the median trust in expert review of medical records is significantly higher than for patient reports (p<0.001), with the differences being most apparent at the highest levels of support (35 percent of participants trusting medical records "a lot," as compared with 19 percent trusting patient reports "a lot") Mean values for the responses to the questions in the paper questionnaire that assessed attitudes towards different dimensions of technical and interpersonal quality indicate that dimensions of both technical and interpersonal quality are important to subjects. For example, participants rated communication as at least as important as preventative care.	Participants use both technical and interpersonal quality ratings when selecting a PCP and that a majority clearly favors technical quality of care, but not to the exclusion of interpersonal quality.	California Health Care Foundation
Hannan 1997 ¹¹³	To determine the reaction of New York	New York	Descriptive Survey	Surveys regarding cardiologists'	All self-reported: Discussing	NYS CSRS	Responses to Questionnaire: Do you routinely discuss the	Primary results regarding how cardiologists	AHRQ

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	cardiologists to the New York CABG surgery reports			opinions and use of the June 1995 NY CABG report were mailed to all (1267) NY cardiologists listed in the State Educations Department's Physician master File as specializing in cardiology. 36% response rate (n=450).	information with patients: Yes or No The following use "Very much," "Somewhat," and "Not at all" scales: Accuracy of report Attitudes towards format of report Impact of report on referrals Usefulness in making referral decisions for patients needing CABG surgery: 5-point Likert scale: Not at all Useful (1-2); Somewhat useful (3); Extremely useful (4-5)		information in the cardiac report with your patients: Yes (89) 22%; No 310 (78%) For the following: Very much (%); Somewhat (%); Not at all(%) Do you feel the information is accurate: 27(7%); 235(60%); 130(33%) How much do you feel that the report: Is too technical: 11(3%); 84(23%); 272(74%) Has too many graphs: 8(2%); 86(23%); 274(75%) Has too many charts: 8(2%); 88(24%); 270(74%) Is misleading in interpretation of records of physician and hospital: 139(37%); 175(46%); 63(17%) how often has the information affected your choice when referring your patients to cardiac surgeons: 25(6%); 129(32%); 248(62%) For the following: Not at all useful; Somewhat useful; Extremely useful; Average (scale of 1-5) How useful do you consider this information in making referral decisions for patients needing CABG surgery: 215(53%); 127(31%); 65(16%); 2.40	feel about the NY Cardiac Report show that a large majority (93%) have at least some reservations about the accuracy of the data in the report. As far as formatting, they appear to be comfortable with the report, but a large portion (83%) are at least somewhat hesitant about the reports being misleading. Moreover, only 22% discuss the information with their patients, and most (62%) claim that the information has not affected their choices when referring patients at all. Finally, more than half say they do not consider the information useful at all	

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								<p>when making referral decisions for patients needing CABG surgery, and only 16% claim it to be extremely useful.</p> <p>In sum, the cardiologists do not use the information very frequently and feel that the data may be inaccurate and the interpretation misleading.</p>	

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Longo 2003 ¹¹⁹	To evaluate how patients view healthcare consumer reports, whether healthcare consumer reports lead to changes in patient behavior, and which aspects of reports are the most important/helpful to patients.	Colombia, Missouri	Descriptive Survey	Outpatients at UMHC clinics; N=925	All self-reported on survey: Patient views on: Perceptions of report: single question Potential use of report Most helpful/important aspects of report	University of Missouri Health Sciences Center Consumer Report	<p>Overall Perspectives on Consumer Reports: An effective means of comparing different hospitals and/or healthcare providers: 59.9% Useful resource to have for healthcare decisionmaking: 55.2% "Nice-to-know" info, but does not make a difference in actions: 34.1% Hospital advertising or public relations: 30.2% A waste of time: 8.4%</p> <p>Based on Information in report, how likely to: [by %, Very likely; Somewhat likely; Not too likely; Not likely at all; Don't know] May change doctors or hospitals: 4.1; 8.1; 30.4; 47.4; 10.1 May use info to make decision re: medical procedure at our medical center: 21.9; 31.9; 18.1; 14.7; 13.4 Keep this report for future reference: 24.6; 22.2; 19.6; 21.3; 12.3</p> <p>Highest ranking most important and/or helpful sections of report by presence of chronic Disease in Respondent and/or Family Member: [Disease Present: Section most helpful; % Respondents with disease] Strokes: Heart Disease; 74.6 and Strokes; 64.4 Diabetes: Diabetes; 74.4 Breast Cancer: Breast Cancer; 68.9 Other Cancer: Heart Disease; 54.7 and Other Cancer: 49.3 No Chronic Disease: Comparisons to National Average; 50.4 Heart Disease: Heart Disease; 79.8 Alzheimer's: Heart Disease; 53.6</p>	Overall, large percentages of respondents said they believed the reports were effective in comparing different hospitals and health care providers. Just over a third said that it didn't really make a difference to them, and 8.4% said it was really just a waste of time. Almost half said that they were not at all likely to change doctors or hospitals due to the reports, but slightly over half said they were at least somewhat likely to use the information to decide whether or not to have certain medical procedures there. Respondents were more likely to say that the most interesting and/or helpful part of the report were sections pertaining to chronic	Missouri Department of Health, Department of Family and Community Medicine, University of Missouri-Columbia School of Medicine

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Marshall 2002 ¹⁵³	To examine the attitudes of service users, general practitioners, and clinical governance leads based in primary care trusts about the public dissemination of comparative reports on quality of care in general practice	Urban NW England	Focus Groups	12 focus groups including four with 35 service users (patients), four with 24 general practitioners, and four with 18 clinical administrators	Format and Content of Public Report	Hypothetical Report on General Practice	<p>Four major themes:</p> <p>1) A difference between the initial reaction and the considered response to the report cards: Initial reaction was strongly negative but this changed over the course of the discussion,</p> <p>2) The usefulness of the data to the key stakeholders: Most would not use as they either felt choice was inappropriate in this area (anti-consumerism) or valued other things (location)</p> <p>3) Immediate concerns about the principle and practice of report cards: perceived as politically motivated and people were concerned about the data quality and impact.</p> <p>4) The wider implications of disseminating comparative information: Concern that 'good' practices would be swamped</p>	Despite support for the principle of greater openness, the planned publication of information about quality of care in general practice is likely to face considerable opposition, not only from professional groups but also from the public. A greater understanding of the practical implications of public reporting is required before the potential benefits can be realized.	UK Department of Health, National Primary Care Research and Development Centre, University of Manchester

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Marshall 2006 ¹⁵⁴	To explore the informational needs of patient in primary care and develop an information source about general practice services	England	Focus Groups Interviews and Observations	103 members of the public, staff from 19 general practices and 4 NHS managers and the research team.	Format and Content of Public Report	Hypothetical Report on General Practice	Five themes: 1) Importance of designing for public: Practice staff and public wanted different information 2) Influence of performance reporting: Was a supplement to personal experience and so new guide highlighted patient experience and included qualitative descriptions of the practice. 3) Attitudes: Participants disliked League Tables and were not confident in the information and worried about the competition it might inspire. 4) Knowing the source: Patients were concerned about vested interests of the report producers 5) Content expectations: People wanted general information about the system, information about providers (gender, training), and what services are available. They were more interested in their commitment to improve then in their actual scores.	Finding suggest that making information available to the general public requires a different approach in terms of content and format	BUPA Foundation, National Primary Care Research and Development Centre, University of Manchester, Department of Health
Maytham 2011 ¹⁵⁵	To assess the views and attitudes of cardiac surgeons to the publication of individual performance reports following 2004 and 2009 releases and to determine whether these views had	United Kingdom	Descriptive Survey	Eligible UK cardiothoracic consultants in a database. 2005 N=109 of 206(52.9% response rate) 2009 N=134 of 266 (50.4% response rate)	Opinions regarding cardiac surgeon public reports; Change of opinion over time	Report not named - Publishes individual performance indicators for consultant cardiac surgeons in Great Britain and Ireland	<u>Answers to survey questions, by %</u> [Yes 2005; Yes 2009; No 2005; No 2009: (between year P-value)]: 1) How are surgeons' performance tables going to affect your behavior? I will avoid high-risk patients: 22; 5.2; 57.8; 72.3 (0.0001) I may avoid high-risk patients: 47.7; 40.3; 33.9; 42.5 (0.1685) It will not change my practice: 38.5; 50.7; 43.1; 35.8 (0.1038)	In general, the surgeons' responses showed a more favorable opinion of public reporting when comparing answers from the 2005 survey to the 2009 survey. Nonetheless, in 2009 UK	Maytham, G., and Kessar, . (authors)

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	changed over the intervening period						<p>2) Do you think surgeons' performance tables improve outcomes: 30.3; 42.5; 67; 52.2 (0.0318)</p> <p>3) How do you think performance should be assessed? By individual surgeons performance tables: 17.4; 35.1; 61.5; 48.5;(0.0033) By surgical teams (i.e. including anesthetists) performance tables: 62.4; 68.7; 23.9; 22.4; (0.6098) By hospital performance tables: 62.4; 61.4; 23.9; 24.6 (0.8994)</p> <p>4) How do you think performance tables will affect your patients' behavior? They will feel more confident in the care they receive: 21.1; 39.6; 59.6; 38.1 (0.0005) They will become more demanding: 45; 20.9; 33.9; 56.7 (<0.0001) They will not be able to interpret them: 80.7; 67.9; 11.9; 21.6 (0.0330)</p> <p>5)Overall, do you welcome the introduction of surgeons' performance tables: 22.9; 48.5; 68.8; 43.3 (<0.0001)</p>	surgeons were still apprehensive about potential incentives to avoid high-risk patients. Also, while larger, the number of surgeons in 2009 who said they welcome surgeon performance tables was less than half of respondents.	
Narins 2005 ¹⁵⁶	To systematically evaluate the opinions and experiences of all physicians who were included in the most recent	New York	Descriptive Survey	All interventional cardiologists in New York State included in the most recent PCI in New York	Self-report questionnaire	PCI in New York State (1998-2000)	Survey Responses [Strongly Disagree vs. Disagree vs. Agree vs. Strongly Agree vs. No Response]: 1) Knowledge that mortality statistics will be publicly disseminated has, in certain instances, influenced your decision on whether to perform	Public reporting influences physicians decision-making about performing PCI in New York state.	NR

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	PCI in New York			state report 1998-2000 n=120 (65% of 186 sent the questionnaire)			<p>angioplasty on individual patients: 5.0% vs. 15.0% vs. 43.35 vs. 35.8% vs. 0.8%</p> <p>2) Knowing that your patient mortality statistics will be made public influences your decision on whether to intervene in critically ill patients with high expected mortality rates (e.g., patients with cardiogenic shock): 6.7% vs. 12.5% vs. 31.7% vs. 47.5% vs. 1.7%</p> <p>3) Patients who might benefit from angioplasty may not receive the procedure as a result of public reporting of physician-specific mortality rates: 0.8% vs. 15.0% vs. 44.2% vs. 39.2% vs. 0.8%</p> <p>4) Do you agree or disagree that the model is sufficient to avoid penalizing physicians who perform higher-risk interventions?: 52.5% vs. 32.5% vs. 10.0% vs. 3.3% vs. 1.7%</p> <p>5) Physicians may report higher-risk conditions to improve their risk-adjusted mortality statistics: 2.5% vs. 8.3% vs. 55.0% vs. 33.3% vs. 0.8%</p>		

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Pettijohn 1999 ¹⁵⁷	To investigate the impact of outcomes data reporting on the practice of interventional cardiology	USA	Descriptive Survey	Interventional Cardiologist in the USA (n=1444; 28% response rate)	Self-reported effects of outcomes data reporting on their approach to high-risk patients who required interventional procedures	NR	85% of the cardiologists followed their own outcomes data. Of the respondents, 12% said that outcomes reporting would have no effect on their willingness to perform procedures on high-risk patients. 88% of the respondents said that if outcomes were reported, they would be somewhat or much less likely to perform interventions on high-risk patients.	Authors' results support the hypothesis that outcomes reporting would limit the access of high-risk patients to interventional cardiology procedures in the USA	NR
Schneider 1996 ¹³⁸	To find out whether cardiologists and cardiac surgeons were aware of the Pennsylvania Consumer Guide to Coronary Artery Bypass Graft Surgery report, and if so, to determine their views on its usefulness, limitations and influence on providers	Pennsylvania	Descriptive Survey	Opinions and attitudes of Cardiac Surgeons and Cardiologists in Pennsylvania . Randomly selected sample of 50 percent of Pennsylvania cardiologists and cardiac surgeons. Total response rate out of 697 physicians was 65%. 64% response overall response rate among cardiologists and 74%	All self reported: Awareness of the guide Opinion of usefulness: importance of risk-adjusted mortality; importance of clinical outcomes other than mortality; Importance of Consumer Guide Ratings; Influence of consumer guide rating on referral recommendations; Discussed Consumer Guide with percentage of patients. Opinion of limitations: multiple	PA Consumer Guide to Coronary Artery Bypass Graft Surgery	Aware of Cardiac Guide: Cardiologists: 82% Surgeons: 100% Views on Importance of Outcomes and the Consumer Guide in Assessing the Quality of a Cardiac Surgeon's Performance: [#,(%) for Cardiologists; #,(%)for Cardiac Surgeons] Importance of risk-adjusted mortality***: Minimally or not important: 11(5); 8(14) Moderately Important: 32(12); 15(26) Very or extremely important: 227(84); 35(60) Importance of clinical outcomes other than mortality**: Minimally or not important: 3(1); 3(5) Moderately important: 31(12); 12(21) Very or extremely important: 236(87); 423(74)	All cardiac surgeons were aware of the report and most of the cardiologists were. Overall, both groups thought there were some limitations to the report, but the biggest potential impact seemed to be in access to care for highest risk patients; 63% of surgeons said that they were less willing or much less willing to operate. None were more willing. Of the cardiologists, a majority (59%) said it was at least somewhat	Henry J. Kaiser Family Foundation, National Research Service Award from the Department of Health and Human Services

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				among cardiothoracic surgeons. After excluding incomplete surveys or ineligible physicians, n=337 (279 cardiologists and 58 cardiac surgeons)	<p>questions related to potential limitations</p> <p>Influence on providers/Access to Care: 5 Point Likert scale, for surgeons: Willingness to operate; for cardiologists: difficulty finding surgeons willing to operate</p>		<p>Importance of Consumer Guide Ratings: Minimally or not important: 158(70); 39(68) Moderately important: 49(22): 12(21) Very or extremely important: 20(9); 6(11)</p> <p>Influence of Consumer Guide ratings on referrals (only cardiologists): none: 1240(62) Minimal: 57(25) Moderate: 25(11) Substantial: 5(2)</p> <p>Percentage of patients with whom respondent discussed Consumer Guide in past year: 0: 149(66); 33(57) 1-10: 54(24); 22(38) >10: 24(11); 3(5)</p> <p>----- ----- Limitations of the Consumer Guide Rated by Respondents as Very or Extremely Important: [#,(%) for Cardiologists; #,(%)for Cardiac Surgeons]</p>	more difficult to find surgeons willing to operate on their most severe cases. Of note, 10% stated it was easier to find surgeons willing to operate. Only 30% of cardiologists said the Consumer Guide had a moderate to substantial influence on their referrals.	
Schneider 1996 ¹³⁸ Cont.							<p>Important factors other than mortality rates not included: 171(78); 45(78) Risk-adjustment methods inadequate to compare surgeons fairly: 169(77); 49(85) Mortality rates are an incomplete indicator of surgeon's quality: 162(74); 49(85) Surgeons and hospitals can manipulate data: 113(52); 33(57) Ratings are based on out-of-date</p>		

Author Year	1. Study Purpose and/or a priori Hypothesis	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population: Who or what is studied?	5. Outcomes	6. Name of Report or Subject Matter	7. Results	8. Summary	9. Funder of Research
							<p>information: 93(43); 20(35) A higher mortality rate is probably due to chance alone: (49(23); 16(28) Few surgeons and hospitals report mortality rates that are higher or lower than expected: 39(18); 11(20) Rating are inaccurate for surgeons with small caseloads: 31(15); 11(20)</p> <p>Differences between two groups ***p<.001; **p<.01</p> <p>Difficulty Finding a Surgeon Willing to Operate in Most Severe Cases (for Cardiologists, by % responding to each option): Much More Difficult: 18 More Difficult:41 No Change: 31 Less Difficult: 8 Much less difficult: 2</p> <p>Willingness to Operate in Most Severe Cases (For Cardiac Surgeons, by % responding to each option): Much Less Willing: 35 Less Willing: 28 No Change: 37</p>		

Author Year	1. Study Purpose and/or a priori Hypothesis	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population: Who or what is studied?	5. Outcomes	6. Name of Report or Subject Matter	7. Results	8. Summary	9. Funder of Research
Schultz 2001 ¹⁵⁸	To investigate consumers' use of report cards that provide information on service quality and satisfaction at the provider group level	Minneapolis - St. Paul, MN	Descriptive Survey	Employees of firms (28 large) aligned with a purchasers group BHCAG who had Choice Plus, specific plan coverage. n=996 single coverage n=913 family coverage	Probability of seeing the report card, finding it useful and selecting a care system based on the contextual factors	Performance Results Book (PRB)	<p>Probability - Respondents' Ease of Selecting a Care System(coefficients)</p> <p>See PRB: Single (0.0350); Family (-0.0235) PRB Helpful: Single (-0.1610); Family (0.2082)</p> <p>Coefficients of Probability of Seeing the Public Report [Single; Family]: Married: (NA); 0.1629 Female: 0.1205; 0.2351** Age: 0.0064; -0.001 Technical School: 0.2673**; -0.0160 Income Missing: 0.329*; 0.556 Information from Experience: 0.1901**; 0.493 Premium Important: -0.2097*; -.0426 Large Company: -0.6633***; -0.2933**</p> <p>***p<0.01; **p<0.05; *p<0.10</p>	The findings show that health care consumers are using satisfaction and quality information provided by their employer. Consumers are actively involved in the selection of provider groups based on factors other than price and covered benefits, an encouraging finding for advocates of managed competition	Robert Wood Johnson Foundation's Changes in Health Care Financing and Organization (HCFO) Initiative
Stein 2009 ¹⁵⁹	To examine consumer preferences regarding content and use of provider performance data and other provider information to aid in consumers' decision-making	Pennsylvania	Focus Groups	4 focus groups including 41 Medicaid enrolled mental health care consumers in Pennsylvania	Uses of provider information and discussions about the value of information and formatting	Multiple	<p>Four themes from focus groups were:</p> <p>1) Information needs to be easily accessible and updated frequently. 2) More information was desired about provider services such as clinical expertise available. 3) Important aspects of care were shared decision making, and receiving care in a timely manner, particularly flexibility in scheduling. 4) Ability to talk to doctor directly was also important.</p>	Participants say they want information but the specifics cited as important do not always match the quality indicators that are currently available (process indicators)	Community Care Behavioral Health Organization

Appendix L. Health Plans: Quantitative Evidence

Section A

Table L1. Health plans quantitative studies: columns 1-10 of 18 (pages L-1 to L-9)

Author Year QA	1. Study Purpose and/or a priori Hypothesis (if stated)	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/ Type	4. Sample/ Population or Population	5. Primary Comparison	6. All Outcomes Measured	7. Name of Public Report and Description	8. Based on a theory? How is it applied?	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/ Choice
Abraham 2006 ⁵⁴ Poor	Examines health plan choices of employees of 16 firms to search for health plan quality information and whether performance information leads to switching plans. N= 651 single employees	Minneapolis-St. Paul Area	Comparison Groups Post test only	Single employees with no dependents and employees eligible for family coverage who were employees of 16 BHCAG (Buyers Health Care Action Group) member firms and had selected Choice Plus as their primary health plan. N=16.	None.	INFO: Probability of Information Seeking Behavior SWITCH: Probability of Care system switching.	Performance results Book.	Hirshleifer and Riley model (1979), we assume that an individual chooses one among several alternative health plans based on the plans' certain features, as well as imperfect information about plan quality.		
Bardenheier 2007 ⁵⁵ Fair	To examine the factors associated with higher childhood immunization rates reported by public reporting and non-public reporting commercial health plans to the NCQA.	USA	Comparison Groups Post test only	All health plans that reported to NCQA from 1999 to 2002. N= 1999 - 423 plans 2000 - 383 Plans 2001 - 371 Plans 2002 - 332 Plans	Intervention: Public Reported Health Plans 1999 - 2002 Comparison: Non-Public reported Health Plans 1999-2002	The proportion of children aged 24 to 35 months in the plan who received 4 doses of diphtheria-tetanus-pertussis vaccine, 3 doses of Haemophilus influenzae type b vaccine, and 3 doses of Hepatitis B vaccine.	HEDIS			

Author Year QA	1. Study Purpose and/or a priori Hypothesis (if stated)	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/ Type	4. Sample/ Population or Population	5. Primary Comparison	6. All Outcomes Measured	7. Name of Public Report and Description	8. Based on a theory? How is it applied?	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/ Choice
Beaulieu 2002 ⁵⁶ Fair	To determine if health plan quality information affects health plan choice	Cambridge MA	One Group Pre test Post test	Approximately 11,500 Employees of Harvard University eligible for health benefits in each of the years 1994-1997. N=11,500.	Comparing whether an employee switches health plans from 1996 to 1997 and whether this is affected by the quality information about the health plan controlling for other factors including price and tenure in plan prior to this year.	Switching health plans and the probability of selecting a health plan (Dependent variables in regression models).	Plan profiles provided by employer (Harvard)		Age and whether choice was for an family or individual policy.	none
Bost 2001 ⁵⁷ Poor	to compare health plans that public reported HEDIS for 1996, 97, 98 to plans that did not in terms of HEDIS and CAHPS scores	US	Multiple Groups, Time Series	421 health plans that submitted HEDIS data to NCQA for 1997, 1998 and 1999.	1. Health plans that allowed their data to be reported for all 3 of the study years are compared to health plans that submitted their data for aggregation but did not allow public reporting. 2. Plans that reported for all 3 years	Eight HEDIS measures from the 'effectiveness of care' domain. Includes adolescent immunization, breast cancer screening, cervical cancer screening, prenatal care in 1st trimester, beta-blockers after MI, eye exam for diabetics, follow-up after mental illness hospitalization, and advising smokers to quit.	HEDIS and CAHPS		willingness to allow public release of their performance measures	none

Author Year QA	1. Study Purpose and/or a priori Hypothesis (if stated)	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/ Type	4. Sample/ Population or Population	5. Primary Comparison	6. All Outcomes Measured	7. Name of Public Report and Description	8. Based on a theory? How is it applied?	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/ Choice
					are also compared to plans that publicly reported for the first time in each year. 3. Public reporting and not reporting plans in the top 25% and bottom 75% of CAHPS are compared in terms of their HEDIS measures.					
Chernew 1998 ⁵⁹ Fair	To examine the relationship between consumer's health plan choice and health plan performance ratings.	USA	One Group Post test Only	Employees of a Fortune 100 company that chose single coverage, active and non-union. n=5795	During 1995 enrollment (Fall 1994) employees were given information sheets for each plan. It had the price for each plan and the report card rating information for five domains: 1. Surgical Care 2. Preventive Care 3. Employee	Odds of choosing a "superior" quality Health plan	HEDIS	Utility Maximization		

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					Satisfaction 4. Physician quality 5. Medical treatment					
Chernew 2004 ⁵⁸ Fair	To understand the association between the plan offerings of large employers, the price of health plans, and observable measures of performance.	USA	One Group, Post Only	855 Employer/MSA combinations	Plans offered by employers vs. not offered by employers. Ns vary.	Plans offered, plans not offered, price of plans, market share	CAHPS and HEDIS		Employers	Plan choices. Not dire consequences, as most employers offer several plans.
Dafny 2008 ⁶⁰ Fair	The study examines the relationship between enrollment and quality before and after report cards were mailed to Medicare beneficiaries in 1999 and 2000. The focus is on separating responses due to learning about quality from other sources from report	USA	Multiple groups Interrupted Time Series	N=8212. The unit of observation is the plan-county-year combination. The Sample includes observations with 10 or more Medicare Enrollees and non missing data for all variables.	Data Trends from 1994 to 2002	Switching into higher quality plans 1. Due to other reasons (market learning) 2. Due to report cards	One HEDIS measure (mammogram rate) and one CAHPS measure (first communicate, then best care) included in the Medicare and you brochure.	For the report cards to have a discernible effect on behavior, following chain of events have to transpire: 1. Beneficiaries must read and comprehend the publications or communicate with someone who has		

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	cares.							done so. 2. Beneficiaries must change their belief about plan quality in response to the reported scores 3. These changes must be of sufficient magnitude to imply a change in the optimal plan for some enrollees 4. Some of these enrollees must take actions to switch to their optimal plan		
Farley 2002 ⁶¹ Good	To assess the effects of CAHPS health plan performance information on plan choices and decision processes by New Jersey Medicaid beneficiaries.	New Jersey	Random Assignment	The study sample was a statewide sample of all new Medicaid cases that were mailed HMO enrollment materials during a four-week period from march 25 to April 15, 1998.	5217 Medicaid Enrollees out of which, 2649 received the CAHPS report, and 2568 did not. Intervention: 66.6% of 2649	1. Proportion choosing a plan Of those choosing a plan: 2. Standardized CAHPS rating of plan selected 3. Proportion selecting the dominant HMO 4. Standardized CAHPS rating of selected plan, for	CAHPS		1. Age 35 or older (OR 0.05**) 2. Race (Hispanic or not)(OR 2.77*) 3. Self-rated health excellent or very good (OR 0.85) 4. Education (Did not	Health Plans

Author Year QA	1. Study Purpose and/or a priori Hypothesis (if stated)	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/ Type	4. Sample/ Population or Population	5. Primary Comparison	6. All Outcomes Measured	7. Name of Public Report and Description	8. Based on a theory? How is it applied?	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/ Choice
				The study used state data on HMO enrollments and survey data for a subset of these cases for evaluating self-reported outcomes.	responded (1763) Control: 30.6% of 2568 responded (787)	those not selecting dominant HMO Logistic regression for Choice of the Dominant Medicaid HMO for receptive subjects who read reports and chose a plan with contextual variables:			complete high school) (OR 2.18*) 5. Has and wants to keep usual provider (OR 0.38*) 6. Index of Importance of CAHPS dimensions in choice (1-4) (OR 0.51#) 7. Previous market share of dominant plan, per 10%age points. (OR 1.46**) #p<0.10 *p<0.05 **p<0.01. The results with no superscript were not significant.	
Farley 2002 ⁶² Good	To assess the effect of CAHPS information on switching from a default health plan into another plan by lowan Medicaid beneficiaries.	Iowa	Random Assignment	New beneficiaries of Iowa Medicaid program n=13,077	CAHPS provided compared with No CAHPS information provided	Switching of plan choice	CAHPS		Patient/families	Plan decisions - stay with default or switch to another
Fowles 2000 ⁶³ Good	1. To compare consumer	Denver CO and St. Louis MO,	Comparison Groups Post test Only	Denver: n=962 employees from 125 employers.	The Employees in Denver vs	Exposure Helpfulness	HEDIS and CHIP	No	NA	NA

Author Year QA	1. Study Purpose and/or a priori Hypothesis (if stated)	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/ Type	4. Sample/ Population or Population	5. Primary Comparison	6. All Outcomes Measured	7. Name of Public Report and Description	8. Based on a theory? How is it applied?	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/ Choice
	responses to report cards in 2 markets. 2. To determine how personal characteristics relate to exposure, and 3. To assess the perceived helpfulness of the report cards			670 (69.6%) completed the survey St. Louis n=900 stratified by enrollment in Monsanto plan or 3 other HMOs. 784 (87%) completed the survey	Employees in St. Louis compared on all outcome measures					
Fox 2001 ⁶⁴ Poor	The study evaluates the impact of CAHPS report card in assisting newly enrolled Medicaid case heads in selecting a managed care plan.	Kansas	Comparison Groups Post test only	Medicaid population who enrolled in Kansas Medicaid managed care program in May 1998.	Intervention: New Enrollees who received CAHPS report in the mail. n=343 Control: New enrollees who did not receive the CAHPS report along with plan material n=698. Assessed by self reporting.	Ho 1: CAHPS will raise the salience of quality and awareness of health plan differences among Medicaid consumers Ho 2: CAHPS will improve the health plan decision-making process Ho 3: Women who are Medicaid beneficiaries will make informed choices about their plans.	CAHPS`			
Habermann 2007 ⁶⁵ Fair	To examine the effects of a Medicare policy change and HEDIS measures on	8 regions of the US covered by cancer registries (San	Comparison Groups Pre test Post test	30, 857 women aged 65-74 diagnosed with breast cancer from 1994 to 2002.	Compares stage of cancer at diagnosis for women 65-69 (reported	% of women at early stage at diagnosis	HEDIS			

Author Year QA	1. Study Purpose and/or a priori Hypothesis (if stated)	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/ Type	4. Sample/ Population or Population	5. Primary Comparison	6. All Outcomes Measured	7. Name of Public Report and Description	8. Based on a theory? How is it applied?	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/ Choice
	stage of breast cancer diagnosis among older women. Only effect of HEDIS measures abstracted as relevant to this review.	Francisco-Oakland, Connecticut, Hawaii, New Mexico, Seattle, Atlanta, SNA Jose-Monterey and Los Angeles			in HEDIS) to women 70-75 (non reported in HEDIS					
Hendricks 2009 ⁶⁶ Poor	Authors examined whether the introduction of managed competition in the Dutch healthcare system along with public reporting of quality information was associated with performance improvement in health plans Ho: The improvements over the years would be more profound for the quality aspects that needed improvement	The Netherlands	Multiple groups, Post Only	Health Plans. Each Year from 2005-2008 the performance of health plans is assessed annually using standardized CQI. Those results are published on a website and a press release is published. 2005 - 13,819 Respondents 30 Health Plans 2006 - 8266 Respondents 32 Health Plans 2007 - 8088 Respondents 32 Health Plans 2008 - 7183 Respondents 32 Health Plans	Comparison of Years 2005 and 2008.	General Rating, Conduct of Employees, Health Plan Information, Access to Call Centre, Getting the needed help from call center, Reimbursement of claims, Transparency of (co)payment Requirements	CAHPS version			

Author Year QA	1. Study Purpose and/or a priori Hypothesis (if stated)	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/ Type	4. Sample/ Population or Population	5. Primary Comparison	6. All Outcomes Measured	7. Name of Public Report and Description	8. Based on a theory? How is it applied?	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/ Choice
	most and for health plans with inferior performance at the first measurement in 2005									
Jin 2006 ⁶⁷ Good	To estimate the impact of public reports of quality on choice of plan by public employees separate from the impact of quality information they can obtain without the report.	86 counties in US	One Group, Post Only	Started with 2 million retirees/surviving family members of employees covered by the Federal Employee Health Benefit Plan from 1995-2000. Narrowed to 86 counties with the greatest number of plans operating at the same time.	Compare the impact of reported quality information on choices to impact of other information (measured by unreported quality information).	The likelihood of plan selection The estimate percentage of people selecting plans under different information conditions Estimates of the dollar value of the information.	HEDIS and CAHPS			
Jung 2010 ⁶⁸ Good	To examine the impact of voluntary information disclosure on quality of care in Health Maintenance Organization (HMO) Markets in the USA.	USA	Multiple Groups, Pre-Post	Commercial HMOs that submitted HEDIS data to NCQA (382 HMOs)	Year 1997 - 2000. 80% of HMOs (Intervention) have more than 2 years of HEDIS data. Depending on year 12-34% of HMOs declined disclosure (Control).	1 HMO-Year is one unit of analysis (i.e. treating an HMO's quality data in a given year as a separate observation (1062 total observations. Clinical Care HEDIS indicators are used to assess quality.	HEDIS			
Knutson 1998 ⁶⁹	Effect of Report card on relative	Minnesota	Comparison Groups Pre test Post test	New enrollees of State of Minnesota	Intervention: State of Minnesota	1. Change in knowledge of health plan benefits from pre-	SEGIP		NA	NA

Author Year QA	1. Study Purpose and/or a priori Hypothesis (if stated)	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/ Type	4. Sample/ Population or Population	5. Primary Comparison	6. All Outcomes Measured	7. Name of Public Report and Description	8. Based on a theory? How is it applied?	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/ Choice
Fair	changes in the employees' knowledge of health plan benefits and their ratings of quality and cost attributes, as well as their plan choice, rates of switching plans, and willingness to pay higher premiums			Employee Groups Insurance Program. N=3,573 interviews total	employees who received report cards vs. University of Minnesota employees who did not receive report cards. (after 1995)They were interviewed pre-enrollment and post-enrollment. Both groups were stratified by single and family coverage and results reported.	enrollment to post-enrollment. 2. Change in perceived level of knowledge 3. Change in relative importance of cost and quality health plan attributes. 4. Change in ratings of the quality of employees own plan 5. Change in ratings of the quality of others plans. 6. influence on the degree to which switching plans was considered. 7. Influence on employees to switch health plans or stay with their current plan. 8. Change in employees' premium contribution.				
Lied 2001 ⁷⁰ Fair	The authors analyzed performance trends from 1996 to 1998 for health plans in the Medicare managed care program.	USA	Time Series Post Only	Health Plans	1996 - 289 Health Plans reporting HEDIS 1997 - 371 Health Plans 1998 - 320 Health plans	Four HEDIS Measures: 1. AAP: Adult Access to Preventive/Ambulatory Health Services. N=167 2. BB: Beta-Blocker Treatment after Heart Attack. N=55 3. BCS: Breast Cancer Screening. N=151 4. EE: Eye Exams for people with Diabetes.	HEDIS			

Author Year QA	1. Study Purpose and/or a priori Hypothesis (if stated)	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/ Type	4. Sample/ Population or Population	5. Primary Comparison	6. All Outcomes Measured	7. Name of Public Report and Description	8. Based on a theory? How is it applied?	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/ Choice
Liu 2009 ⁷¹ Fair	To examine whether low-income parents of children enrolled in the New York State Children's Health Insurance Program (SCHIP) chose managed care plans with better quality of care.	New York	Multiple groups, Post Only	New Enrollees (2644) of NY SCHIP	2644 people who enrolled in SCHIP at the end of 2001 or in early 2002. Parents were interviewed during 12-month period.	N=156 Choice of child-plan in Managed care (SCHIP)	CAHPS and HEDIS	Assumption is that consumers are rational agents that maximize utilities reflecting preferences across alternatives varying in benefits and costs.	Effect of Education and income of Parents on plan choice for child. Other characteristics include, child race, and prior insurance status	Health Plan for Children
McCormack 2001 ⁷² Fair	To examine the effect of providing new Medicare information materials on consumers' attitude and behavior about health plan choice.	Kansas City	Random Assignment	New Medicare Enrollees and Old beneficiaries of Fall and Winter 1998-99 N= 1,156 experienced beneficiaries (62% response) 951 new beneficiaries (58% response) .	Control Group: No Report Card information (pre release) Three Treatment Groups (post mailing): 1. Medicare & You Handbook (52pg) 2. Medicare & You + 22pg CAHPS 3. Medicare & You Bulletin (8pg)	1. The probability of using the information to choose or change health plans 2. Beneficiaries' level of confidence in their current health plan choice.	CAHPS	Decision making and Cognitive-Aging Theories.		
Pham 2002 ⁷³	To assess whether	USA	One Group Post test Only	The Unit of analysis was a	Effect of higher	A Contract-County unit was considered to	HEDIS			

Author Year QA	1. Study Purpose and/or a priori Hypothesis (if stated)	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/ Type	4. Sample/ Population or Population	5. Primary Comparison	6. All Outcomes Measured	7. Name of Public Report and Description	8. Based on a theory? How is it applied?	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/ Choice
Good	higher performance by Medicare health plans on quality indicators was associated with withdrawal from Medicare		(Retrospective Cohort)	contract-county unit, as each health plan could be in various counties. Medicare Managed Care plans were active in 2310 contract-county combinations in 1997 and followed for 3 years	quality vs low quality as per HEDIS on risk of withdrawal. N = 2310. Used Kaplan Meier to assess hazard. Stratified by clinical and ambulatory HEDIS measures.	withdraw if the county was absent from every contract active within the plan at time of follow-up. Withdrawal was the outcome.				
Scanlon 1999 ⁷⁵ Fair	To examine the relationship between both HEDIS-based plan performance ratings and individual HEDIS measures and 1996 health plan enrollment.	A firm in USA	One Group Post test Only	Markets in which at least 10 employee have a choice of plans. Family coverage has N=154 plan/market observations representing the choices of 9,719 employees. For single coverage n=105 observations representing 5,536 employees	All employees were given a fact sheet that included plan ratings. Selection based on these rating was compared to selection based on measures going into these ratings as a way to examine informal sources of information	Probability of selecting a plan rated 'superior' or 'needs improvement' compared to average. Probability of selecting a health plan with a super	HEDIS-based ratings created by employer	The underlying econometric is based on the assumption that employees seek to maximize utility, and the utility derived by each individual, i , from health plan, j , can be expressed as a function of health plan attributes.		
Scanlon 2002 ⁷⁴ Good	To examine how the release of	USA (GM Corporation)	One Group Pre test Post test	GM Employees N=29,000	Pre: 1996 Open Enrollment	Probability of Choosing a Plan given certain conditions.	GM Report Card + HEDIS			

Author Year QA	1. Study Purpose and/or a priori Hypothesis (if stated)	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/ Type	4. Sample/ Population or Population	5. Primary Comparison	6. All Outcomes Measured	7. Name of Public Report and Description	8. Based on a theory? How is it applied?	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/ Choice
	health plan performance ratings influence employee health plan choice				Post: 1997 Open Enrollment + Report Card					
Tae-Seale 2004 ⁷⁶ Fair	The level of consumer satisfaction affects retention in health plans. To find evidence on the link between improvement in consumer satisfaction, distribution of consumer satisfaction information and health plan member retention	USA	One Group Pre test Post test	250 Federal Employee Health Benefit Program(FEHBP) health plans in 1994 and 1995	Intervention: Consumer satisfaction as per the report card Control: Retention Rate (%age of incumbent federal employees who have remained in the plan they were previously enrolled in during open seasons in 1994 and 1995. N=250	Retention Rate	OPM			
Wedig 2002 ⁷⁷ Fair	To test the hypothesis that consumer report card influence consumer's choice of health plan.	231 counties in 40 US states that are broadly representative of the US based on geography and population density.	One Group Pretest Post Test	Federal employees including new hires and existing employees (4299 in 1995 and 4863 in 1996).	The impact of quality on choice in 1995 when a report card on plans had very limited distribution and in 1996 when it was widely distributed to	Impact of quality report on choice of health plan	Not named. Report card created by Office of Personnel Management for federal employees.	none	none	none

Author Year QA	1. Study Purpose and/or a priori Hypothesis (if stated)	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/ Type	4. Sample/ Population or Population	5. Primary Comparison	6. All Outcomes Measured	7. Name of Public Report and Description	8. Based on a theory? How is it applied?	9. Context: Decisionmaker Characteristics	10. Context: Type of Decision/ Choice
					all employees.					

Section B

Table L2. Health plans quantitative studies: Columns 11-18 of 18 (pages L-10 to L-25)

Author Year QA	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ Report Article
Abraham 2006 ⁵⁴ Poor	None	None	None	<p>INFO:</p> <ol style="list-style-type: none"> 1. Low Care system Rating - pr(-0.106)* 2. Medium Care system Rating - pr(0.010) 3. Booklet distributed to all - pr(0.124)** 4. Booklet distributed on request - pr(0.252)*** 5. Quality Rating Comparison - pr(-0.064) 6. Understand quality - pr(0.082)* <p>SWITCH:</p> <ol style="list-style-type: none"> 1. Low Care system Rating - pr(-0.001) 2. Medium Care system Rating - pr(-0.16) 3. Quality Rating Comparison X Predicted INFO - pr(-0.041) 4. Understand quality - pr(-0.023) <p>*p<0.10 **p<0.05 ***p<0.01</p>	None	None	Authors conclude that results do not support either a link between quality information and switching behavior, or between perceived health plan satisfaction and switching. They find that switching is influenced by changes in premiums and whether an individual has an existing relationship with a health care provider.	Robert Wood Johnson Foundation
Bardenheier 2007 ⁵⁵ Fair	<p>Multivariate model of factors associated with proportion fully immunized:</p> <ol style="list-style-type: none"> 1. Public Report vs Non-Public Report (keeping everything else constant): Beta Coefficient (SE) 3.2 (1.2) p=0.009 	None	None	None	None	<p>Multivariate model of factors associated with proportion fully immunized: (contin.)</p> <ol style="list-style-type: none"> 1. Proportion of African Americans -0.2 (0.1) p=0.01 2. Proportion of 	Plans that reported publicly has higher childhood immunizations rates than plan that did not report publicly (p<0.001) Plans with higher proportions of	Not reported

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	2. With 1999 as reference: 2000 - -2.5(1.1) p=0.02 2001 - 2.3 (1.1) p=0.04 2002 - 0.6 (1.2) p=0.65 (not significant.)					Hispanics -0.2 (0.1) p<0.001 3. Proportion of Pacific Islander 0.6(0.1) p<0.001	Hispanics or African Americans has lower childhood immunization rates (p<0.001)	
Beaulieu 2002 ⁵⁶ Fair	None	None	None	Lower quality of care rating are associated with switching plans (the coefficient on the quality rating variable is significant p<0.01). Analyses of the association of several variables found that a one-unit increase in the quality rating increased the odds of selecting a plan by 10%. OR 1.105 (coefficient -.110 S.E. 0.015, p<.01). Plan tenure and whether the plan has point of service options (POS) have a stronger impact on odds of selecting a plan.	none	Analyses by type of policy (family or individual) and age revealed families and older individuals have stronger preferences for quality than younger individuals who are most sensitive to price.	Employees were more likely to switch from lower quality plans though the effect is small. Quality played a role in plan choice even after controlling for other factors like price and tenure with plan.	Harvard University and Aetna US Healthcare
Bost 2001 ⁵⁷ Poor	For the plans that publicly reported their measures, the rates increase across the 3 years (96, 97, 99). For 3 of the 8 measures the linear trend was significant at p<0.01.: adolescent immunization (60.6%, 65.4%, 67.9%,	None	None	None	None	Plans that publicly reported for 3 years had better 1998 mean rates on all HEDIS measures (p<.001) than both those that did not publicly report and	Health plans that voluntarily reported for 3 years had better rates on all 8 HEDIS measures and these measures improved with time. Reporting plans also had higher scores for	Not reported

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	<p>breast cancer screening (73.8%, 74.6%, 76.1%) beta-blockers after MI (70.5%, 82.4%, 85.0%)</p> <p>Plans that scored in the top 25% on CAHPS had better HEDIS measure rates than plans in the bottom 75% (p<.001 for all measures).</p>					<p>those plans that reported in 1998 for the first time.</p> <p>Plans that publicly reported for 3 years had better 1998 mean rates on 7 of 10 CAHPS measures (p<.01) than both those that did not publicly report and those plans that reported in 1998 for the first time.</p>	<p>7 of 10 CAHPS measures. The authors report that the 3 HEDIS measuring in which there was improvement among the plans that publicly reported their results were often the target of QI programs.</p>	
Chernew 1998 ⁵⁹ Fair	None	None	None	<p>Odds Ratios to show relationship between choice of plan and plan attributes for nonunion single choosers:</p> <ol style="list-style-type: none"> 1. Price 0.92 (p=0.2934) 2. Physicians/Members 1.20 (p=0.686) 3. Integration 1.11 (p=0.6353) 4. Prevention 1.74 (p=0.0002) 5. Satisfaction 0.44 (p=0.0031) 6. Medical treatment 1.07 (p=0.8222) 7. Physician Quality 0.99 (p=0.9580) 8. Surgical Care 0.75 (p=0.4546) 	None	None	<p>Authors conclude that the probability of choosing a health plan is inversely related to the out-of-pocket price of the health plan, all else held constant. There was no significant association between ratings and plan choice, although cannot say anything about impact as this is a cross-sectional design.</p>	Blue Cross Blue Shield Association and Finger Lakes Blue Cross Blue Shield

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Chernew 2004 ⁵⁸ Fair	None	None	None	<p>A one standard deviation increase in the sum of the ratings is projected to increase the offering probability by about 7.0 percentage points.</p> <p>Logit Results: CAHPS variables: HMO plan market share within an MSA (Does not include outside coverage): Sum CAHPS variables: 0.009 (P<0.01) FEHBP price: 0.001 (NS) More than 10 years old: 0.038 (NS) For profit: 0.315 (P<0.01) %IPA: -0.170 (NS) %Network: 0.658 (P<0.01) %Medicare enrollees: -0.155 (NS)</p>	None	None	<p>Author's summary: Analysis of the health plan choices of 17 large employers suggests that employers do not preferentially offer plans with poor performance scores. Our results indicate that factors other than plan performance affect the likelihood of a plan being offered as well. We found employers less likely to offer plans with high prices. This finding should be interpreted with some caution. As with our analysis of the performance measures, omitted variables may also influence our estimates regarding the impact of price. Consistently, the analysis suggests that</p>	US Department of Labor and AHRQ

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							employers prefer plans that are more established, non-profit, and affiliated with national chains. Though not uniform, the bulk of the evidence suggests that employers prefer network model plans and plans with relatively few Medicaid enrollees.	
Chernew 2004 ⁵⁸ Fair Cont.				%Medicaid enrollees: 0.095 (NS) National affiliation: 0.067 (NS) Blue cross blue shield affiliation: 0.261 (P<0.1) HMO plan market share with an MS (includes all non-HMO coverage including uninsured): Sum CAHPS variables: 0.019 (P<0.01) FEHBP price: -0.003 (NS) More than 10 years old: 0.408 (P<0.01) For profit: -0.107 (NS) %IPA: -0.455 (P<0.01) %Network: 0.598 (P<0.01) %Medicare enrollees: -0.049 (NS) %Medicaid enrollees: 0.351 (NS) National affiliation: 0.325				

Author Year QA	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ Report Article
				<p>(P<0.05) Blue cross blue shield affiliation: 0.325 (P<0.1) Logit Results: HEDIS variables: HMO plan market share within an MSA (Does not include outside coverage): Sum HEDIS variables: 0.101 (P<0.01) FEHBP price: -0.002 (NS) More than 10 years old: 0.083 (NS) For profit: 0.281 (P<0.05) %IPA: -0.139 (NS) %Network: 0.593 (P<0.01) %Medicare enrollees: -0.295 (NS) %Medicaid enrollees: 0.120 (NS) National affiliation: 0.025 (NS) Blue cross blue shield affiliation: 0.282 (P<0.1)</p> <p>HMO plan market share with an MS (includes all non-HMO coverage including uninsured): Sum HEDIS variables: 0.188 (P<0.01) FEHBP price: -0.004 (NS) More than 10 years old: 0.466 (P<0.01) For profit: -0.074 (NS) %IPA: 0.256 (NS) %Network: 0.470 (P<0.05) %Medicare enrollees: -0.077 (NS) %Medicaid enrollees:</p>				

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				0.265 (NS) National affiliation: 0.117 (NS) Blue cross blue shield affiliation: 0.258 (NS)				
Dafny 2008 ⁶⁰ Fair	None	None	None	Medicare enrollees were switching to high quality plans independent of the report cards during the period. A response to the report card is still found controlling for switching already happening. This effect is due to the CAHPS measure not the HEDIS measure. The coefficients on the best-care* post interaction variable are all significant at p<.05 or p< .01 for the different model specifications (values not given as they are not interpretable). Report cards resulted in swings in market share among HMOs, but only a small amount of switching from traditional Medicare to HMOs. In a simulation, net switching associated with report cards at the end of 2002 was only 1.24% of beneficiaries.	None	The impact of report cards (as well as other trends toward switching) are greatest in markets that have providers of varying quality levels.	None	Northwestern University and NBER. Serle Fund for Policy Research.
Farley 2002 ⁶¹ Good	None	None	None	Format: Mean or Proportion (sample size) All April Enrollees: 1. Proportion choosing a plan: Int: 0.68 (2649), Con: 0.69 (2568)	None	1. Age 35 or older 2. Race (Hispanic or not) 3. Self-rated health excellent	Authors conclude that for the Medicaid population as a whole, we found no evidence that the CAHPS	AHRQ

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				<p>2. Standardized CAHPS rating of plan selected: Int: -0.03 (1813), Con: 0.03 (1775)</p> <p>3. Proportion selecting the dominant HMO: Int: 0.28 (1813), Con: 0.27 (1775)</p> <p>3. Standardized CAHPS rating of selected plan, for those not selecting dominant HMO Int: 1.80 (1253), Con: 1.73 (1255)</p> <p>Receptive Subgroup:</p> <p>1. Proportion choosing a plan: Int: 0.95 (334), Con: 0.96 (341)</p> <p>2. Standardized CAHPS rating of plan selected: Int: 0.62# (318), Con: 0.00 (327)</p> <p>3. Proportion selecting the dominant HMO: Int: 0.25# (318), Con: 0.32 (327)</p> <p>3. Standardized CAHPS rating of selected plan, for those not selecting dominant HMO Int: 2.58** (232), Con: 1.81 (226)</p> <p>#p<0.10 *p<0.05 **p<0.01. The results with no superscript were not significant.</p>		<p>or very good</p> <p>4. Education (Did not complete high school)</p> <p>5. Has and wants to keep usual provider</p> <p>6. Index of Importance of CAHPS dimensions in choice (1-4)</p> <p>7. Previous market share of dominant plan, per 10%age points.</p>	<p>report reduced auto-assignment rates, influenced plan choices, or modified consumer's perceptions of the enrollment process.</p>	
Farely 2002 ⁶² Good	None	None	None	No CAHPS vs. CAHPS Type I counties assigned to high-rated HMO:	None	None	Public reporting did not have an affect on the	Cooperative agreement 5U18HS09204-

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				<p>n=1,717 vs. n=1,693 Stayed on HMO: 84% vs. 85.7% (used as standard for below ORs) Switched to Medi PASS: 13.2% vs. 10.6%; OR 0.80 (95% CI 0.58 to 1.09) Switched to low-rated HMO: 2.7% vs. 3.8%; OR 1.36 (95% CI 0.75 to 2.45)</p> <p>Type I counties assigned to low-rated HMO: n=1,614 vs. n=1,679 Stayed on HMO: 76% vs. 74.7% (used as standard for below ORs) Switched to Medi PASS: 14.1% vs. 14.4%; OR 1.03 (95% CI 0.75 to 1.39) Switched to high-rated HMO: 9.9% vs. 11%; OR 1.13 (95% CI 0.79 to 1.60)</p> <p>Type I counties overall switching from low- to high-rated HMO and vice versa: 10.5% of low-rated HMO participants switched to a high-rated HMO, while only 3.2% of high-rated HMO participants switched to a low-rated HMO (p<0.001)</p> <p>Type II counties assigned to high-rated HMO: n=1,087 vs. n=1,037 Stayed on HMO: 70.5% vs. 71.8% (used as standard for below OR) Switched to Medi PASS:</p>			<p>health plan choices of new lowan Medicaid participants. However, participants were more likely to switch from a low-rated HMO to a high-rated HMO than from a high- to a low-rated HMO, which is the only statistically significant finding in the report.</p>	05 with RAND

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				<p>29.5% vs. 28.2%; OR 0.92 (95% CI 0.68 to 1.24)</p> <p>Type III counties assigned to low-rated HMO: n=2,097 vs. n=2,153 Stayed on HMO: 76.3% vs. 76.4% (used as standard for below OR) Switched to Medi PASS: 23.7% vs. 23.6%; OR 0.99 (95% CI 0.79 to 1.23)</p>				
Fowles 2000 ⁶³ Good	None	None	None	<p>1. Exposure: Remember seeing report card OR (95% CI) Plan Decision (satisfaction with current plan): Very or somewhat satisfied 1.22 (0.94,1.60) Neutral or somewhat or very dissatisfied 1.00 Ease of Choosing a Plan Easy 1.00 Neither Easy nor Hard 0.72 (0.54, 0.97) Hard 0.77 (0.53, 1.12) Importance of Plan Selection Extremely Important 1.00 (0.73, 1.36) Very, Somewhat, or not very important 1.00 Read most of All of Report Card OR (95% CI) Plan Decision (Satisfaction with current plan): Very or somewhat satisfied 1.38 (0.94,2.--) Neutral or somewhat or very dissatisfied 1.00 Ease of Choosing a Plan</p>	None	None	The results of this study suggest that report cards may be more helpful where more switching among health plans is anticipated, such as markets where there are new entrants, more competition or when an employer drops 1 health plan option. Employers who anticipate significantly increasing premiums for their employees, and thus more switching among plans may also find report cards helpful.	Commonwealth Fund

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				<p>Easy 1.00 Neither Easy nor Hard 1.00 (0.64, 1.--) Hard 1.24 (0.74, 2.--) Importance of Plan Selection Extremely Important 1.91 (1.24, 2.--) Very, Somewhat, or not very important 1.00</p> <p>2. Helpfulness: Among sociodemographic characteristics, only educational level was related to finding the report card helpful in deciding whether to stay or switch health plans. There were no significant difference between Denver and St. Louis.</p>				
Fox 2001 ⁶⁴ Poor	None	None	None	<p>Result Format for Received CAHPS vs did not receive CAHPS: Odds (p) Ho 1: Ease of judging quality of care (1=easy, 0=not easy) - 2.30 (0.01) Ho 2: Improving Health Plan decision-making (1=somewhat to very easy, 0=not easy) - not reported Ho 3: Making informed choices - 0.70 (0.05) odds of influenced most by nurse or doctor</p>	None	None	Authors suggest that CAHPS is in many respects useful to Medicaid beneficiaries, however this should be one of many approaches for disseminating this information.	Kansas Department of Social and Rehabilitation Services
Habermann 2007 ⁶⁵ Fair	None	Stage at diagnosis (early, late, unstaged) for	None	None	None	None	Lack of difference between age groups in HMO	Not Reported

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		HMO and Fee for Service Medicare 1998-02 65-69 HMO: 92.0, 6.4, 1.6 70-75 HMO: 91.4, 6.3, 2.3 65-69 FFS: 89.6, 7.7, 2.7 70-75 FFS: 89.2, 7.9, 2.9					and the persistent of the difference between FFS and HMO across the two age groups suggests there is not crowding out and may be spill over to the older group not included in the HEDIS measure.	
Hendricks 2009 ⁶⁶ Poor	***p<0.001	None	None	None	None	None	On Most (six out of seven) aspects the performance of below-average scoring health plans increased more than the performance of average and/or above-average scoring health plans. The Hypothesis was confirmed.	Netherlands Institute for Health Services Research (NIVEL)
Hendricks 2009 ⁶⁶ Poor Cont.	Effect of Public reporting: General Rating of Health Plan: Below Average in 2005- 2005 - Mean (7.30) chi-square (17.60)*** 2008 - Mean (7.52) Average in 2005- 2005 - Mean (7.53) chi-square (0.02) 2008 - Mean (7.51) Above Average in							

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	2005- 2005 - Mean (7.90) chi-square (0.11) 2008 - Mean (7.88) Conduct of Employees: Below Average in 2005- 2005 - Mean (3.34) chi-square (15.38)*** 2008 - Mean (3.52) Average in 2005- 2005 - Mean (3.49) chi-square (5.55)* 2008 - Mean (3.55) Above Average in 2005- 2005 - Mean (3.65) chi-square (0.64) 2008 - Mean (3.67) Health Plan Information Below Average in 2005- 2005 - Mean (2.54) chi-square (16.96)*** 2008 - Mean (2.71) Average in 2005- 2005 - Mean (2.61) chi-square (22.61)*** 2008 - Mean (2.72) Above Average in 2005- 2005 - Mean (2.75) chi-square (0.05) 2008 - Mean (2.75) Access to Call Center Below Average in 2005- 2005 - Mean (2.26) chi-square (4.26)* 2008 - Mean (2.40)							

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Hendricks 2009 ⁶⁶ Poor Cont.	<p>Average in 2005- 2005 - Mean (2.53) chi-square (0.70) 2008 - Mean (2.58) Above Average in 2005- 2005 - Mean (2.75) chi-square (0.29) 2008 - Mean (2.72) Getting the needed help from call center Below Average in 2005- 2005 - Mean (3.13) chi-square (1.43) 2008 - Mean (3.23) Average in 2005- 2005 - Mean (3.37) chi-square (0.49) 2008 - Mean (3.34) Above Average in 2005- 2005 - Mean (3.60) chi-square (1.03) 2008 - Mean (3.54) Reimbursement of claims Below Average in 2005- 2005 - Mean (3.51) chi-square (16.53)^{***} 2008 - Mean (3.65) Average in 2005- 2005 - Mean (3.68) chi-square (1.01) 2008 - Mean (3.64) Above Average in 2005- 2005 - Mean (3.79) chi-square (9.19)^{**} 2008 - Mean (3.70) Transparency of</p>							

Author Year QA	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ Report Article
	(co)payment Requirements Below Average in 2005- 2005 - Mean (2.49) chi-square (3.89)* 2008 - Mean (2.65) Average in 2005- 2005 - Mean (2.63) chi-square (5.80)* 2008 - Mean (2.75) Above Average in 2005- 2005 - Mean (2.95) chi-square (1.81) 2008 - Mean (3.05)							
Jin 2006 ⁶⁷ Good	None	None	None	<p>Few people switch plans in general and this is confirmed in the models where coefficients on a 'switch indicator' are large and negative indicating most people do not switch plans. 99.3% of enrollment choices would have been the same with or without the information.</p> <p>In the final model the coefficient on the public information is greater than that on unpublished information. This positive difference is significant and suggests that published scores have a meaningful impact on choice. A one standard deviation increase in reported score would increase likelihood of</p>	None	None	Publicized ratings have a direct impact on choice even though few people change and they seem to provide information above and beyond what is available from other sources.	University of MD

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				choice of the plan by 2.63 percentage points.				
Jung 2010 ⁶⁸ Good	Yes. The disclosure variable (public reporting) has significant and positive effects on quality. Public reporting was associated with an increase of 0.40 (95%CI 0.26,0.53) composite score units (p<0.001). Refer to Table 3 in the paper for all the coefficients.	High quality plans in markets with high mortality rates from CVD/DM tended not to disclose.	None	None	None	None	The analysis found positive effects of disclosure on HMO quality. However effect of disclosure on quality depends on type of services.	Department of Health Policy and Administration. Pennsylvania State University
Knutson 1998 ⁶⁹ Fair	None	None	None	Outcome 1: No significant difference between Intervention and Control group (summary statistic not shown). Outcome 2: Significant difference seen (Chi-square 8.5 p<0.05) for single coverage employees but not for family coverage. Outcome 3: No difference in single coverage but significant results in family coverage comparisons (chi-square 7.7, p<0.05). Multivariate analysis (including patient characteristics) resulted in OR 1.11 CI 0.79,1.58 for cost rating and OR1.02, CI 0.60,1.74 for quality. Outcome 4/5: No significant difference between intervention and control (data not reported) Outcome 6: bivariate	None	None	The author concludes No significant Influence of Report cards on Employees.	HCFA

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				analysis in single family resulted in significant results (chi-square 8.64, p=0.034) but multivariate analysis resulted in no significant results. Outcome 7: Single coverage intervention group switched more frequently than control p<0.05. Family coverage showed no significant results Outcome 8: No significant difference.				
Lied 2001 ⁷⁰ Fair	1. AAP: Mean 96/97/98 - 84.90, 87.43, 88.55 t-test - 96vs97 2.0*, 97vs98 1.77, 96vs98 2.90* 2. BB: Mean 96/97/98 - 60.38, 78.52, 85.14 t-test - 96vs97 7.76*, 97vs98 4.33*, 96vs98 11.16* 3. BCS: Mean 96/97/98 - 72.08, 72.73, 85.14 t-test - 96vs97 1.02 97vs98 4.24*, 96vs98 4.14* 4. EE: Mean 96/97/98 - 52.86, 52.55, 55.72 t-test - 96vs97 -0.27, 97vs98 3.52*, 96vs98 2.37* *p<0.05	None	None	None	None	None	Authors found that there were statistically significant improvements for three of the four selected HEDIS measures between 1997 and 1998 (BB,BCS,EE). Mean rate for AAP improved from 1996 to 1998.	CMS
Liu 2009 ⁷¹	None	None	None	One unit increase in weighted HEDIS score	None	Interaction terms of parent	Authors found a positive	Not funded

Author Year QA	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ Report Article
Fair				increased the choice factor by 0.05% ($p>0.10$). One unit increase in weighted CAHPS score increased the choice factor by 2.5% ($P=0.000$). The effect of CAHPS on choice probability where there were Children with special needs increased by 0.35%.		education and HEDIS and CAHPS resulted in no significant results. In fact parents with higher education were less likely to have an impact of quality on plan choice. - 0.008 ($p=0.693$) for HEDIS and - 0.436 ($p=0.993$). However these were just to see if family characteristics confounded the quality-choice relationship and that turned out to be no. Interaction term of parent income resulted in a positive association with no significant result. 0.000 ($p=0.47$) for HEDIS and 0.028 ($p=0.406$) for CAHPS.	association between CAHPS and plan choice. Individuals with special care needs valued quality more than without. Low-income parents in NY SCHIP choose managed care plans with better quality for children.	
McCormack 2001 ⁷² Fair	None	None	None	Beneficiaries who used materials to choose or change plans: 1. Experience Beneficiaries	None	None	Results conclude that the new consumer information materials are	HCFA and AHRQ

Author Year QA	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ Report Article
				<p>Used information to choose or change plans: Control Group 7.0% Treatment Group 5.6%</p> <p>Used the information when considering changing plans: Control Group 19.8% Treatment Group 18.4%</p> <p>Did not use the information to choose or change plans: Control Group 73.2% Treatment Group 76%</p> <p>2. New Beneficiaries</p> <p>Used information to choose or change plans: Control Group 49.6% Treatment Group 27.3%***</p> <p>Used the information when considering changing plans: Control Group 10.4% Treatment Group 15.4%</p> <p>Did not use the information to choose or change plans: Control Group 40.0% Treatment Group 57.3%</p> <p>Level of Confidence in Current Plan Choice:</p> <p>1. Experienced Beneficiaries</p> <p>Not at all confident: Control Group 7.0% Treatment Group 3.3%***</p> <p>Somewhat confidence: Control Group 24.9% Treatment Group 23.7%</p> <p>Very Confident: Control</p>			<p>having some influence on Medicare beneficiaries' attitudes and behaviors about health plan decision making. The effects on confidence and health plan switching did not vary across the different treatment materials.</p>	

Author Year QA	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ Report Article
				<p>Group 51.9% Treatment Group 47.6%</p> <p>Extremely Confident: Control Group 16.2% Treatment Group 25.5%</p> <p>2. New Beneficiaries</p> <p>Not at all confident: Control Group 9.5% Treatment Group 7.1%</p> <p>Somewhat confidence: Control Group 40.8% Treatment Group 35.5%</p> <p>Very Confident: Control Group 32.3% Treatment Group 38.1%</p> <p>Extremely Confident: Control Group 17.4% Treatment Group 19.4%</p> <p>***p<0.01</p>				
Pham 2002 ⁷³ Good	None	Kaplan Meier: Clinical HEDIS Measures: Annual rate of withdrawal for high quality was 4% vs 20% for low quality. (IRR: 0.21; 95%CI 0.13-0.32). Ambulatory HEDIS Measures: 10% for high quality vs 16% for low quality (IRR: 0.63, 95%CI 0.48-0.82) Cox Regression	None	None	None	None	Authors found that plan contracts with higher baseline performance on HEDIS quality indicators were less likely to withdraw from Medicare, independent of the payment rates they received. The association between clinical quality measures and withdrawal appears strong, graded and significant.	Robert Wood Johnson Clinical Scholars Program and BJHSPH

Author Year QA	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ Report Article
		(Multivariate): Clinical (Adjusted for confounders): All low vs All high HR=0.19 (0.08-0.43) i.e. significant. Ambulatory (Adjusted): All low vs All high HR=0.57 (0.30-1.08) i.e. not significant.						
Scanlon 1999 ⁷⁵ Fair	None	None	None	If ratings impacted plan selection the coefficients for the superior or needs improvement rating would be significant (indicating difference from average) and positive for superior and negative for needs improvement. Preventive Care: neither significant at p<.05 Satisfaction: neither significant at p<.05 Medical Treatment: neither significant at p<.05 Physician Quality: neither significant at p<.05 Surgical care: Superior significant at p,.001 but sign in opposite direction (negative); need improvement not significant	None	None	Analysis suggests that ratings did not have a major influence on plan enrollment at a large firm in 1996. A second analyses seems to support the idea that information obtained from informal channels offsets the reported ratings.	Society of Actuaries
Scanlon 2002 ⁷⁴ Good	None	None	None	Of the 12 estimated coefficients on the superior or below average ratings, only seven are of the hypothesized sign	None	None		AHRQ

Author Year QA	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ Report Article
				(+/-). Of the six domains of performance, only one, women's health, has a positive estimated coefficient on the superior rating and a negative estimated coefficient on the below average rating. Neither of those estimated coefficients is statistically significant. The hypothesis that ALL ratings coefficients equal 0 can be rejected at $p < 0.01$.				
Tae-Seale 2004 ⁷⁶ Fair	None	None	None	<p>Difference between 1994 and 1995:</p> <p>1. Retention Rate: 1994: 95.68; 1995: 91.54 ($p < 0.01$)</p> <p>2. %Extremely Satisfied: 1994: 18.47 1995: 18.05 ($p < 0.05$)</p> <p>RESULTS: Predicted Satisfaction is associated with higher retention rate: 0.411 ($p < 0.01$). The number of rival plans have a negative effect on retention rate -0.18, ($p < 0.01$). Another model is used to include an interaction term (address confounding) of predicted satisfaction X dummy variable for Year. This addresses the effect of free distribution of consumer satisfaction information. The</p>	None	None	Authors conclude that examining a plan's ability to retain members (vs switching as shown in other studies), higher consumer satisfaction can boost member retention.	Not Reported

Author Year QA	11. Results: KQ1: (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI and other behaviors)	14. Results KQ4: (Selection by Patients and Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ Report Article
				association of predicted satisfaction and retention rate increases in this case to 0.57 (p<0.01). The rival plans still have similar negative effect on retention rate.				
Wedig 2002 ⁷⁷ Fair	None	None	None	Models of the choice of health plan for 1995 find little evidence that consumers used quality information in the selection of plans (the coefficient on the quality rating was not significant). In the model of the 1996 choices the biggest difference is that the coefficient for the widely disseminated report card rating is highly significant for new and existing public employees. Specifically the regression model finds that a 1 standard deviation increase in the quality score results increases the likelihood of plan selection by more than 50%. In the 1996 The odd ratio (probably of plan choice given quality score is mean plus one SD) for the quality score is 1.57 for new hires and 1.21 for existing employees	None	None	The quality report based on employee survey data influenced selection of plan controlling for premiums, out of pocket costs and service coverage. The impact is stronger on new employees but is also evident for existing employees.	Indiana Hospital and Health Association for one author

Appendix M. Health Plans: Qualitative Evidence

Table M1. Health plans qualitative studies: Columns 1-9 of 9 (pages M-1 to M-23)

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
Braun 2002 ¹⁶⁰	To evaluate consumer response to the first healthcare system-level report card	Northeast Minnesota	Focus Groups	<p>2 focus groups drawn from community club members in Minnesota (N=10 for each focus group)</p> <p>3 focus groups of retired persons living independently in the community (N=9 or 10 per focus group)</p>	Usefulness Trustworthiness and Content of Public Reports	Derived from Patient Survey	<p>Effect on Knowledge of the Health Care System. 56% reported that their confidence in the health care system remained unaffected by report card data, 21% reported increased confidence, 3% less confidence, and 10% had no opinion..</p> <p>Usefulness. Participants claimed they would use information in the report card if they were dissatisfied with their current medical care, if their options for healthcare coverage changed, or if they were in poor health. When asked to identify health care consumers who potentially would be most receptive to report cards, participants named new community members, individuals with insurance coverage allowing a choice of health care systems, and people with changing healthcare needs. The report card was considered especially useful for individuals, such as clinic administrators, in a position to effect system</p>	Healthcare consumers appreciated the attention to patient experiences and supported healthcare quality improvement initiatives. Report cards were considered important for choosing a healthcare system in certain circumstances and for guiding quality improvement efforts at all levels.	Minnesota Institute for Community Health Information

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
							<p>level changes.</p> <p>Trustworthiness. Community club members reported higher levels of trust compared with senior participants, who were almost universally skeptical of the quality data. Both groups wanted additional information about the sponsoring organization, role of the healthcare systems in collecting and presenting data, and characteristics of the respondents.</p> <p>Content. Requests for additional quality information fell into 4 categories: Patient-physician relationships; availability of specialists and ease of getting a referral; clinic facilities and additional services; and cost.</p>		
Damman 2009 ¹⁶¹	To understand how consumers process and evaluate comparative healthcare information available on the internet	The Netherland	Interviews	20 people of 157 members of a Dutch health plan enrollees panel invited to participate who lived within 45 minutes of the interview location	No a priori outcomes. Themes extracted based on interviewee comments	1. website with quality of hospital care for hip surgery 2. information on quality of health plans 3. information on quality and	12 themes Design 1. amount of information--too much 2. information complexity and organization---often difficult to follow 3. usability of website--not clear what is clickable, vertical text hard to read 4. appearance of information--messy or clean	Key finding include the tension between the large amount of information consumers say is important and how rarely this is incorporated in decisions. What is important changed during the interview suggesting this is	Netherlands organization for health research and development (ZonMw)

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
						premiums of health plans	<p>Content</p> <p>5. importance of quality indicators</p> <p>6. interpretation of information--difficulty with bar charts and symbols</p> <p>7. comparison of information to their own experience and ideas--often experience did not match the ratings</p> <p>8. quality of the presented information--questions about how many and who answered</p> <p>Use of information</p> <p>9. potential use in daily life--interest in using the quality information varied</p> <p>10. different decision strategies --task of choosing was perceived as difficult and requiring other information</p> <p>Purpose of information</p> <p>11. Direct purpose of the information---most related information to consumer choice</p> <p>12. Purpose of different quality indicators</p>	<p>not as predictable as assumed. Contradictory information was hard to process. Overall recommendations are to identify the minimum sets of information needed and make these readable.</p>	
Farley-Short 2002 ¹⁶²	To examine similarities and differences across people with different health care insurance in terms of the reasons for choosing health plans and perceptions and	CAHPS demonstrations in Kansas, Oregon, Washington, Pennsylvania and Iowa	Descriptive Survey	<p>Private Insurance, Medicaid, Medicare</p> <p>a. KS b. OR c. WA d. PA e. IA f. NJ g. KS</p>	Ease of Use Time spent on report Recall receiving report	CAHPS	<p>Privately Insured, Medicaid</p> <p>a. Kansas b. Oregon c. Iowa d. Washington e. New Jersey</p> <p>Percentage (SE) Received report a. 29 (1.7) b. 47 (1.9)</p>	<p>Many thought the report was easy to understand and readers most commonly spent 15 to 30 minutes on the CAHPS report. Between 10 and 40% of people surveyed say CAHPS had a lot of influence</p>	AHRQ to Harvard Medical School, RAND, and the Research Triangle Institute

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
	use of CAHPS reports			<p>h. KS</p> <p>Sampled</p> <p>a. 1,239 b. 1,260 c. 2,508 d. 750 e. 3,880 f. 2,550 g. 4,682 h. 3,505</p> <p>Responded</p> <p>a. 1,085 b. 931 c. 1,525 d. 517 e. 1,864 f. 1,098 g. 1,095 h. 2,107</p> <p>Response rate</p> <p>a. 88% b. 73% c. 61% d. 71% e. 48% f. 43% g. 23% h. 60%</p>			<p>c. 26 (1.9) d. NA e. 44 (1.8)</p> <p>Don't know</p> <p>a. 3 b. 23 c. 27 d. NA e. 12</p> <p>Received and looked at report</p> <p>a. 25 (1.6) b. 43 (1.9) c. 24 (1.2) d. 77 (2.6) e. 43 (1.8)</p> <p>Don't know</p> <p>a. 3 b. 0 c. 1 d. 10 e. 0</p> <p>NA: not applicable</p>	<p>on their choice. Fewer than half of the intended audience received and remembered the CAHPS report. There are important differences across types of insurance suggesting report cards should be more targeted.</p>	
Farley-Short 2002 ¹⁶² <i>Cont.</i>							<p>Private insurance, Medicaid, Medicare a. KS b. OR c. IA d. WA e. NJ f. KS g. KS</p> <p>How much did report influence choice % (SE)</p>		

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
							<p>A lot a. 12 (2.5) b. 33 (2.7) c. 9 (2.6) d. 13 (2.1) e. 39 (2.8) f. 40 (2.9) g. 17 (2.0)</p> <p>A little a. 34 (3.6) b. 33 (2.7) c. 39 (4.4) d. 37 (3.4) e. 46 (2.8) f. 33 (2.8) g. 21 (2.1)</p> <p>Not at all a. 55 (3.8) b. 34 (2.7) c. 52 (4.5) d. 50 (3.6) e. 15 (2.0) f. 27 (2.6) g. 61 (2.6)</p> <p>Never switched/chose a. no data b. no data c. NA d. NA e. NA f. NA g. 1 (0.6)</p>		
Gabel 1998 ¹⁶³	How important are NCQA accreditation and HEDIS data to employers' decisions regarding which health plans to offer employees?	USA	Survey	KPMG Employees	Proportion of Employers considering HEDIS as an important aspect while selecting Health Plans	HEDIS	Proportion of Employers indicating particular factors as Very Important to the Selection of Health Plans: HEDIS Data and Information: 200 to 999W Percent of Firms 2	Lack of Awareness and Usage of NCQA and HEDIS data suggests market failure, with employers currently acting as far less than	Not Reported

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
	Did employers' knowledge of NCQA accreditation change from 1996 to 1997						<p>Percent of Workers 2 1000 to 4999W Percent of Firms 1 Percent of Workers 2 5000+W Percent of Firms 7 Percent of Workers 2 Overall Percent of Firms 2* Percent of Workers 2*</p> <p>Does Company Use HEDIS data for selecting managed care plans? 200 to 999W Yes 2 No 7 Don't Know 0 Unfamiliar with HEDIS 34 Unfamiliar with NCQA 56 5000+W Yes 27 No 36 Don't Know 1 Unfamiliar with HEDIS 15 Unfamiliar with NCQA 22</p> <p>Does Company Use HEDIS data for managing your health insurance plans? 200 to 999W Yes 2 No 8 Don't Know 0 Unfamiliar with HEDIS 34 Unfamiliar with NCQA 56 5000+W Yes 24 No 36 Don't Know 1</p>	perfect agents for their employees.	

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
							Unfamiliar with HEDIS 15 Unfamiliar with NCQA 22 Does Company Provide HEDIS data to its employees to assist them in plan selection?? 200 to 999W Yes 1 No 8 Don't Know 0 Unfamiliar with HEDIS 7 Unfamiliar with NCQA 51 5000+W Yes 4 No 60 Don't Know 0 Unfamiliar with HEDIS 14 Unfamiliar with NCQA 20		
Gibbs 1996 ¹⁶⁴	To develop prototype materials containing plan choice information, identified what different consumer groups considered important in choice of health plan. It also explored several factors that may limit consumers' acceptance of, understanding of, and willingness to use QIs and other measures	Selected cities and towns (Minneapolis, MN; Los Angeles, CA, Portland, OR; Albany, OR, Yucca Valley, CA; Virginia, MN; Jacksonville, FL, Raleigh, NC	Focus Groups	22 Focus groups, 10 with Medicare beneficiaries; 6 with Medicaid enrollees, 6 with privately insured. Limited to people who had a choice among plans.	Dimension of plans; decision process; comparative information for choice, assessing likely costs, credible information, problems encountered with plans.	NA	Participants expressed a desire for comparative information, but discuss revealed barriers to use in choosing a health plan: Perception that information is persuasive (marketing) rather than informative Questions about how the data are collected Interpretation of ratings: prefer indications that identity plans that are clearly outstanding or inferior Lack of understanding of indicators and how health plans might influence these View indicators in terms of their specific needs,	Consumers across all insurance groups express a desire for comparative information, but presentation is important to understanding and people want information customized to their health priorities.	Health Care Financing Administration (HCFA)

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
							not as indicators of overall quality Find consumer satisfaction numbers meaningful but questions whether they are too subjective.		
Goldstein 2001 ¹⁶⁵	To assess what CAHPS measures are most meaningful to Medicare beneficiaries, how they are interpreted and how	USA	Focus Groups	3 focus groups with beneficiaries and 3 with SHIP counselors (9-10 people in each group) in MD, CA and NC as well as 12 cognitive interviews with beneficiaries in MD and MA 112 mall intercept surveys in NY, Tallahassee, Chicago, Denver, and LA.	Importance of different domains Preference for different formats	CAHPS	Most important measures: getting the care you need, getting care quickly, assess to specialists and doctors who communicate well. Least important: customer service and office staff Participants liked how the start format looked but were confused about what they meant and found bar charts easier to read. In the second round people were confused by the series of bar charts. In mall intercept interviews (n=122) 71% of people chose having doctors who communicate well over getting care quickly for a single measure.	Studies demonstrate the many challenges to be overcome in presenting quality information to Medicare beneficiaries in a way that is understandable and useful.	Not reported
Guadagnoli 2000 ¹⁶⁶ Veroff 1998 ¹⁶⁷	To evaluate CAHPS in Washington State.	Washington state	Descriptive Survey	Jun-Aug 1997 1,182 enrollees from the 3 largest health plans before open-enrollment. 65% response rate Dec 1997 - Mar 1998 N=2,392 following open	Awareness of CAHPS report	CAHPS	Largest Plans N = 585*; 1997 Not Available in 1998 N = 389*; 1997 Plan Rated One Star N = 237* ; p * Number who saw the CAHPS quality report Reaction: Easy or very easy to understand 60% 54% 54% .12	Early large-scale evaluation that is generally positive. Most people report seeing the CAHPS ratings and those who used it were more likely to switch plans and be	AHRQ

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
				enrollment from 3 largest plans as well as from plan that was discontinued and plans with lowest ratings 64% response rate			<p>All or most of the information needed to evaluate plans available 65 53 65 < .001 Easy or very easy to compare plans 55 42 48 < .001 Very or somewhat helpful to learning about differences in quality 75 71 70 .25 Very or somewhat helpful to deciding whether to stay with a plan or switch 76 NA 75 > .05 Trust the ratings a lot 43 36 38 .08 Ratings reflect very well or fairly well the experiences of current health plan members 90 80 85 < .001 Ratings tell a lot about the care received from a plan 31 22 33 < .01 Ratings are about the same as own opinion about quality of plans 59 42 46 < .001</p> <p>Largest Plans N = 739; 1997 Not Available in 1998 N = 444; 1997 Plan Rated One Star N = 308 Most Useful Source CAHPS printed report 30% 25% 29% CAHPS Internet report 1 1 2 Benefits fair 15 16 16</p>	confident they picked the right plan for their situation. Very few accessed the web page.	

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
							<p>Non-CAHPS printed materials supplied by employer 8 9 11 Materials supplied by health plans 6 11 6 Co-workers 15 14 13 Friends or family members 9 7 6 Newspaper or magazine articles 2 1 2 Other 14 16 15</p>		
Harris 2002 ¹⁶⁸	To investigate the impact of quality information on the willingness of consumers to enroll in health plans that restrict provider access	Los Angeles CA area	Lab-Type Experiment	<p>The experiment was administered in Spring 2000 to 206 adults between ages 25-64 in the Los Angeles metropolitan area who had private insurance obtained through an employer or purchased individually.</p> <p>The Impact of different types of quality information on consumers' hypothetical willingness to enroll in health plans with restrictive provider networks.</p>	206 Adults Three arms: 1. Network Features + No quality information 2. Network Features + Expert-Assessed Quality 3. Network Features + CAHPS	CAHPS	<p>Modeling results find that both expert and consumer assess quality reduce the magnitude of the impact of network features on the choice. The raw coefficients use different scales in the different models so the results cannot be used to directly compare the impact of expert vs. consumer assess quality. That is done through simulations. The overall conclusion is that quality information reduces the impact of changes in network features on the probability of choosing a plan with more options by 1/2 to 1/3.</p> <p>All quality ratings except satisfaction with results of care are less important than access to specialists or having own MD in network.</p>	The impact of quality information depends more on the actual measure the whether it is expert or consumer assessed. Extremely satisfied with care has the largest impact (19.6 percentage points increase in the probability of enrollment) and percent of doctors with university affiliation has the smallest (4 percentage points increase). Two other expert assess and two other consumer assess all result in about an 8 percentage point increase.	AHRQ

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
Harris-Koejetin 2000 ¹⁶⁹	This article discusses lessons learned from consumer testing to create consumer plan choice materials.	Portland OR, Washington DC Metro Area, Baltimore MD, Raleigh/Durham, NC, Wichita and Kansas City.	Focus Groups Interviews	N=258; 52 Medicaid, 125 Medicare, and 90 private insurance	FGD: 1. Overall Impressions 2. Understand Purpose and Intent 3. Usefulness 4. Problematic Aspects. Cognitive Interviews: 1. Content 2. Comprehension 3. Navigation 4. Decision Process	CAHPS	Reports should be: 1. short, clear and easy to use 2. address diversity among the target audience in terms of education, literacy, health needs, interest 3. help consumers understand key fundamentals the choice 4. assist consumers to determine and differentiate among their preferences 5. minimize cognitive complexity by breaking task into steps 6. help consumers understand how and why to use quality information 7. realize more information is not necessarily better	Several lessons emerge and while they may be obvious, literature in health care frequently does not incorporate these.	AHRQ, Health Care Financing Administration, and the American Association for Retired Persons
Harris-Kojetin 2001 ¹⁷⁰	To elicit impressions of a pilot version of the Medicare and You 1999 handbook and CAHPS Survey report	Kansas City, Kansas and Kansas City, Missouri	Focus Groups	56 participants in 7 FGDs with Medicare beneficiaries. Two groups were with age 65 (new), three were age 66-85y and the rest were Medicare eligible due to disability.	1. Overall Impressions 2. Understanding the purpose and intent of CAHPS 3. Usefulness of CAHPS and how would they use it. 4. Trust in the information 5. Problematic aspects	CAHPS	1. Overall Impressions Positive. Short easy to read booklet that are good starting points for decision-making. 2. Understanding the purpose and intent of CAHPS High School Graduate or Less: Very Hard - 1 (6%) Somewhat Hard - 5 (29%) Somewhat easy - 6 (35%) Very easy - 5 (29%) At Least Some College Very Hard - 0 Somewhat Hard - 1 (3%)		Centers for Medicare & Medicaid Services and AHRQ

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
							<p>Somewhat easy - 16 (53%) Very easy - 13 (43%)</p> <p>3. Usefulness of CAHPS and how would they use it.</p> <p>I. Primarily useful for people considering or choosing an HMO. Some new beneficiaries said they would have chosen a different plan had they known of this document.</p> <p>II. Found these two things about REPORT FEATURE particularly useful:</p> <p>a). Two-page section on "Things to Think about" that guides the reader through the process of comparing plans using CAHPS data.</p> <p>b). Four page worksheet.</p> <p>III. Found these useful about the REPORT CONTENT:</p> <p>a). Shows differences in quality among plans</p> <p>b). Valuable to be able to see the opinions that other beneficiaries have of the Medicare HMO.</p> <p>IV. Increase utility by including beneficiary costs.</p> <p>4. Trust in the information</p> <p>Somewhat Less trust in CAHPS. Trust level varied significantly with beneficiary education,</p>		

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
							<p>with lower educated beneficiaries being more skeptical about the survey report than higher education beneficiaries. At Least Some College: Trust a Lot - 50% Not At all - 0% High School Graduate or Less Trust a Lot - 28% Not At all - 18% They thought that the report for “pushing HMOs” because only Medicare HMOs were shown. The report should mention that beneficiaries do not need to enroll in an HMO. Some beneficiaries had general skepticism about surveys and the related statistical issues. But regardless of education level, they said they trusted CAHPS more than information from individual health plans.</p> <p>5. Problematic aspects Some special needs participants were confused/frustrated with lack of clarity about their eligibility as they were not over the age of 65.</p>		
Hibbard 1997 ¹⁷¹	To assess the relationship between how important information included in quality indicators is and	Eugene/Springfield OR	Focus Groups Descriptive Survey	NOTE: SAME AS JEWETT 1996 AND HIBBARD 1996 15 Focus group (5 each for	Importance of indicators in selecting a plan Comprehension Association between comprehension	Items from CAHPS and HEDIS	Indicators in order of importance for selecting a plan: 1. Patient ratings (PR) of overall quality 2. PR of doctor communication	Patient ratings of quality and satisfaction were viewed as most important to decision as well as providing the	AHRQ

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes and importance	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
	how well it is understood by consumers			Medicaid, private insurance and uninsured) with a total of 104 participants			3. PR of respect given patients 4. PR of satisfaction with time spent with doctor 5. Rates of immunizations among children under age two 6. Rates of cervical cancer screening 7. Hospital-acquired infection rates 8. Rates of postsurgery complications 9. Professional organization disciplinary actions 10. Rates of mammograms 11. Rates of cholesterol screening 12. Rates of eye exams among diabetics 13. Malpractice judgments 14. Hospital death rates after a heart attack 15. Disenrollment rates 16. Rates of low-birthweight infants 17. Pediatric asthma hospitalization rates Comprehension and Importance Ave. importance rating, importance rank, % of low comprehension comments, comprehension rank Patient ratings 4.21 1 8.7% 1 Desirable event indicators 3.83 2 21.8% 3	most information about aspects of care, except prevention. Information that people understand is considered important; if people don't understand, it is dismissed as unimportant.	

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
							Disciplinary actions 3.75 3 13.4% 2 Undesirable event indicators 3.37 4 41.0% 4		
Hibbard 2002 ¹⁷²	To empirically examine some of the key assumptions about how disseminating CAHPS report cards may influence employee knowledge, attitudes and choice.	Portland, OR Metro Area	Lab-type Experiment	Large Private employer with two campuses geographically separated but demographically similar	Three Outcome Variables: 1. Perceived Information Availability index: 7-item summated index about info on 7 CAHPS reporting categories. 2. Importance of CAHPS categories: 5-item index. 3. Materials influence Choice: Single item i.e. how much did the information that employer gave you influence which plan you chose?	CAHPS	1. Perceived info Availability index (0-21 M=7.8) Int 8.4 and Con 6.8 (p<0.001) 2. CAHPS Importance Index (0-15 M=9.2) Int 8.9 and Con 9.0 (NS.) 3. Info influenced decision (%some or a lot) Int 52.0 and Con 52.4 (NS.)	The findings indicate that exposure to the intervention is related to having more information on how well the different plans perform on the CAHPS reporting categories. They further indicate that those who saw the report perceived the CAHPS reporting categories to be more important in health plan choice that those not seeing the report. Finally those who saw the report were more influenced by information sent by their employer that those who did not see the CAHPS report. These hypothesis are not confirmed for the intervention group but it is for those who said they were exposed. (28% control group said	AHRQ

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								they were exposed to PR whereas 52% in Intervention group said they were exposed i.e. flaw in the experimental design)	
Hibbard 1996 ¹⁷³	To explore what consumers want for making choices and how they will use the information	Eugene/Springfield OR	Focus Groups Descriptive Survey	NOTE: SAME AS JEWETT 1996 AND HIBBARD 1997 15 Focus group (5 each for Medicaid, private insurance and uninsured) with a total of 104 participants	Importance of domain Relative impact on choking	items from CAHPS and HEDIS	Results not repeated that are in Hibbard 1997 What consumers indicated was important (all, private insurance, uninsured, Medicaid) % of respondents Chose from all 4 categories 51.0, 63.9, 41.7, 46.9 Majority of choices from patient ratings 21.1., 16.6, 25.5, 21.9 form desirable events 25, 16.6, 30.5, 28.1 from disciplinary actions 18.3, 22.2, 8.3, 2.5 Which Health Plan Selected: Private Insurance, Uninsured, Medicaid Plan A: better on desirable events, less well on undesirable events 33.3, 27.8, 25.7 Plan B: better on undesirable events, less well on desirable events 66.7, 72.2, 74.3	Consumers have a preference for desirable events and patient ratings. But when asked to choose from 2 plans, the plan that did better on undesirable events was chosen. The reason given was that they give priority to aspects of care outside their control that could have dire consequences.	AHRQ
Hibbard 2000 ¹⁷⁴	To test the effect of a)presenting information in terms of possible risks or benefits	Washington DC and Research Triangle NC	Lab-type Experiment	207 Volunteers between 18 ad 64 years old with employer-sponsored	Comprehension Relative importance of CAHPS data in choice	altered CAHPS data	Risk-message group had better comprehension then benefits-message group (p<.01) No added explanatory	Framing reports using a risk message increases comprehension	AHRQ

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	and b) presenting more explanatory information on aspects of health plan choice			health insurance	Willingness to make trade-offs for quality		information group had better comprehension that added information group --contrary to hypothesis The group with the risk-message and no added information place the highest importance on CAHPS information In the higher income group people receiving the risk message were willing to trade off higher premiums, less convenience, and access to current doctor for higher quality. There was no difference for lower income participants.	and value to consumer. Willingness to tradeoff other features for quality is only evident in higher income. Additional explanatory information had an unanticipated negative effect on comprehension.	
Hibbard 2001 ¹⁷⁵	To determine whether there are approaches to reporting comparative information that make it easier for consumers to understand.	Eugene/Springfield OR	Lab-type Experiment	253 elderly Medicare beneficiaries and 239 non elderly adults	Comprehension scores	NA	Overall comprehension The Medicare group made almost 3 times as many errors as the non elderly (25% error rate vs. 9%) Format tests Use of stars and bar charts improved the % answering correctly in the Medicare sample compared to bar charts(24% no stars; 18% stars p,.05) , but not the non elderly (7% for both versions) Bar charts vs. tabular numbers found no significant difference. Order by performance vs. alphabetical order decreased errors for the Medicare sample (30%	Formatting does increase comprehension for some subgroups.	Rober Wood Johnson Foundation's Changes in Health Care Financing and Organization (HCFO), and the Health Care Financing Administration

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							<p>vs. 46%, $p < .01$) Bar charts with evaluative labels verses no labels had not significant influence.</p> <p>Sub analyses by level of comprehension found that those in the lowest quartile (combined Medicare and Medicaid) had better comprehension with the stars; all comprehension levels were helped by ordering by performance; evaluative labels helped the Medicare sample respondents in the middle quartile of comprehension.</p>		
Hibbard 1996 ¹⁷⁶	To gain consumer perspective on the usefulness and understandability of one set of condition-specific performance measures, and to determine whether providing consumers with information about health care context will improve understanding of performance measures.	Eugene/Springfield OR	Lab-Type Experiment	Random people chosen randomly through voter registration lists. Lab-type Experiment and Focus Groups had N=17 people and the Cross-sectional survey analysis had N=72 people.	Provide health care context and see the effect on consumer understanding. Focus Groups: How consumers view the performance measures. Cross-Sectional Analysis: To look for comprehension and salience of condition-specific performance measures	None	<p>Cross-sectional Analysis: Salience of Condition-Specific Indicators (N=72): Patient Satisfaction Mean 4.37 SD 0.98 Rank 2 Patient's Quality of Life Mean 3.82 SD 1.25 Rank 5 Days' Patients too sick to Work Mean 3.06 SD 1.35 Rank 7 Patients Still alive after 5 years Mean 4.17 SD 1.24 Rank 3 % of Patients Diagnosed in Early Stage Mean 4.61 SD 0.90 Rank 1 % who had Lumpectomy Mean 4.03 SD 1.14</p>	<p>The findings provide some support for the dissemination of condition-specific QIs. However that might be true for high prevalence and general perception of risk.</p> <p>While the context information appeared to make a difference in how the measures were understood, it was also insufficient in that the individual indicators were</p>	Foundation for Accountability (FACCT)

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							<p>Rank 4 % of older women who had Mammogram Mean 3.36 SD 1.14 Rank 6</p> <p>38% of the “no context” group said that knowing about the lumpectomy rates gave no information about how well the plan doctors “educated and informed” patients. Only 11% of the “context” respondents through this gave no information about how well the plan informed and educated. Because the context material laid out that a good health plan should be doing and how the plan can work to achieve better quality, it is not surprising that the “context” group had a better understanding of what the indicators told about.</p>	<p>often misinterpreted. Consumers commonly interpreted the indicators as telling about how good one’s coverage is.</p>	
Hibbard 1997 ¹⁷⁷	To understand how large purchasers perceive the differences among various performance measures, and what types of performance information they use.	CA, NY, PA and OH	Interview	Large healthcare purchasers (N=33)	Awareness of performance data, Performance information used in purchasing decisions, Understandability of information, Dissemination of performance information	Not Reported	<p>Availability of Data: Average 78% of purchasers reported that HEDIS data were available to them: New York purchasers: 63% California purchasers: 88% Cleveland purchasers: 86% Pennsylvania purchasers: 78% Average 75% of purchasers reported that consumer satisfaction</p>	The use of clinical quality information among the purchasers observed in our study is relatively low, and not all of the purchasers were aware that performance data are available.	Robert Wood Johnson Foundation

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							<p>data were available: New York: 50% California: 75% Cleveland: 86% Pennsylvania: 89% Less consistent awareness of hospital outcomes data, which was available to all purchasers: New York: 25% California: 38% Cleveland: 71% Pennsylvania: 67% Types of Data Used by Purchasers: HEDIS: New York: 50%; California: 50%; Cleveland: 60%; Pennsylvania: 57% Consumer Satisfaction: New York: 57%; California: 43%; Cleveland: 83%; Pennsylvania: 56% Hospital Outcomes: New York: 0%; California: 20%; Cleveland: 80%; Pennsylvania: 0% Regarding hospital outcomes, purchasers explained: 1) concerns about hospital outcomes measurement methodology and whether the data are timely and valid 2) some expect the managed care plans to monitor hospital quality 3) the information is not packaged for their needs</p>		

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							Employers and Employees interests: 31% of employers indicated that they give performance information to their employees. Another 15% said that they were planning to do so in the future.		
Hibbard 2001 ¹⁷⁸	To compare the skills of a medicare and a nonelderly sample in their ability to interpret compatible information and we determine whether skill in using information is related to attitudes about making plan choices.	OR	Lab-type Experiment	A Medicare sample age sixty-five and older (N=253), and a non-Medicare sample ages eighteen to sixty four (N=239).	The comprehension index assesses the ability to accurately interpret comparative plan performance information when it is presented in tables, charts, and texts.	Not Reported	Nonelderly: 1. Decision Burden Index 0.24*** 2. Delegation 0.23*** 3. Choice/Information Index 0.01 4. Seeking Decision Assistance 0.03 5. Screening Index - 0.14** Medicare 65+: 1. Decision Burden Index 0.34*** 2. Delegation 0.32*** 3. Choice/Information Index 0.02 4. Seeking Decision Assistance 0.30*** 5. Screening Index 0.22*** **p<0.05 ***p<0.001	The results indicate that elderly consumers have much more difficulty accurately using comparative information to inform health plan choice than nonelderly consumers have. These differences are not explained by educational differences.	Robert Wood Johnson Foundation's Changes in Health Care Financing and Organization (HCFO) initiative, the AARP Public Policy Institute, and the Health Care Financing Administration
Hibbard 2002 ¹⁷⁹	To assess whether presentation approaches designed to be more meaningful result in greater weighting of quality information in decisions. Participants were randomly assigned to	USA	Lab-type Experiment	Sample recruited through the benefits office of the City of Eugene, OR. N=162	The dependent variables included the amount of weight given to quality information in choices and decision accuracy. Three experiments were conducted: 1. Visual Cues 2. Ordering	Not Reported	1. Visual Cues: A repeated-measures ANOVA using stacked bars with stars, stars only and stacked bars only as the repeated measures and the three conditions (choices 1,2 & 3) as the independent variable indicated that the manipulations significantly impacted choice, F(2,157)=5.2, p<0.01.	Some presentation approaches make it easier for users to process and integrate quality data into their choices. However, other presentation formats influence consumers' decision in ways that undermine	Robert Wood Johnson Foundation's Changes in the Health Care Financing and Organization

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	different conditions and asked to complete tasks related to using quality information and making health plan selections.				3. Trend Data		<p>2. Ordering: 15 plans were described on two variables (cost and member satisfaction). Regardless of the number of choices considered, there were approximately twice as many non-quality-maximizing choice patterns in the unordered condition than in the ordered one (All Chi square $s > 3.8$, $p < 0.05$).</p> <p>3. Trend Data: Participants were asked to compare two HMO plans that differed in cost and in member satisfaction scores. A one-way ANOVA indicated that participant choices in the three conditions were marginally different ($F(2,87) = 2.4$, $p < 0.10$).</p>	their self-interest.	
Jewett 1996 ¹⁸⁰	To explore what consumers want for making choices and how they will use the information	Eugene/Springfield OR	Focus Groups Descriptive Survey	NOTE: SAME AS HIBBARD 1996, AND HIBBARD 1997 15 Focus group (5 each for Medicaid, private insurance and uninsured) with a total of 104 participants	Comprehension and interpretation of 18 quality indicators grouped into desirable events; undesirable events; patient ratings of satisfaction and quality and disciplinary actions.	Items from CAHPS and HEDIS	<p>Out of 1,723 comments made during the focus groups 24% reflected low comprehension.</p> <p>Undesirable events had the lowest comprehension (most low comprehension comments). Patient ratings were best understood. Low comprehension is evenly split between misinformation and acknowledged lack of</p>	Consumers views differ from those of policy makers who created the indicators. Consumers seem unable to 'roll-up' from these specific measures to a general sense of quality even though that is how indicators are often intended to be	AHRQ

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							<p>information.</p> <p>21% of all low comprehension comments are based on lack of understanding of the medical condition associated with the indicator</p> <p>8% show lack of understanding of the test or procedure</p> <p>20% interpret indicator performance in the opposite direction from its intended meaning</p> <p>51% question the utility of the indicator or are misinformation</p> <p>Separate analysis from above (so these comments are reanalyzed) found that 43% of low comprehension comments reflect lack of understanding of aggregate or quantitative concepts such as rates or the nature of comparisons.</p> <p>57% of low comprehension comments are related to plan-level concepts such as how plans influence care or how hospitals vary.</p> <p>26% of low comprehension comments reflect beliefs</p>	<p>used.</p>	

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							that events measured by the indicators are uncontrollable or inevitable. Low comprehension is evident for Medicare, Medicaid and uninsured.		
Marquis 2001 ¹⁸¹	To provide information on employer health insurance purchasing strategies	USA	Descriptive Survey	1997 RWJF Employer Health Insurance Survey of a national sample of 21, 545 business establishments. Response rate was 60%	Use of quality information when choosing health plans to offer	NA	Percentage Of Large Employers Using Information On Quality Of Care When Choosing Which Health Plans To Offer, By Employer Characteristics, 1997 All establishments Offers HMO/POS Does not offer HMO 58% 69% 49% Offers choice of plans Yes 76 78 67 No 49 57 46	More than half report using quality information and this is higher if employers offer HMO/POS. Employers do not seem to have shifted responsibility to employees as employers that offer choices are more likely to use quality information.	Robert Wood Johnson Foundation (RWJF)
O'Day 2002 ¹⁸²	To elicit health plan selection and assessment criteria by groups of people with impaired mobility arising from different origins	Phoenix, Philadelphia and Washington DC	Focus Groups Content Analysis	Each Participant had a mobility Impairment. 57 Individuals of working age who use a mobility aid and have Multiple Sclerosis, Cerebral Palsy, Rheumatoid Arthritis or Spinal Cord Injury	Focus Groups asked questions on several domains: (1) disability-related experiences with primary care providers; (2) access to specialists; (3) physical access to care; (4) strategies for getting health plan payment for needed care, including durable medical	CAHPS	Analyzed CAHPS and determined what criteria for this group are and are not included. Included: Access to Primary Care Partially covered, but might need disability specific items: access to specialists to rehabilitation, to medications, to equipment, health plan information, to transportation No information: accessible facilities Plan criteria identified as		National Institute on Disability and Rehabilitation Research: Rehabilitation Research and Training Center on Managed Care and Disability

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					equipment and prescription drugs; and (5) dimensions of a high quality health care plan		important: Provider panel with appropriate accessible specialists Ease of referral Transportation and physically accessible offices Medications on formulary Equipment and models covered Independent living needs covered Maintenance (not improvement) and alternative therapies covered Coordination of Care Access to preventive services Health plan information in alternative formats Responsive appeals process		
Paulsbo 2007 ¹⁸³	To explore report card preferences of people with disabilities	Oregon, California, Virginia, Maryland, and DC	Focus Groups	N=49 people; 34 women, 15 men recruited through independent living centers	Defining quality health care including: Care coordination and communication Choice of providers Disability competence and sensitivity Access to information Evaluation or report card content	Reports from California, Maryland, Michigan and Texas	Most participants preferred shorter report cards and wanted number and visuals. Some did not understand stars or composite ratings. Most wanted disability specific information and provider specific, not just health plan ratings. They also wanted information on the coordination of care and accessibility of facilities.	Finding confirm other studies that demonstrate that format can help or confuse and that people want information specific to there situation or condition.	U.S. Department of Education
Peters 2009 ¹⁸⁴	Examine the impact of evaluative meaning on the	USA	Lab-type Experiment	Study 1: 303 non student adults Study 2: 207	Comprehension Use of information Impact of	NA	Study 1: Mood and numeracy impact interpretation when no categories are provided;	Presenting evaluative information allows people to	Robert Wood Johnson Foundation, the National

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	impact numeric information has on health care decisions.			older adults Study 3: 218 respondents to ad in student paper Study 4: 83 undergraduate students	information on choice		the presentation with evaluative information helps people use it. Study 2: People made different choices of health plan (picked the better plan more often) based on the bar chart with labels and lines vs. the bar chart alone or with just lines. Study 3: 54% chose the 'better' plan when they had information with categories; 39% chose it when they did not Study 4: feeling about choices may be more consistent than thoughts and the use of categories made feeling come to mind more quickly than thoughts	use numbers in ways that differ from when numbers are presented alone. The results suggest people need assistance in interpreting what numbers mean. However providing this assistant requires difficult decisions about what categories to use (e.g. what is good and what is poor). Presentation of simple numbers is unlikely to lead to the informed decisions intend by many health care policies.	Science Foundation and Blue Cross Blue Shield Association
Rainwater 2005 ¹⁸⁵	To evaluate California's Quality of Care Report Card	California	Focus Groups and Interviews	6 consumer focus groups 2,341 mail and internet surveys of Quality Report Care users, Interviews with program staff in depth telephone interviews with 56 key informants	1. Do consumers use the Quality Report Card 2. How useful are the included quality measures 3. What is the impact of the Quality Report Cared on quality improvement	CA Quality of Care	HMOs and Medical Groups are familiar with the report (100% of HMOs and all but one Medical Group informant). Used to benchmark performance against similar providers 47% of Medical Groups and 13% of health plans undertake QI in response to report card. Dissemination of the paper version has increased each year (more than 100,000 booklets). Website has		California Office of the Patient Advocate

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							<p>28,000 visitors per year. 90% of users are consumers who are comparing (48.1%), seeking information about current (37.5%) or considering joining (11.5%) HMOs.</p> <p>Most users review the summary page with the HMO star charts (74.5%) and not the details Area of most interest is Plan Service (customer service, paying claims etc.) Comparative information on prevention indicators is of less interest either because performance is the same or it is only relevant to specific people.</p>		
Rosenthal 2007 ¹⁸⁶	To provide systematic descriptions and analyses of value-based purchasing and related efforts to improve quality of care by health care purchasers.	USA	Descriptive Survey	Largest 26 private and public employers in each of the selected markets, with the exception of New Orleans and San Antonio, in which we sampled 7 and 20 employers respectively.	Comparisons were made by employer size (<1000 (103), 1001-5000 (281) and >5000(225))	HEDIS CAHPS	<p>Weight given to CAHPS/HEDIS when a health plan is chosen, by employer size:</p> <p><1000 Employees - 57 (45-70) 1001-5000 Employees - 64 (56-72) >5000 Employees - 62 (50-73) p-value for difference in employer size = 0.29</p> <p>Value based Purchasing efforts directed at Health Plans <1000 Employees - 11 (2-19) 1001-5000 Employees - 11 (5-16)</p>	Authors conclude that many large employers are not using their purchasing power with health plans to improve the quality of health care received by their employees.	AHRQ

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							>5000 Employees - 26 (15-37) p-value for difference in employer size = 0.003		
Sarfaty 2008 ¹⁸⁷	To determine if the inclusion of a colorectal cancer screening measure in HEDIS lead to changes in policy and practice by insurance plans in Pennsylvania	PA	Descriptive Survey	Medical Directors of insurance companies marketing health plans in PA. 13 companies met the inclusion criteria and all 13 (100%) responded to the survey.	Survey asking if specific actions and policies were changed in response to the addition of the HEDIS measure	HEDIS	<p>Screening Policies before and after HEDIS addition of measure</p> <p>a. Activity Before 2003 # (%)</p> <p>b. 2003 or After # (%)</p> <p>c. Unknown # (%)</p> <p>d. No Response # (%)</p> <p>Adopted practice guidelines</p> <p>a. 6 (46)</p> <p>b. 2 (15)</p> <p>c. 2 (15)</p> <p>d. 3 (23)</p> <p>Revised guidelines</p> <p>a. 2 (15)</p> <p>b. 7 (54)</p> <p>c. 0</p> <p>d. 4 (31)</p> <p>Measured CRC screening rate</p> <p>a. 1 (8)</p> <p>b. 8 (62)</p> <p>c. 1 (8)</p> <p>d. 3 (23)</p> <p>Implemented the HEDIS measure</p> <p>a. NA</p> <p>b. 9 (69)</p> <p>c. 0</p> <p>d. 5 (39)</p> <p>Coverage and Tracking Changes in response to HEDIS addition</p> <p>Activity: Yes # (%); No #</p>	Some Medical Directors report increases in activities related to screening (adopting guidelines, reminder systems) in response to the inclusion of a related measure in HEDIS, but not all plans report taking these actions.	Legislative Budget and Finance Committee of the Pennsylvania General Assembly

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							Coverage of more types of CRC screening tests: 3 (23); 9 (69) Lowered out-of-pocket charges for CRC screening: 1 (8); 10 (77) New or updated enrollee or provider reminder systems: 6 (46); 6 (46) New or updated data systems to track CRC screening: 6 (46); 6 (46)		
Scanlon 2001 ¹⁸⁸	To explore how managed care plans use performance measures such as HEDIS and CAHPS for quality improvement.	PA, MD, KS, and WA	Interviews	24 plans in the selected states (six per state) and attempted to interview CEO, Medical Director, and directors of quality improvement. Completed 8 CEO interviews (33.3%); 19 QI directors (79.2%) and 15 medical directors (62.5%).	1. How QI is organized generally 2. What prompted 3 specific QI activities, how they were monitored and barriers. 3. Evaluation of HEDIS and CAHPS	CAHPS and HEDIS	Ratings of HEDIS and CAHPS a. HEDIS Mean Accuracy Rating (1-5) b. HEDIS Mean Utility Rating (1-5) c. CAHPS Mean Accuracy Rating (1-5) d. CAHPS Mean Utility Rating (1-5) Overall Mean Ratings a. 3.35 (n = 34) b. 3.60 (n = 34) c. 3.21 (n = 33) d. 3.13 (n = 32) CAPHS items are viewed as not specific enough 77% of the identified QI activities were in response to performance measurement but 37% were targeted exclusively because of	Plans use measures but in a variety of ways including targeting QI, establishing goals and monitoring progress. Respondents have specific issues with HEDIS and CAHPS including the cost and specificity of the information.	RAND, AHRQ

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							<p>HEDIS and 6% exclusively because of CAHPS. Most frequently mentioned advantage is comparison to other plans. Another mentioned use was to identify areas where more information was needed to drill down and understand a rating or to monitor progress once a QI initiative was started. Respondents reported that measures need to be standardized, actionable, timely, stable and capable of trending and relevant.</p>		
Smith 2001 ¹⁸⁹	To assess the information needs and responses of managed care plans to the Medicare Managed Care Consumer Assessment of Health Plans Study.	USA	Focus Group	23 focus groups over 3 years (1998-2000) and 12 interviews over two years (199-2000) with 150 representatives of managed care plans.	Themes Credibility of the report, concerns about public reporting, preferred displays of comparative performance, information to support quality improvement, and the logistic challenges of producing effective reports.	CAHPS	<p>Credibility of the report was lowest at the first round before it was actually distributed and increased as plans gained experience with the report. Concerns about public reporting also decreased. Participants like comparative displays but wanted them limited to practical market areas and not to include plans from too big an area. Plans reported using the report for QI , but wanted the raw data or more detailed analysis by beneficiary type. Logistic challenges included receiving the data more than 1 year</p>	Managed care representatives found the report useful and acceptance of public reporting increased over time. Participants said plans intensified their QI efforts in response to below average scores but competition inhibited sharing best practices.	Health Care Financing Administration, "Implementation of Medicare Managed Care CAHPS", with Barents Group of KPMG Consulting and subcontractors, Westat, The Picker Institute, Harvard Medical School, and Data Recognition Corporation

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							after it was collected and getting reports distributed to local offices if they sent to the central office of a large organization.		
Spranca 2000 ¹⁹⁰	To learn whether consumer reports of health plan quality can affect health plan selection.	Los Angeles CA area	Lab-Type Experiment	<p>n=311 men and women in Los Angeles county who were recruited by a focus group recruiting firm</p> <p>A controlled Lab Experiment where 4 hypothetical health plans were presented (HMO vs PPO) and CAHPS survey results were given to experimental arm and not the control arm.</p> <p>Experimental Arm 1: n=91 Higher CAHPS ratings for more expensive plans</p> <p>Experimental Arm 2: n=88 Higher CAHPS ratings for less expensive plans</p> <p>Control Arm: n=132 No CAHPS</p>	<p>1. %Distribution of Plan Choice</p> <p>2. Gain in Market Share as a result of higher vs. Lower CAHPS ratings by Plan type (HMO vs PPO)</p>	CAHPS	<p>1. Consumer Preferences for plans A through D were essentially the same in control vs experimental group1 Chi-square=2.14, p=0.54, n=309</p> <p>2. Plan preferences were significantly different between the control vs experimental group 2 Chi-Square=20.07, p=0.0002, n=309</p> <p>A follow-up test showed that consumers shifted toward plans with higher CAHPS ratings vs lower CAHPS ratings compared to the control group Chi-square=55.61, p<0.0001, n=309.</p> <p>People's preferences to HMOs are more sensitive to CAHPS ratings than are their preferences for PPOs.</p> <p>The medium in which information was presented (printed vs web) had no effect on preferences for Plans A through D chi-square=0.70, p=0.87 or on the strength of</p>	CAHPS ratings have an effect in situations where high CAHPS plans cost less and cover fewer services and not in situations where high CAHPS plans cost more and cover more. This suggests that CAHPS ratings may help to contain costs.	AHRQ

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
							CAHPS effects chi-square=4.12, p=0.25.		
Spranca 2007 ¹⁹¹	To investigate how intermediaries use the Medicare web site, whether including disenrollment information affects recommendations and the effects of time pressure	Los Angeles CA area	Lab-type Experiment	359 Medicare intermediaries (people who helped a family member or partner with health-related decisions that were under 65 and comfortable reading and writing English and using a computer.	Response to disenrollment information Time spend on website sections Selection of plan	HEDIS and CAHPS measures were included on the sites	<p>Disenrollment information 55% very important 34% somewhat important 48% very useful 39% somewhat useful 58% very easy to understand 36% somewhat easy 46% felt site contained the right amount of information 34% would like a little more The disenrollment information had no significant effect on choice Subjects with lower educational levels were more likely to pick plans with lower HEDIS/CAHPS scores when disenrollment information was added.</p> <p>Time constraint (limited to 15 minutes) reduced time spent on site by 3 minutes (p<.001) Time reduced to all sections but by different amounts when disenrollment is added</p> <p>Plans with higher CAHPS/HEDIS scores were preferred whether there was a time restraint or not. When under a time restraint, low cost</p>	Disenrollment information may increase the cognitive burden on people with lower educational levels. People say the additional information is useful, but may not actually use it in a decision. Time constraints affect how much time is allocated to the task and encourage focus on attributes considered important or that are more familiar.	Centers for Medicare & Medicaid Services (CMS), AHRQ, CDC

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
							/benefit plans were more likely to be selected.		
Teleki 2007 ¹⁹²	To describe how CAHPS is formatted and disseminated by sponsors.	USA	Interviews	25 CAHPS sponsors including 8 State Medicaid agencies, 9 other state agencies, 4 business coalitions, and 4 national organizations. 25 out of 33 contacted to participate after randomly selecting 40 from 80 possible sponsors and removing duplicates and non working phone numbers	(1) What CAHPS® consumer experience data do sponsors report?, (2) How do sponsors report this information?, and (3) What are sponsors' goals in reporting data?	CAHPS	Types of data in reports: % of respondents Both CAHPS® and Non-CAHPS Data 84 CAHPS® Data Exclusively 16 Health Plan-Level 92 Trend Data 48 Comparison Groups 91 Composite Measures 70 CAHPS® Supplemental Items 68 Ways Data Were Reported : Percent (Proportion) Intended Audience Public Only 44 (11/25) Limited Audience Only 8 (2/25) Both Public and Limited Audiences 48 (12/25) Media Web-Based 100 (25/25) Written 96 (24/25) Data Files 40 (10/25) Frequency of Reporting At Least One Report within Past 2 Years 88 (22/25) At Least One Report Annually 80 (20/25) Timing of Report Release Fall 52 (13/25) No Specific/Consistent Month 28 (7/25) Literacy Assessed Literacy of at Least One Report 54 (13/24)2 Among Those Assessing	Sponsors are engaged in many activities to produce and disseminate CAHPS data so it can be used. Area where additional work could make reports more effective include: tailoring reports to specific audiences, consider and adjust for literacy levels, more actively plan dissemination, evaluate reports, and selecting and working vendors to be sure they understand the report card.	AHRQ, CDC

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
							Literacy With Literacy Software Program 46 (6/13) By Internal Staff 38 (5/13) With Some Other Method (e.g., Focus Group) 23 (3/13) Translation Translation of at Least One Report into a Foreign Language 33 (8/24) ² Hired Vendor to do Translation(s) 100 (8/8) Dissemination of Report Notified Audience about at Least One Report 76 (19/25) Distributed Report by Regular Mail 68 (17/25) Distributed Report on Web Site 60 (15/25) Distributed Report by E-mail 28 (7/25) Evaluation of Reporting Process Conducted Any Type of Evaluation 52 (14/25) Hired Vendor to Assist with Evaluation 71 (10/14)		
Uhrig 2002 ¹⁹³	To test the effects of comparative quality information on plan choice.	Eastern and Central Pennsylvania, USA	Lab-type Experiment	226 Medicare Beneficiaries (age 65 or older)	Hypothesis 1: Probability of choosing the high-cost HMO, if choosing an HMO in any quality information group vs no information group. AND	CAHPS and HEDIS	Predicting the probability of choosing the high-cost HMO vs the Low-Cost HMO: Intercept - -0.7897 (beta-coefficient) p=0.5032 Scenario A - Intervention 1: 2.75 (beta-coefficient) p=0.0072 Scenario B - Intervention 1: 0.19 (beta-coefficient) p=0.8632	Authors conclude that the effect of quality information on plan choices differ by plan type. Information about plan quality did not alter Medicare beneficiaries' willingness to	AHRQ

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
					<p>Probability of choosing Original Medicare (instead of HMO) in these two groups.</p> <p>Hypothesis 2: Probability of choosing high-cost HMO, if choosing HMO in high ratings for plan compared to low rating for plan AND Probability of choosing Original Medicare (instead of HMO) in these groups.</p>		<p>Intervention 2: -1.71 (beta-coefficient) p=0.0907 Intervention 3: 3.32 (beta-coefficient) p=0.0009 Intervention 4: 0.197 (beta-coefficient) p-0.8117</p> <p>Predicting the probability of selecting Original Medicare vs an HMO: Intercept: 0.0557 (beta-coefficient) p=0.9297 Intervention 1: -0.1267 (beta-coefficient) p=0.8182 Intervention 2: 0.1267 (beta-coefficient) p=0.8274 Intervention 3: 0.2165 (beta-coefficient) p=0.6995 Intervention 4: -0.8009 (beta-coefficient) p-0.2040</p>	enroll in a Medicare HMO instead of Original Medicare.	
Uhrig 2006 ¹⁹⁴	To test the impact of content and format on choice of plans of different versions of employer-based and Medicare Advantage information.	Oregon and North Caroline	Lab-type Experiment	152 people 58 to 64 years old recruited through word-of-mouth and snow ball sampling.	(1) perceived utility of the materials, (2) understanding and awareness of the materials, (3) use of health plan quality information, and (4) health plan choice Control variables were education, gender, race, household income, and self-reported health	HEDIS and CAHPS information	<p>The new and alterative versions were</p> <ol style="list-style-type: none"> 1. rated significantly better on ease of use (p<.0001) 2. had significantly higher scores on a quiz about Medicare and health insurance (p<.01) 3. Use of Quality Information is more likely with non control materials <p>Comparison to control materials Variable OR (95%</p>	The new shorter materials with design elements selected to improve usability were easier to use and participants gained greater knowledge from them. They understood the comparative information better and were more likely to select high quality	AHRQ

Author Year	1. Study Purpose	2. Geographic Location	3. Study Design/ Type	4. Sample/ Population Procedure	5. Outcomes	6. Name of Public Report	7. Results	8. Summary	9. Funding of Research
					status.		Confidence Interval) *p<.05 Quality Information Use of Quality Information Choose with Care 5.68* (1.19, 27.19) Alternate 6.36 (0.80, 50.74) Plan Choice Appropriate Plan Choice Choose with Care 2.72* (1.05, 7.00) Alternate 3.33* (1.23, 9.01) High-Quality Plan Choice Choose with Care 3.24* (1.30, 8.09) Alternate 2.56* (1.04, 6.31)	plans. They were also more likely to select a plan that matched what they said was important to them.	

Appendix N. Long-Term Care: Quantitative Evidence

Section A

Table N1. Long-term care quantitative studies: Columns 1-10 of 18 (pages N-1 to N-6)

Author Year	1. Study Purpose and/or a priori Hypotheses (if stated)	2. Geographic Location	3. Study Design	4. Sample/Population or Population	5. Primary Comparison	6. Outcomes	7. Public Report: Name & Description*	8. Context: Environment	9. Context: Decision maker Characteristics	10. Context: Type of Decision/ Choice
Cai 2010 ⁷⁸	To examine trends in influenza vaccination in NHs before and after public reporting.	USA	Interrupted Time Series	All NHs in USA who reported vaccination rates in NH Compare. N=15,560	Vaccination rates for three flu seasons (2005-2006, 2006-2007, 2007-2008) after the publication of vaccination rates in NH Compare. Rates for NH residents compared to rates for Community Dwelling elderly.	Influenza vaccination rates for short and long-term nursing home residents.	NH Compare	None	High or low rates at baseline	None
Castle 2007 ⁷⁹	To determine if competition and excess supply influence NH compare quality scores over 1 year	USA	One Group Post Only	14,554 US NHs included in NH Compare for 2003 and 2004	NHs in markets with high competition and low occupancy rates to NHs in markets with low competition and high occupancy rates	Change in facility quality measures, number of facilities in with quality scores improved and declined, and odds of improvement in the high competition and/or low occupancy markets compared to low competition and high occupancy	NH Compare	Characteristics of market	None	None
Castle 2008 ⁸⁰	To examine nursing home quality scores after public reporting and determine if scores have improved accounting for regression to the mean. Also to determine if improvement varied according to market competition and occupancy rates.	USA	One Group Post Only	All Medicare and Medicaid certified NHs (N=14,224) in NH compare in 2004 and 2006	Trend in improvement post public reporting adjusted for regression to the mean. Sub group comparisons by market characteristics.	15 quality measures used in NH Compare	NH Compare	Competitiveness of market, Occupancy rates in the market	None	None

Author Year	1. Study Purpose and/or a priori Hypotheses (if stated)	2. Geographic Location	3. Study Design	4. Sample/Population or Population	5. Primary Comparison	6. Outcomes	7. Public Report: Name & Description*	8. Context: Environment	9. Context: Decision maker Characteristics	10. Context: Type of Decision/ Choice
Castle 2010 ⁸¹	To determine if the presence of nursing homes publicly designated to be of chronic poor quality influenced the quality of care at other nursing homes in the market; specifically to test whether the attention brought by the designation of a Special Focus Facility (SFF) has a spillover effect on the quality of other NHs in the same county.	USA	Comparison Groups Posttest Only	All NHs in USA with OSCAR and Medicare compare who are not designated as SFF (not persistent low quality). N=16,850.	NHs in counties that had one or more SFF in 2007 to NHs in counties where none had this designation	Deficiencies and quality indicators included in OSCAR and NH Compare	SFF designation on Nursing Home Compare	Presence of SFF in market	None	None
Gaudet 2011 ⁸²	To examine how nursing home performance changed in response to public reporting and how this varies across market and facility characteristics, particularly the proportion of black residents in NHs.	USA	Interrupted Time Series	N=528,378 NH quarterly observations in over 14,500 NHs (n of NH changed each year).	Change in quality measures pre NH Compare to post NH Compare	4 Quality Measures: 1. Physical Restraints 2. ADLs 3. Pressure Ulcers 4. Pain	NH Compare	Market competition	Ownership (non-profit, for-profit) % of Medicare residents % of Black Residents	None
Grabowski 2011 ⁸³	To evaluate the effect of NH Compare on facility performance and consumer demand for services	USA	Multiple Groups, Interrupted Time Series	US NHs providing data in 1st Quarter 1999 to 1st Quarter 2005 (25 quarters. n=15,553 NHs)	Quarters pre public reporting to post NH Compare in pilot and non pilot states.	Market share (market area defined as 25 km radius about the NH). Quality of Care (defined as each of five quality measures reported in NH compare: UTI, ADL loss, Physical restraints, Pressure ulcer in high and low risk patients.	NH Compare	Market competition	None	None

Author Year	1. Study Purpose and/or a priori Hypotheses (if stated)	2. Geographic Location	3. Study Design	4. Sample/Population or Population	5. Primary Comparison	6. Outcomes	7. Public Report: Name & Description*	8. Context: Environment	9. Context: Decision maker Characteristics	10. Context: Type of Decision/ Choice
Jung 2010 ⁸⁵	To examine the association between home health agency characteristics and improvement in quality after the release of Home Health Compare	USA	Time Series Post Only	All home health agencies reporting HH Compare data for at least two years from 2003 to 2007. n= 8,678 agencies with two years of data (92% of all agencies in HH Compare for these years).	Change in quality measures from 2003 to 2007 (yearly measures), and change by Home Health Agency Characteristics.	7 outcome measures in HH Compare every year from 2003 to 2007 % of patients who improve in 1. Bathing 2. Transferring to bed 3. Taking oral meds 4. Have less pain 5. Walking or moving around % of patients who 6. Need urgent care 7. Are admitted to the hospital	Home Health Compare	None	Home Health Agency Characteristics including Ownership, hospital-based, branch/chain affiliation, number of RNs (size of agency), Medicare tenure, and geographic region	None
Konetzka 2012 ⁸⁴	To determine if NHs respond to public reporting by rehospitalizing post acute care residents who might have a negative impact on their NH Compare scores before Day 14, the assessment on which the NH Compare scores are based.	USA	Multiple Groups, Interrupted Time Series	8139 NHs and 2,642,063 post acute patients with 10 to 20 day length of stay between 1999 and 2005. NH had to be included in NH Compare.	1999 to launch of NH Compare and after NH compare through 2005 and the pilot to the non pilot states	Discretionary re hospitalization within 14 days of admission to NH.	NH Compare	None	None	None
Mukamel 2010 ⁸⁸	To determine if NHs shifted resources from hotel to clinical activities in response to public reporting.	USA	Interrupted Time Series	10,022 free-standing Medicare and Medicaid certified NH over 6-years from 2001 to 2006 (54,235 observations)	2 pre report-card years and 4 post-report card years	Ratio of clinical to hotel expenditures for each NH by year	NH Compare	Market competition	Case mix, ownership, occupancy, Quality of care provided	none
Mukamel 2008 ⁸⁶	To examine whether NH quality of care has improved since NH Compare and whether improvement is associated with specific actions taken by NHs.	USA	Interrupted Time Series	For improvement over time: All USA NH 2001-2003 For association with actions: 10 percent random sample for a national survey of all Medicare and Medicaid certified NHs reporting NH Compare in November 2002. 724 out of 1502 (48.2%) responded.	Pre Public Reporting: 4th Q 2001 to 4th Q 2002 (publication) Post Public Reporting: 1st Q 2003 to 4th Q 2003.	1. Change in values and trends for 5 Quality Measures (change in ADLs; New infections, pressure ulcers, physical restraints, and pain). 2. Association of change with actions NHs Administrators reported taking in response to NH Compare	NH Compare	None	None	None

Author Year	1. Study Purpose and/or a priori Hypotheses (if stated)	2. Geographic Location	3. Study Design	4. Sample/Population or Population	5. Primary Comparison	6. Outcomes	7. Public Report: Name & Description*	8. Context: Environment	9. Context: Decision maker Characteristics	10. Context: Type of Decision/ Choice
Mukamel 2009 ⁸⁷	To investigate whether nursing homes 'cream skim' (admit healthier people) in response to NH Compare. Hypothesize that cream skimming is more likely among for-profit, high occupancy and NH with low quality scores. Chain affiliation and region of the country are considered by no direction of impact hypothesized.	USA	Interrupted Time Series	All Medicare and Medicaid certified NH in USA: N=16,745. Data on admission cohorts are based on people over 65 years old and long-stay not post-acute admissions.	Pre Reporting: 1st Q 2001 to 4th Q 2002 Post Reporting: 1st Q 2003 to 4th Q 2005. NH Compare changed in 1st Q 2004 and this time is noted as well.	6 Characteristics of people admitted to NHs: ADL limitations, Diabetes, Incontinence, PU stage 2 or higher, Pain, Memory loss.	NH Compare	None	Nursing home characteristics (for profit, chain, occupancy, initial quality scores, geographic region).	None
Park 2011 a ⁸⁹	To examine if high quality NHs or NHs that improve on publicly reported quality scores receive a return in terms of financial performance	USA	Interrupted Time Series	6,286 Medicare-certified NHs in US included in NH compare and for which quality and cost report data were available.	Pre NH Compare (1999-2002) to after (2003-2005)	Financial performance including revenues, expenses, operating and total profit margins.	NH Compare	None	None	None
Park 2011 b ⁹⁰	To determine if public reporting changes the relationship between financial performance and quality of care in NHs	USA	Interrupted Time Series	n=9444 NHs in US in NH Compare (pilot states excluded); 75,400 facility/year observations	Years prior to NH compare (1997-2002) to years post NH compare (2003-2006)	4 quality measures (total staff hours per resident day, incidence rates of pressure sores and restraint use, and total number of deficiency citations), and nursing home total profit margin	NH Compare	Market competition	For profit ownership	None
Stevenson 2006 ⁹¹	To determine if the reporting of deficiencies and staffing levels had an impact on occupancy rates for NHs	USA	Interrupted Time Series	USA Medicare/Medicaid certified free standing nursing homes N=87,739 nursing home quarters	Pre Reporting is period is prior to NHC--Oct. 15, 1998 (1996, 1997, 1998). Post: (1999, 2000, 2001, 2002). One, two and three years post were tested.	NH Occupancy rate by year	Deficiencies and Staffing	Market characteristics are included in alternate models to see if the produce different results	Size, for profit status, chain status, resident case mix are all included as controls, not characteristics	None

Author Year	1. Study Purpose and/or a priori Hypotheses (if stated)	2. Geographic Location	3. Study Design	4. Sample/Population or Population	5. Primary Comparison	6. Outcomes	7. Public Report: Name & Description*	8. Context: Environment	9. Context: Decision maker Characteristics	10. Context: Type of Decision/ Choice
Werner 2009a ⁹²	To determine whether public reporting resulted in improvements in reported and unreported quality of care for post acute care in NHs.	USA	Multiple Group Interrupted Time Series	NHs in Nursing Home Compare 1999 to 2005 N=8,137 including 5,899,327 stays of at least 14 days. Small NHs not included in NHC and 214,094 post acute stay of at least 14 days. N=2,277	1. Pre 2002 NH Compare launch vs. post 2. NHs in NH Compare vs. small nursing homes not included in NHC	NH Compare measures for post acute care (pain, delirium, improvement walking). Potential preventable re hospitalizations as a general, not reported quality measure	NH Compare	None	None	None
Werner 2009b ⁹³	To examine the effect of publicly reported quality information on unreported quality of care for post acute care in NHs	USA	Interrupted Time Series	13,683 NHs in US with MDS data for post acute patients from 1999 to 2005	pre NH Compare and post NH Compare for quality measures reported and quality measure not reported but that can be calculated from MDS	3 publicly reported measures from NHC: Pain, Delirium, Walking) 9 not publicly reported measures developed for post acute care: Improved pain, locomotion, Shortness of breath, Bladder incontinence, Respiratory infection, UTI, ADL, mid-loss ADL, early loss ADL. Professional nurse staffing changes	NHC	None	None	None
Werner 2010 ⁹⁴	To examine changes in quality in post acute care in NHs after NH Compare and determine to what extent consumer-driven changes in market share and provider-driven changes in quality are responsible for the improvements.	USA	One Group Pretest Posttest	All NHs (8,137) involved in public reporting for the 3 NH Compare post-acute care measures and 1,843,377 post-acute stays.	Pre: Twelve months before Post: Twelve months after launch of NH Compare	Change in three post acute quality measures (pain, delirium, improvement in walking) dissected into the portions attributable to 1. Nursing home specific quality improvements, 2. Changes in market share (consumer selection) and 3. Residual changes	NH Compare for Post Acute care	None	None	None

Author Year	1. Study Purpose and/or a priori Hypotheses (if stated)	2. Geographic Location	3. Study Design	4. Sample/Population or Population	5. Primary Comparison	6. Outcomes	7. Public Report: Name & Description*	8. Context: Environment	9. Context: Decision maker Characteristics	10. Context: Type of Decision/ Choice
Werner 2011 ⁹⁵	To determine if public reporting on post acute care in NHs results in changes in the types of people choosing high and low quality providers (patient sorting)	USA	Multiple Group Interrupted Time Series	Short stay (post acute) NH residents admitted from 2001 to 2003 n=8,139 NHs and 4,437,746 post acute admissions.	Period prior to public report and after. States where NH Compare was launched earlier as a pilot to non pilot states.	Patient risk (defined by admission assessment of pain, delirium and difficulty walking which correspond to the quality measures) and the match between patient risk and quality of the facility.	NH Compare for Post Acute Care	None	None	None
Werner 2012 ⁹⁶	To determine if public reporting influences patients' selection of NHs for post acute care.	USA	Multiple Groups, Pre-Post	n=7675 NHs in NH Compare that have more than 1 NH in their market n=3,008,731 admissions in 2000-2003 who did not have a NH admission in the prior year	2000-2002 pre NH Compare to 2003 post NH Compare Small NHs not in NH Compare use in the falsification test	Market Share	NH Compare or Post Acute Care	Capacity constraints	Education level	None
Zinn 2005 ⁹⁷	To examine the relationship between publicly reported quality measures and NH characteristics.	USA	Time Series Post Only	All NHs reporting for NH Compare during the time period N varies by quality measure over 13,00 for long-stay resident measures, over 9,000 for short-stay resident measures	5 quarters (15 months) NH Compare quarterly reports from Nov. 2002 (first publication) through January 2004	10 Quality Measures included in NH Compare at time of study	NH Compare	None	NH characteristics	none
Zinn 2008 ⁹⁸	To assess whether differences in strategic orientation are associated with differences in NH responses to NH Compare	USA	Cross-sectional	10% random sample of NH administrators. 724 out of 1502 responded (48.2%) Same survey as Mukamel 2007 and 2008	Cross sectional comparison of response to NH Compare by different types of strategic orientation: Prospectors change frequently and value innovation and flexibility Defenders focus on core services and emphasize operating efficiencies. Analyzeers blend characteristics of the 1st two. Reactors lack a strategy.	1. Immediate Response 2. No response to NHC 3. Discussed with residents or families 4. Investigate reasons for poor scores 5. Revise job descriptions 6. Change priorities for QI 7. Invest in new technology of equipment. All in response to NH Compare and all as self reported by survey respondents.	NH Compare	None	NH characteristics including for-profit status, chain affiliation, low quality scores, and perceived competitiveness of the market were control variables, not outcomes	none

Author Year	1. Study Purpose and/or a priori Hypotheses (if stated)	2. Geographic Location	3. Study Design	4. Sample/Population or Population	5. Primary Comparison	6. Outcomes	7. Public Report: Name & Description*	8. Context: Environment	9. Context: Decision maker Characteristics	10. Context: Type of Decision/ Choice
Zinn 2010 ⁹⁹	<p>To determine if NHs were motivated to invest substantial resources in response to NH Compare</p> <p>Hypotheses: Quality investments in response to public report will be associated with perceived influence on</p> <ol style="list-style-type: none"> 1. Professional referrals, 2. Patients and family choices; 3. State survey process. 4. In highly competitive markets, low-quality scores will be associated with investments to improve quality compared to NH with high scores. 5. Having a managed care contract will be associated with lower likelihood of making substantial resource investment in response to the public reporting 	USA	Cross Sectional	<p>10% random sample of nursing home administrators of all facilities with at least one quality measure reported on NH Compare in 2006</p> <p>538 responses of 1407 contacted (38.3%)</p>	Likelihood of investing resources to respond to NH Compare by administrator perceptions and NH characteristics	<p>Hired new nursing director</p> <p>Hired new medical director</p> <p>Hired more clinical staff</p> <p>Increased staff wages</p> <p>Other initiative to hire/retain staff</p> <p>Purchased new equipment/technology</p> <p>All self-reported by administrators in response to questions asking if these actions were undertaken specifically in response to NH Compare</p>	NH Compare	Perceived competitiveness of the market	For-profit, chain affiliation, strategic type of administrator	none

Section B

Table N2. Long-term care quantitative studies: Columns 11-18 of 18 (pages N-7 to N-24)

Author Year	11. Results: KQ1 (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI & other Behaviors)	14. Results KQ4:(Selection by Patients & Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ and Conflicts of Interest
Cai 2010 ⁷⁸	None	None	Vaccination rates (mean) for States and DC (n=51) (2005-6 pre-Report, 2006-7, 2007-8, change 2005-6 to 2007-8) Short-term residents 74.64, 76.99, 80.10, 5.46% Long-term residents 87.15, 87.88, 88.82, 1.67% Community dwelling 65.64, 68.80, 72.05, 6.41% 38 states experienced improvement in vaccination rates for short term residents and 29 states for long term residents.	None	None	NYS NH Vaccination rates by facility and baseline score, percent (2005-06 and 2006-07) Low baseline group Short term residents: 58.53; 70.22 Long term residents: 83.43; 86.81 High baseline group Short term residents 86.89; 85.33 Long-term residents: 93.62; 91.79	Immunization rates at NHs increased after public reporting in NH Compare, but rates also increased in community dwelling elderly suggested the increase may not be due to public reporting. Facilities that had low baseline scores were more likely to increase their vaccination rate.	NIA Conflicts: Not Reported
Castle 2007 ⁷⁹						Adjusted Odds Ratio (AOR) of highest quartile to lowest quartile (95% CI) for influence on quality measures Competition (AOR>1 greater competition-improvement), Occupancy (AOR>1 higher occupancy-improvement), Interaction (AOR>1 lower competition and high occupancy - improvement). Need for help with daily activities has increased 1.18 (1.03 to 1.27*) 0.85 (0.64 to 0.96**) 0.92 (0.76 to 1.05) Moderate to severe pain 1.10 (0.98 to 1.32) 0.97 (0.61 to 1.04) 0.99 (0.67 to 1.10) Low-risk residents who	5 Quality Measures (QM) have significant AOR for competition, indicating more improvement. 7 have lower AOR for occupancy also indicating more improvement. Improvements were most likely in highly competitive markets and in markets with low occupancy rates. This supports the idea that report card encourage improvement through market-driven mechanisms. 3 of the QM that show more improvement are	Funding: not reported Competing interests: none declared

Author Year	11. Results: KQ1 (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI & other Behaviors)	14. Results KQ4:(Selection by Patients & Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ and Conflicts of Interest
						<p>have pressure sores 1.14 (1.01 to 1.26*) 0.86 (0.70 to 0.97*) 0.88 (0.71 to 0.97*)</p> <p>Physically restrained 0.81 (0.76 to 1.03) 1.11 (0.90 to 1.32) 0.91 (0.86 to 1.12)</p> <p>More depressed or anxious 0.95 (0.80 to 1.02) 0.96 (0.80 to 1.12) 0.97 (0.82 to 1.15)</p> <p>Lost control over their bowels or bladder 0.92 (0.81 to 1.08) 0.98 (0.81 to 1.22) 0.93 (0.78 to 1.19)</p> <p>Catheter inserted and left in 1.07 (0.89 to 1.10) 0.89 (0.77 to 1.00*) 0.90 (0.79 to 0.98*)</p> <p>Spend most of their time in bed or in a chair 0.93 (0.81 to 1.05) 0.90 (0.72 to 1.15) 0.95 (0.77 to 1.12)</p> <p>Ability to move about has become worse 0.96 (0.86 to 1.11) 0.93 (0.88 to 0.99*) 0.95 (0.82 to 0.99*)</p> <p>Urinary tract infection 0.95 (0.86 to 1.05) 1.03 (0.93 to 1.12) 0.93 (0.86 to 1.10)</p> <p>Lost too much weight 0.87 (0.79 to 1.08) 0.91 (0.88 to 1.13) 0.97 (0.89 to 1.10)</p>	<p>for short-stay residents, NH may be more open to influence by market forces for short stay (Medicare rates are higher and turn over may allow faster gains in improvement).</p>	
Castle 2007 ⁷⁹ Cont.						<p>Short-stay residents with delirium 1.25 (1.04 to 1.29*) 0.85 (0.69 to 0.99*) 0.88 (0.70 to 0.97*)</p> <p>Short-stay residents with moderate to severe pain 1.21 (1.07 to 1.33*) 0.73 (0.61 to 0.95*) 0.75 (0.68 to 0.98*)</p>		

Author Year	11. Results: KQ1 (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI & other Behaviors)	14. Results KQ4:(Selection by Patients & Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ and Conflicts of Interest
						Short-stay residents with pressure sores 1.15 (1.03 to 1.27*) 0.84 (0.78 to 0.97*) 0.99 (0.70 to 1.17) Overall quality measures' difference 1.12 (1.03 to 1.16*) 0.89 (0.76 to 0.98*) 0.93 (0.79 to 0.97*)		
Castle 2008 ⁸⁰	<p>Mean 2004, Mean 2006, Relative Change (negative is improvement in quality):</p> <p>Long-stay residents Increased Help with Daily Activities: 15.39, 15.68, 2%* Pain: 6.32, 5.03, -20%* High-risk with Pressure Sores: 13.43, 12.80, -5%* Low-risk with Pressure Sores: 2.59, 2.42, -7%* Physically Restrained: 7.26, 6.13, -16%* More Depressed: 14.66, 14.45, -1%* Lose Control of Bowel or Bladder: 47.68, 48.66, 2%* Catheter: 5.91, 5.79, -2%* Most Time in Bed or Chair: 4.21, 4.21, 0% Worse Ability to Move Around:12.18, 12.56, 3%* Urinary Tract Infection: 8.64, 8.74, 1%* Lose Too Much Weight:8.63, 8.73, 1% Short-Stay Residents Delirium: 2.97, 2.31, -22%* Pain: 23.11, 21.47, -7%* Pressure Sores: 19.16, 18.39, -4%* *significant at .05 using a paired t-test</p>	none	None	none	None	<p>Influence of competition AOR (95% CI) and Occupancy AOR (95% CI) on Quality Measures AOR<1 = high competition associated with improvement AOR>1 low occupancy associated with improvement Long-stay residents Increased Help with Daily Activities: 0.69 (.55-.85)**; 0.79 (.67-.94)** Pain: 1.05 (.84-1.12); 1.10 (.87-1.39) High-risk with Pressure Sores: 0.45 (.19-.77)**; .90 (.68-1.19) Low-risk with Pressure Sores:0.89 (.69-1.44); 0 .61 (.45-.82)*** Physically Restrained: 1.41 (.86-2.32); 0.9 (.71-.96)** More Depressed: 0.77 (.63-.97)**; 0.81 (.68-.96)* Lose Control of Bowel or Bladder: 0.95 (0.59-1.52); 0.84 (.67-.99)* Catheter: 1.02 (.90-1.15); 0.99 (.82-1.19) Most Time in Bed or Chair: 0.94 (.87-.99)*; 0.93 (.75-1.16) Worse Ability to Move Around: 0.96 (.79-1.17);</p>	<p>From 2004 to 2006, improvement in 9 quality measures, decline in 5 and 1 stayed the same. All but 2 (the no change and a 1% increase in % of residents who lose too much weight) were statistically significant (p<.05). Improvements ranged from a 20% reduction in residents with pain to a 1% reduction in % of residents more depressed or anxious.. The largest decline was a 3% increase in t% of residents whose ability to move around in their room got worse.</p> <p>Stratifying the changes by the lowest 10% and highest 10% at baseline indicated that there may be some regression to the mean and for variables where this may be the case, an adjusted</p>	Not Reported

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						0.72 (.58-.89)** Urinary Tract Infection:0.85 (.61-.97)*; .82 (.72-.95)** Lose Too Much Weight: 0.43 (0.29-0.85)*; 0.89 (.59-.99)* Short-Stay Residents Delirium: 0.97 (.77-.99)*; 0.81 (.69-.95)* Pain: 0.81(.67-.98)**; 1.10 (.91-1.32) Pressure Sores: 0.93 (0.59-1.46); 0.81 (.63-.99)*	change score was calculated which reduced the magnitude but did not eliminate the improvement. Improvements were most likely in highly competitive markets for 8 quality measures and in markets with low occupancy rates for 10 quality measures. This supports the idea that report card encourage improvement through market-driven mechanisms.	
Castle 2010 ⁸¹		none	None	none	None	Impact on quality measure of having a SFF NHs in the county Coefficient (SE) for model with all facilities. High-risk residents with Pressure Sores -.201 (.039) ** Low-risk residents with Pressure Sores -.073 (.042)* Residents with UTI -.261 (.101)* Short-stay residents with the Pressure Sores -.044 (.031)* Any deficiency .152 (.038) ** Quality deficiency citations .137 (.079)* *p≤.01; **p≤.001 Remainder of quality indicators were not significantly different. When only the subset of NHs below the median	The analyses provide partial and relatively weak evidence of spill over of improved quality in counties with a SFF receiving attention for poor quality for the NHs in the county that had poorer quality when the SFF was designated. The increase in deficiencies is counter to the spillover hypothesis. In both cases, however the number of deficiencies and quality of care deficiencies cited during inspection	NIA

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						on quality rating in the county are compared, 8 out of 22 quality indicators are higher in counties with SSF. Additional measures with significant differences are pain, depressed; lose too much weight, and flu vaccine.	surveys were higher for facilities in counties with a SFF.	
Gaudet 2011 ⁸²	<p>Change Associated with NH Compare</p> <p><u>Restraints:</u> Significant improvement at introduction (intercept) and post NH Compare slope increased.</p> <p><u>Pressure Ulcers:</u> Decline at introduction and significant but small gain post NH Compare</p> <p><u>ADL</u> Significant decrease at introduction and decline post NH Compare</p> <p><u>Pain</u> Significant improvement after introduction and positive change rate of change post NH Compare</p>	None	None	None	None	<p><u>% of Medicare residents</u> minimal impact on performance change (-0.01 change in intercept for restraints and PUs; .004 per quarter gain in ADL performance after NH compare)</p> <p><u>Non Profit Ownership</u> No significant impact on performance.</p> <p><u>Market competition</u> No significant impact on performance. County was used for market</p> <p><u>% of Black Residents</u> Gap in baseline quality was not always in the direction expected. Impact of NH Compare is smaller on facilities with the highest portion of black residents for 3 measure of 4 measures (ADL, Restraints, Pain) when change in intercept is considered and in 2 of 4 (ADL, PU) when considering change in slope.</p>	Improvement in quality associated with NH Compare varied by quality measure. Market and Facility Characteristics were not found to influence the impact of NH Compare.	AHRQ
Grabowski 2011 ⁸³	The coefficients on the dummy variable for the introduction of NH Compare were not statistically significant in any of	None	None	No Impact of NH Compare on Selection (Market Share)	None	The coefficients on the interaction term of the introduction of NH Compare with an	NH Compare has no overall effect on quality of care. NHCs in more competitive	NIA

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	<p>the models with a different QM as the dependent variable. Coefficient/SE/N (facility quarters) UTI : 0.013 /0.017/ 369,907 ADL loss: 0.002/ 0.018/ 367,998 Physical Restraints:0.015/0.021/369,913 PU, high risk: - 0.012/0.020/366,338 PU, low risk: - 0.028/0.033/364,597</p> <p>The estimated effects were also insignificant.</p>			<p>NH quality below bottom quartile vs. /top quartile Coefficient (NS unless noted) UTI : - 0.0001/0.007 ADL loss: 0.0009 (sig. at 10% level) /0.002 Physical Restraints: - 0.0001/0.008 PU, high risk: 0.006 /0.009 PU, low risk: - 0.003/0.010 (sign. At 5% level)</p>		<p>measure of market competitiveness were statistically significant for two of the five QMs Coefficient/SE/N (facility quarters) UTI : -0.040 /0.029/ 369,907 ADL loss: 0.036/ 0.024/ 367,998 Physical Restraints:- 0.022/0.051/369,913 PU, high risk: 0.062/0.034/366,338 significant at 10% level PU, low risk: 0.217/0.048/364,597 significant at 1% level</p>	<p>markets do seem to respond to public reporting by increasing quality and the magnitude of the impact estimated by the models is meaningfully large (going from 2 to 5 facilities in a market would result in a 15% or 89% of standard deviation increase in quality for pressure ulcers in high and low risk residents respectively.</p>	
Jung 2010 ⁸⁵	<p>Scores improved for all five of the measures related to the management of daily activities, but the degree varied by measure from 7.1% increase (3.4 percentage points) for transferring to bed to 18.9% (5.7 percentage points for ability to walk around). Urgent care did not change and hospitalizations increased (interpreted as a decline in quality). [Data not shown in tables].</p> <p>The percentage of agencies that: Improved, No change, Worsened 1. Bathing 61.9, 10.8, 27.4 2. Transferring to bed 54.9, 10.8, 34.3 3. Taking oral meds 59.8, 11.9, 28.3 4. Have less pain 57.2, 11.5, 31.3 5. Walking or moving around 62.1, 11.1, 26.8 % of patients who</p>	None	None	None	None	<p>Quality scores generally improved for all types of agencies. For profits were higher on some measures at baseline but by 2007 nonprofits had improved more and had better performance for all measure. Agencies with lower baseline scores improved more. Agency types associated with higher quality at baseline often had larger improvements. [Data presented graphically, unable to extract values].</p>	<p>Quality measures for patient's ability to manage activities improved while urgent care and hospitalization did not. Baseline quality scores for 2003 varied by agency characteristics but the differences were small (3.6% to 11.3% of the mean depending on the measure). Not for profits did best on 4 of 7 measures, and for profits on 3 of 7. Hospital-based and larger agencies also had higher scores at baseline. There were no patterns in Medicare certification or region.</p>	<p>Social Science Research Institute at Pennsylvania State University Conflicts: none declared</p>

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	6. Need urgent care 41.5, 13.4, 45.2 7. are admitted to the hospital 47.2, 12.0, 40.8						Agencies with lower baselines, nonprofits, hospital-based, and agencies with longer Medicare Tenure improved more.	
Konetzka 2011 ⁸⁴	None	1.2 % point increase in discretionary hospitalizations by day 14 (sample average of 18.8%) after public reporting. Coefficient on public reporting indicator 0.0121; robust standard error 0.00007, p<.01 Controlling for secular trends (comparing the pilot and non pilot states) the increase is still significant, but smaller at 0.5 percentage points. Non discretionary hospitalizations decreased after public reporting. The increase in discretionary hospitalizations was greater in patients at higher risk of scoring poorly on NH Compare indicators at day 14, even controlling for risk at admission.	None	None	None	None	Authors document that increase in re hospitalization is an unintended, negative consequence of public reporting. This suggests that gaming in order to improve publicly reported scores is not limited to selection of patients/residents at admission, but can also occur at other points in the care process.	Not reported
Mukamel 2010 ⁸⁸	None	None	Ratio of clinical to hotel expenditures increased significantly (p<0.0001) by 5% after publication of NH Compare. Average ratio: 1.78	None	None	The stratified results support the author's assumptions: NH with lower quality scores, lower occupancy, for-profit,	NHs do appear to have increased their expenditures on clinical services after the public release of NH	NIA Conflicts: Not Reported

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			Pre: 1.71 in 2001; 1.72 in 2002 Post: 1.76 in 2003; 1.84 in 2004; 1.85 in 2005; 1.80 in 2006 To get the same increase in expenditure ratio would require a 17% increase in case mix or a 27% increase in Medicare residents. Controlling for differential growth in the costs of clinical verses hotel services using the CPI reduced the effect by 75%, it remained significant.			chain owned and in more competitive markets increased their clinical to hotel expenditures after reporting.	compare. This is supported by the fact that subgroups expected to be more sensitive to public reporting (e.g. those in competitive markets) shifted more resources to clinical services.	
Mukamel 2008 ⁸⁶	Impact of Public Reporting on Quality Measures (Time Trend Change-all NHs, Change in Level: Demo States, Change in Level. Non Demo States) Physical Restraints 0.09, -0.92**, -0.74* Short-term Pain 0.12, -2.78***, -2.54*** Pressure Ulcers 0.05, 0.47. 0.56* ADLs 0.07, 0.48, 0.62 Infections -.18, -0.14, 0.23 ***p<=.0001 **.001<p≤.01 * .01<p<.05	None	Change in Level by Number of Actions Taken (1,2, 3, 4,5) Physical Restraints -.62, -.89*, -1.09***, -1.22***, -1.29*** Short-term Pain: -2.38**, -2.48***, -2.58***, -2.68***, -2.77*** Pressure Ulcers .52*, .52*, .52*, .52*, .52* ADLs .64, .40, .22, .12, .08 Infections .16, .06, -.01, -.06, -.08 ***p<=.0001 **.001<p≤.01 * .01<p<.05	KQ4: none	None	None	Improvement was found in some but not all of the QM studied, all of which were publicly reported. Changes were linked to actions taken in response to reports. Based on prior improvement trends, NHC publication generated the equivalent of 3 years of improvement prior to the public report.	NIA Stated: no disclosure or disclaimers
Mukamel 2009 ⁸⁷	None	Significant decline (0.5 one-tailed tests) in post publication admissions ADL limitations: none Diabetes: none Incontinence: none PU stage 2 or higher: none Pain: 2.5 percentage points; 13% fewer admissions around time of first publication	None	None	None	Significant decline (0.5 one-tailed test) in post publication admission when stratified by ownership, full occupancy status, having a low QM reported in first publication, chain affiliation and geographic region. ADL limitations: none Diabetes: none Incontinence: none PU stage 2 or higher:	Empirical analyses found cream skimming in 2 of 6 admission cohort characteristics but the effect sizes were not large. Four of the six characteristics did not decline in people admitted post NHC, suggesting there was no cream skimming. For the	NIA Conflicts: Not Reported

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		Memory loss: 0.4 percentage points; 0.7% fewer admissions around the time NH Compare changed in 1st Q 2004.				none Pain: NH in bottom 20th percentile for state has a stronger and sustained decline in admissions. Tendency to cream skim about for-profit and non-profit, but not government NH Memory loss: Tendency to cream skim among for-profit and chain affiliated NHs.	four admission characteristics in which there was no decline, a no decline was found in stratified analyses by NH types, suggesting the overall analyses were not hiding cream skimming. For pain the evidence of some cream skimming is seen across the subgroups with no differences by chain affiliation or region while for-profits and non profits were more likely to cream skim than government-owned NH about the strongest effect is that NH with poorer quality scores at initial publication were more likely to cream skim. For memory loss the subgroups with more cream skimming were for-profits, chain affiliation and, for only one follow-up Q, low quality NHs.	
Park 2011 a ⁸⁹				NHs with high quality scores or those that improve on publicly reported scores: increased market share and more Medicare admissions which lead to higher			NHs that have higher quality scores or improve in quality had better financial performance (increase in revenue) after public reporting.	AHRQ

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				<p>revenues and increased profit margins. The advantage comes primarily through increased Medicare admissions, which are financially advantageous. The difference was statistically significant when facilities were stratified by improvement (improved, no change, worse) and not significant when stratified by level of quality score (high, middle, low). Cost savings did not differ across the groups.</p>				
Park 2011 b ⁹⁰	None	None	<p>Interaction terms (profit margin and indicator of public reporting) were significant for three of the studied quality measures: total staff hours per resident day (0.118 [7.08 minutes] p<0.01) , incidence rates of pressure sores (-0.201, p<0.01), and Total number of deficiency citations (-0.034, p<0.05)). For restraint use the change pre and post public reporting was not significant (0.17 p>.1)</p> <p>For a 25% increase in profit margin (mean total profit margin is 1.1%), the mean relative change in each</p>	None	None	<p>For profit facilities: significantly higher quality with higher profit margin on the three of the four measures studied after public reporting Non profit facilities: the change in the relationship between profit and quality was only significant for deficiencies. The positive association between profit and quality increased more after public reporting in competitive markets (5.3%) then in less competitive markets (1.9%).</p>	Public reporting changes the relationship between profit and quality in the way models of economic incentives predict, but these changes are small and may not be clinically important.	AHRQ and VA

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			quality measure is less than 1%. For example: Pressure Ulcer incidence predicted to decline 0.0005 percentage points (0.14% of the overall mean of 3.7%) or a reduction of 40 pressure ulcers in 786,297 residents.					
Stevenson 2006 ⁹¹	None	None	None	Mean NH occupancy rate for the entire period was 86%. Regression with DV=NH occupancy rate of next period. IV = deficiencies and staffing levels in prior period. Regression coefficients Prior deficiencies -0.038 Prior serious deficiencies - 0.372 Prior nurse staff 0.021 Prior aide staff - 0.008 all significant p<0.05 r-squared: 0.75	None	None	While finding support for the idea that public reporting has an impact on selection of NH, the effect sizes are small. Occupancy rate may not be the most appropriate outcome measure as it is constrained in its potential to change. Regression analyses including alternative models, all find an effect of the quality or staff reporting on occupancy, but the effects are small: an increase in 10 deficiencies would result in 0.4 percent decrease in occupancy.	NIA
Werner 2009 a ⁹²	Within NH changes associated with NH Compare No pain 2.0 percentage points improvement (base 76%) No delirium 0.5 percentage points improvement (base 96%) Improved walking 0.2 percentage points improvement (base 7%) Preventable re hospitalizations declined slightly (.075 to .05-- estimated from graph)	None	None	None	None	None	All three reported quality measures and potentially preventable re hospitalizations improved over time. (Same numbers reported as other Werner article) When Using the NHs not in NH Compare to control for secular trends,	Funding: AHRQ, VA, PA Department of Health Stated: no disclosure or disclaimers

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	<p>Repeated model with small, non reporting I NHs as a control for secular trend No pain: improvement but decreased magnitude No delirium: no difference from pre-post model above Improved walking: improvement and increased magnitude Preventable hospitalizations: Slightly worsening then stable</p> <p>All changes pre and post NH compare $p < .01$</p>						<p>improvements in pain and walking occur after NHC, while delirium shows no change after this adjustment. Re hospitalizations worsen slightly after NHC and then stayed the same in the model with this adjustment.</p> <p>These improvements are within-NH changes rather than changes in market share or case mix as propensity scores were used to match cases for comparison constraining these variables. These are tested within NHs at the facility level. Propensity scores are used for matching residents, so changes in market share are constrained and what is measured is provider-driven improvements.</p>	
Werner 2009 b ⁹³	None	<p>Change After NH Compare At implementation (2002-2003); between pre (2000-2002) and post (2003-2005) Reported Measures Pain: .0256; .0294 Delirium: .00486; .0139 Walking: .00377:</p>	None	None	None	None	<p>Several unreported measures also improved after NHC launch and persisted through the post period; but several declined, though these trended down from 2000 through 2005 suggesting they might not be</p>	<p>AHRQ, University of PA, VA and PA Department of Health. No conflicts</p>

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		<p>.00863 Not Reported Improved Pain .0251; .0189 Locomotion: .00341; .00368 Shortness of Breath: .00592; .0105 Bladder Incontinence: .00619; .0111 Respiratory Infection: -.00323; .00918 UTI: -.00255; - .00902 ADL: -.00946; - .0268 Mid-loss ADL: .00900; -.00973 Early-loss ADL: - .00835; -.0242 all p<.01 Change in Not Reported Pre-Post NHC (High Scoring on Reported, Low Scoring on Reported) Improved Pain .047***, -.0149*** Locomotion: .0103***, -.00512 Shortness of Breath: .0211***, -.00482* Bladder Incontinence: .00931***, .00619** Respiratory Infection: .00107, .000697 UTI: -.00445***, .0173*** ADL: -.0319***, - .0278*** Mid-loss ADL: - .00656***, -.0163*** Early-loss ADL: -</p>					<p>associated with NHC.</p> <p>The stratified analyses found that in general facilities that were high on reported measures improved on unreported measures. When quality declined overall for an unreported measure it was greater for the facilities who had lower quality reported measures. Reported and unreported quality of care improved after NHC. Improvements in unreported care were larger among facilities with high scores on reported measures. This supports the theory that quality improvement 'spills over' rather to other areas rather than 'crowding out' improvement in other areas.</p> <p>Authors conclude crowding out does not appear to be an unintended consequence of public reporting and suggest that a growing divide between NHs able and unable to do QI might be the</p>	

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		.023***, -.0277*** Nursing Staffing: -.0304***, -.0388** **p<.05; ***p<.01					consequence.	
Werner 2010 ⁹⁴	Without Moderate to Severe Pain:73.8% at baseline and 77.3% post 2.4 percentage point increase in pts without pain due to NH QI, 1.6 percentage points due to change in market share -0.5 percentage point reduction due to residual (case-mix) No delirium: 96.2% for pre NHC and 95.5% post NHC. No change due to NH QI, 2.9 percentage points improvement due to market share - 2.7 percentage points reduced quality due to residual changes. Improvement in walking: Overall no change. 0.3 percentage points improvement due to NH QI, 1.1 percentage points due to market share. -0.9 percentage reduced quality due to residual changes.	None	None	None	None	None	Both provider (NH QI) and market share (patient selection) explain observed improvements in quality. However the residual changes (here due to case mix) suggest these are not the only two pathways from public reporting to improvement, specifically that patients with different severity of illness may choose differently.	AHRQ and VA Conflicts: Not Reported
Werner 2011 ⁹⁵	None	Examines cream-skimming and down coding. A decline in the admission levels of pain after public reporting suggests facilities may be down coding high risk patients. No evidence of cream-skimming.	None	With public reporting high-risk patients are more likely to be admitted to high-quality facilities: Significant for pain but not for delirium or difficulty walking. Correlations between risk & scores on the	None	None	Authors conclude public reporting leads to better patient sorting with higher risk patients going to higher quality facilities. They also find some evidence that facilities are down coding in response to public reporting. Authors suggest one implication is	AHRQ and VA

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				<p>quality report increased significantly after public reporting in the pilot and non pilot states for pain, but then declined. Coefficients on the interaction of the quality score and the indicator for public reporting was significant for pain (0.095 p-value <.01) but not for delirium or difficulty walking. For pain, a 10 point higher facility quality score was associated with about 1 percentage point higher admission pain level in the next quarter.</p>			<p>the public reporting could have more of an impact on sickest patients and therefore looking at changes in selection or quality overall could underestimate the impact of public reporting.</p>	
Werner 2012 ⁹⁶	None	None	None	<p>The interaction term which represents the effect of public reporting on the choice of a nursing home after NH Compare is available are positive and significant for the pain quality measure (0.082, p<.05), near 0 for delirium, and negative for improved walking.</p>	None	<p>Patients with higher education levels have a slightly larger response to publicly reported information: Differences between less than HS and HS or more are small but significant for all three quality measures.</p> <p>Report card scores have a greater impact on NH with lower occupancy.</p> <p>Small NHs that were not required to report for NH Compare experience a reduction in market share when they are in</p>	<p>Public reporting resulted in small increases in selection of high scoring facilities (increase in market share). People with a higher level of education are more likely to pick higher level facilities. Facilities with lower occupancy, that is less capacity constraints, are more likely to experience increased market share with higher quality scores.</p>	AHRQ and VA

Author Year	11. Results: KQ1 (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI & other Behaviors)	14. Results KQ4:(Selection by Patients & Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ and Conflicts of Interest
				<p>The interpretation of the change in market share related to the pain quality measure being publicly reported is that a NH with a pain score that changes from the 25th to the 75th percentile would increase its market share by 1.3 percent (calculated by simulation).</p> <p>Several falsification tests confirm the findings.</p>		<p>markets with NHs that do report. This suggests people interpret the lack of information as lower quality.</p>		
Zinn 2005 ⁹⁷	<p>Mean % of residents over 5 quarters (1, 2, 3, 4, 5) estimated from graph [significant at 0.01 and visual trend for 4 of 10 quality measures]</p> <p>Long-Stay Residents Pain: 10.8, 10.2, 8.8, 7.8, 7.2 Physical Restraints: 9.8, 9.6, 9, 8.5, 8.2</p> <p>Short-Stay Residents Delirium: 3.8, 3.6, 3.4, 3.1, 3 Pain: 25.4, 25.8, 24.8, 23, 22.6</p> <p>Following were statistically significant, but no trend on visual inspection.</p> <p>Long-Stay Residents Loss in Basic Daily Tasks: 15.5, 15.2, 15.5, 16, 15.3 Pressure Sores: 8.5,8.4, 8.5, 8.9, 8.9 Pressure Sores risk adjusted: 8.5, 8.3, 8.5, 9.3, 9.1 Infection: 14.6, 4.2, 15, 15.4, 15</p>	None	None	None	None	<p>5 Quality Measures that showed improvement were examined by NH characteristic (40 models). 8 Were statistically significant in terms of decline. (Unable to estimate from graph). Differences from baseline to last quarter by NH characteristic are notable in 3 cases.</p> <p>Delirium: low occupancy rate % greater than high occupancy rate Baseline 25%; Last Quarter 15% Pain Short Stay: Non chain % greater than chain Baseline 4%; Last Quarter 2% Pain Long Stay: Hospital-based% greater than non</p>	<p>All but one of the quality measures had changes that were statistically significant (0.01 level) over the time period; graphical analyses found trends in pain (long and short stay residents), physical restraints, and delirium (adjusted and unadjusted for NH case mix)</p> <p>Differences were found at baseline across types of NHs: Nonprofit, non chain, smaller, and high occupancy NH started with better scores. But the trend lines for the different types of</p>	Not Reported

Author Year	11. Results: KQ1 (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI & other Behaviors)	14. Results KQ4:(Selection by Patients & Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ and Conflicts of Interest
	<p>Short-Stay Residents Delirium Risk Adjusted: 3.8, 3.2, 3.2, 3, 2.9</p> <p>Walking for Short-Stay Residents was not significant.</p>					<p>Hospital Baseline 13%; Last Quarter 6%</p>	<p>NH do not cross, suggesting limited differences in response across NHs defined by these characteristics.</p>	
Zinn 2008 ⁹⁸	None	None	<p>Odd Ratios Results from Logistic Regression for Action Taken by Strategic Orientation (Defender, Prospector, Analyzer Reactor) followed by other significant variables</p> <ol style="list-style-type: none"> Immediate Response (Ref, 1.58**, 1.39*, 0.26**) for profit status 0.62**; Perceived completion 1.15* No response to NHC (1.62*, Ref., 0.96, 1.54) Initial quality 0.89*; perceived competition 0.79*** Discussed with residents or families (Ref., 1.49, 1.24, 0.98, 0.96) Chain affiliation 1.49+; perceived competition 1.37*** Investigate reasons for poor scores (Ref., 1.59**, 1.54*, 0.64) initial quality 1.14* Revise job descriptions (Ref., 2.02**, 1.18, 0.52) initial quality 1.21*; perceived competition 1.21+ Change priorities for QI (Ref., 1.89***, 1.67**, 0.84) initial quality 1.10+ Invest in new technology of equipment: none (0.83, Ref., 1.63+, 0.43) for-profit 1.57+; initial quality 1.14+ <p>+p, .10, *p<.05, **p<.01, ***p, .001</p>	None	None	<p>Immediate response: more likely with higher perceived competition and less likely (38% reduction in odds) with for-profit status. Chain status and initial quality had no impact.</p> <p>Poor quality and higher perceived competition associated with no action taken.</p> <p>Score are more likely to be explained in competitive markets and by chain NH.</p> <p>Facilities with low initial scores were more likely to investigate reasons for scores and change QI program priorities.</p>	<p>Finding suggest if, when and how NHs respond to NH compare varies according to the strategic orientation of the NH. (Comparisons are to defenders) Compared to defenders, prospectors are 58 percent more likely to respond immediately.</p> <p>Defenders compared to prospectors were 62 percent more likely to take no action.</p> <p>No statistically significant difference was found in discussing scores with residents or family.</p> <p>Prospectors and Analyzers were more likely to investigate reasons for scores.</p> <p>Prospectors were twice as likely to revise job descriptions.</p> <p>Prospectors are</p>	NIA Conflicts: Not Reported

Author Year	11. Results: KQ1 (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI & other Behaviors)	14. Results KQ4:(Selection by Patients & Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ and Conflicts of Interest
							<p>twice as likely and Analyzers 67 percent more likely to change priorities of existing quality programs.</p> <p>No differences were found purchasing new technology or equipment.</p>	
Zinn 2010 ⁹⁹	None	None	<p>Odd ratio (se) QMs influence professional referrals a. Hired new Nursing Director 2.31 (.88)** b. Hired new Medical Director 2.64 (1.04)*** c. Hired more clinical staff 0.95 (0.30) d. Increased staff wages 1.11 (0.33) e. other initiatives to hire/retain staff 1.86 (0.66)** f. Purchased new technology/equipment 2.54 (1.05)** QMs influence choice of facility a. Hired new Nursing Director 0.83 (0.31) b. Hired new Medical Director 0.66 (0.24) c. Hired more clinical staff 2.29 (0.75)*** d. Increased staff wages 1.23 (0.35) e. other initiatives to hire/retain staff 1.06 (0.40) f. Purchased new technology/equipment 0.94 (0.39) QMs influence state survey process a. Hired new Nursing Director 1.87 (0.50)*** b. Hired new Medical Director 3.41 (1.31)****</p>	None	None	<p>Interaction of perceived level of competition (high/low) with quality (based on public reported scores).</p> <p>Odds of taking action in response to quality reporting Low High SE quality quality</p> <p>Hired new nursing director High competition 3.26* 1.0 1.81 Low competition 0.70 1.0 0.27 Hired new medical director High competition 1.34 1.0 0.86 Low competition 1.22 1.0 0.73 Hired more clinical staff High competition 1.18 1.0 0.38 Low competition 0.70 1.0 0.24 Increased staff wages High competition 3.13** 1.0 1.24 Low competition 0.93 1.0 0.24 Other initiatives to hire/retain staff High competition 2.95*</p>	<p>When administrators perceive that NH Compare influence professional referrals this increased their odds of hiring new nursing and medical directors, other initiatives to hire/retain staff and purchases of equipment or technology. Consumer choice being influential was only associated with hiring more staff. When administrators thought the staff survey process was influenced by NH Compare, the most actions were taken. In highly competitive markets, low quality NH are most likely to take action in response to NH Compare. Having a Managed care contract did reduce</p>	NIA Conflicts: Not Reported

Author Year	11. Results: KQ1 (Health Care Outcomes)	12. Results: KQ2 (Harms)	13. Results: KQ3 (Provider Outcomes-QI & other Behaviors)	14. Results KQ4:(Selection by Patients & Payers)	15. Results: KQ5 (Impact of Public Report Characteristics)	16. Results: KQ6 (Impact of Contextual Factors)	17. Summary/ Conclusion	18. Funder of Research/ and Conflicts of Interest
			<p>c. Hired more clinical staff 2.30 (0.72)****</p> <p>d. Increased staff wages 1.44 (0.25)**</p> <p>e. other initiatives to hire/retain staff 1.33 (0.29)</p> <p>f. Purchased new technology/equipment 1.84 (0.54)**</p> <p>Have a Managed Care Contract</p> <p>a. Hired new Nursing Director 0.64 (0.17)*</p> <p>b. Hired new Medical Director 0.37 (0.16)***</p> <p>c. Hired more clinical staff 0.67 (0.14)*</p> <p>d. Increased staff wages 0.71 (0.17)</p> <p>e. other initiatives to hire/retain staff 1.07 (0.43)</p> <p>f. Purchased new technology/equipment 0.92 (0.24)</p> <p>*p .10. **p .05. ***p .01. ****p .001</p>			<p>1.0 1.52</p> <p>Low competition 1.06</p> <p>1.0 0.35</p> <p>Purchased new equipment/technology</p> <p>High competition 0.61</p> <p>1.0 0.25</p> <p>Low competition 1.80</p> <p>1.0 0.86</p> <p>*p < .05. **p < .01.</p>	<p>administrator likelihood of taking these actions.</p>	

Appendix O. Long-Term Care: Qualitative Evidence

Table O1. Long-term care qualitative studies: Columns 1-9 of 9 (pages O-1 to O-6)

Author Year	1. Study Purpose	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/Type	4. Sample/Population Procedure	5. Outcomes	6. Name of Public Report or Subject Matter	7. Results	8. Summary	9. Funder of Research
Castle (a) 2009 ¹⁹⁵	To determine whether consumers use NH Compare and examine whether they can accurately interpret the quality measure information.	USA	Survey	<p>200 Nursing Homes were randomly selected (hospital-based and those with less than 70 beds were excluded). Each of these NHs was asked to send a survey to a family member of people 60 or older admitted in the last 3 months until 40 surveys were mailed. The survey asked about internet use and included a paper version of a NH Compare web site and asked the respondents comprehension questions.</p> <p>4754 out of 8000 surveys were returned (59%)</p>	Use of NH Compare Scores and a comprehension index Individual and NH Characteristics associated with comprehension.	NH Compare	<p>Reported Use of Information/NH Compare % Yes (95% CI) Had someone supply NH info from internet 18 (8-20) Used internet to chose NH 31 (15-33) Used Medicare.gov 5 (4-6) Used NH Compare 12 (10-16) If internet used, how many times 3.3 (1.7-4.1) In internet used, how much time 54 minutes (35.68)</p> <p>Mean comprehension score (maximum 8) Non risk adjusted quality measures: 5.56 Risk adjusted quality measures 5.32</p> <p>Characteristics Significantly Associated with Comprehension (higher): Younger, Married, Higher education level, White, higher income, lower</p>	Approximately 1/3 of family members of people admitted to NHs used NH Compare and comprehension was moderate to good (high scores indicate better comprehension).	Not reported

Author Year	1. Study Purpose	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/Type	4. Sample/Population Procedure	5. Outcomes	6. Name of Public Report or Subject Matter	7. Results	8. Summary	9. Funder of Research
							Medicaid Occupancy for NH Characteristics NOT Significantly Associated with Comprehension (higher): Gender, Internet access, NH size, NH ownership, chain, occupancy rate.		
Castle (b) 2009 ¹⁹⁶	To determine the extent to which consumers use nursing home report cards and the information in the report cards.	NH: USA Assisted Living: PA Community/Senior Housing: PA	Survey	Survey 1: 8000 family members of residents admitted in past 3 months from 200 randomly selected NH in US (this is the same survey used in Castle (a), 2009 Survey 2: 809 family members of residents admitted in the past 2 years in 25 randomly selected AL in PA Survey 3: 2000 elders living in 25 randomly selected elderly high-rise housing. Survey 1: 4754 responses (59%) Survey 2: 496 responses (61%) Survey 3: 1252 responses (63%)	Use of internet Looked at report cards Purchased a report card Used Medicare.gov or NH Compare in looking for a Nursing Home Intended and Actual uses of report cards	any (NH Compare, state reports)	(Percentages are for Survey 1, 2, 3) Use of Report Cards:* Used the Internet at any time in looking for a nursing home 31% 53% 23% Looked at a report card on nursing homes 29% 47% 15% Looked at more than one type of report card on nursing homes 7% 11% 2% Purchased a report card on nursing homes from a Web site 1% 4% 0% Used Medicare.gov Web site in looking for a nursing home 5% 9% 13% Used the Nursing Home Compare Web site in looking for a nursing home 12% 17% 6%	Using of internet and access to web-based report cards appear high though it is not compared to any standard. Between 23 % and 53% of respondents used internet to look for NH information and most of these used a report card. The most frequent actual use of the report cards is to find the location (35% to 49%) on NHs. Actually examining quality information is slightly less common (29% to 47%).	Not reported

Author Year	1. Study Purpose	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/Type	4. Sample/Population Procedure	5. Outcomes	6. Name of Public Report or Subject Matter	7. Results	8. Summary	9. Funder of Research
							<p>Actual Primary Use of Report Card: Find location of nursing homes 39% 37% 35% Examine quality information of nursing homes 32% 36% 29% Examine quality-of-life information of nursing homes 2% 4% 5% Examine amenities of nursing homes 6% 7% 5% Find cost/charges information of nursing homes 2% 1% 1% Examine general characteristics of nursing homes 14% 15% 21%</p>		
Castle 2005 ¹⁹⁷	To describe nursing home administrators' opinions about NH Compare	4 states, MD, CT, PA and TN	Survey	<p>A 30% random sample of NH Administrations in 2 states without a state NH report card prior to NH Compare (MD and PA) and two states that had a state nursing home report card (CT and TN). Conducted in January 2003.</p> <p>324 completed out of 477 mailed (68% response)</p>	<p>Responses to survey items on their own and their opinion about consumers' perspectives: a) Use of NH Compare b) NH Compare Content c) Comprehension d) Navigation e) Decision Process</p>	NH Compare	<p>Use of NH Compare 33% have used NHC information in facility 51% Plan to use NHC information in the future 11% Ever used other NH report cards Mean (SD) 1 to 10 with 10 most positive rating MD and PA, CT and TN, Total Sample Administrators' opinion Administrators' opinion about consumers' perspective Content Relevant 7.4 (2.8), 6.2</p>	Administrators' ratings of NH Compare were relatively high for themselves and lower for residents/families. Most ratings were not statistically different for 2 states with prior NH report card than for 2 states without prior NH report cards.	Not Reported

Author Year	1. Study Purpose	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/Type	4. Sample/Population Procedure	5. Outcomes	6. Name of Public Report or Subject Matter	7. Results	8. Summary	9. Funder of Research
							(3.1)*, 6.9 (2.9) Relevant 6.2 (3.0) 5.7 (2.8) 6.0 (2.8) Complete 6.3 (2.9) 7.9 (2.7)* 7.1 (2.8) Complete 4.9 (3.3) 4.7 (2.9) 4.8 (3.2) Unnecessary information 4.1 (3.4) 4.7 (3.3) 4.3 (3.3) Unnecessary information 3.6 (2.1) 4.2 (3.2)* 3.8 (2.5) Comprehension Easy to understand 8.7 (1.9) 8.5 (2.0) 8.6 (2.0) Easy to understand 6.5 (3.2) 6.2 (3.4) 6.4 (3.2) How much understood 8.5 (2.2) 8.2 (2.0) 8.4 (2.1) How much understood 5.2 (2.8) 5.8 (3.0)* 5.4 (2.9) Navigation Easy to explore 8.2 (2.1) 8.0 (2.4) 8.1 (2.3) Easy to explore 6.0 (3.1) 6.4 (2.6) 6.1 (2.9) Easy to find what you needed 8.4 (2.0) 7.5 (2.6)* 8.2 (2.1) Easy to find what you needed 7.7 (2.1) 7.2 (2.4)* 7.5 (2.2) Helps with interpreting information 7.9 (2.1) 8.2 (2.5) 8.0 (2.2)		

Author Year	1. Study Purpose	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/Type	4. Sample/Population Procedure	5. Outcomes	6. Name of Public Report or Subject Matter	7. Results	8. Summary	9. Funder of Research
							<p>Helps with interpreting information 7.4 (2.2) 7.0 (2.4) 7.2 (2.2) Decision Process Helpful in choosing NH 7.1 (2.2) 6.7 (2.5) 6.9 (2.3) Helpful in choosing NH 6.7 (2.4) 6.3 (2.3) 6.5 (2.3) Helpful in choosing your facility 5.6 (2.7) 6.3 (3.2)* 5.8 (2.8) Helpful in choosing your facility 5.6 (2.7) 6.3 (3.2)* 5.8 (2.8) Help you be more confident in choosing 6.4 (2.3) 6.2 (3.0) 6.3 (2.5) Help you be more confident in choosing 5.7 (2.4) 6.4 (3.1)* 5.9 (2.8) * difference between prior report card and no prior report card significant at p<.05</p>		
Gerteis 2007 ¹⁹⁸	To test different display formats for NH Compare information.	Boston, MA and McLean, VA	Lab-type Experiment	<p>90 volunteers between 45 and 75 years old. Selected to be representative of family caregivers of people needing nursing home care.</p> <p>During an in-person interview, participants were shown 7 different formats for the data for 5 NH Compare</p>	<p>Comprehension of Terms Ability to identify the NH with better performance Reasons for Errors Preference for formats</p>	NH Compare	<p>For each Template Percent of all errors, % correct interpretations, % preferred by respondents, %easiest to use</p> <p>Evaluative Table with Stars 7.7, 86, 19, 22 Evaluative Table with 3 Symbols 12.1, 76, 6, 11 Evaluative Table with</p>	Based on results an Evaluative Table with Words or Stars is preferred to a bar graph. A major barrier to understanding is the use of a negative direction (lower numbers are better) that people find confusing in spite of the directions. People prefer to be able to compare several NHs	CMS

Author Year	1. Study Purpose	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/Type	4. Sample/Population Procedure	5. Outcomes	6. Name of Public Report or Subject Matter	7. Results	8. Summary	9. Funder of Research
				Quality Measures for 10 NHs. The order was varied for each participant to avoid order effects.			words 6.6, 89, 21, 30 Numeric Table with Percentages only 13.2, 76, 11, 3 Numeric Table with Stars 13.7, 73, 21, 13 Standard Bar Graph 29.7, 47, 16, 6 Bar Graph with Line 17.0, 72, 16, 14	on one page.	
Mukamel 2007 ¹⁹⁹	To examine the initial reactions of nursing home administrators to NH Compare in terms of their view of the measures and actions in response to the information.	USA	Survey	10% sample of all US Medicare and Medicaid certified NH. Surveys sent to 1502, 724 responded (42%) in May and June of 2004	Awareness of NH Compare Assessment of NH Compare Actions taken in Response to NH Compare	NH Compare	Actions reported taken in response to poor NH Compare scores Facilities That Implemented Action (%), # Poor Scores for NH that implemented action, # Poor Scores for NH that did not implemented action, Initiation of quality-improvement activities Investigated reasons for scores 63.3 1.90* 1.60* Changed priorities of existing quality-assurance or quality-improvement program to focus on QMs 41.6 1.92 1.67 Requested help from the Quality Improvement Organization 21.1 1.91 1.76 Started an organized quality-improvement program 17.8 2.01 1.73 Changes in protocols and work organization	Most NHs are acting on the NH Compare information in ways that could lead to improvement. The motivation seems greater for NHs with lower reported quality (in the bottom 20% for state).	NIA no conflicts stated

Author Year	1. Study Purpose	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/Type	4. Sample/Population Procedure	5. Outcomes	6. Name of Public Report or Subject Matter	7. Results	8. Summary	9. Funder of Research
							Changed existing care protocols 36.3 1.94 1.70 Trained staff specifically for targeted QM 36.3 2.06** 1.65** Developed new care protocols 28.9 1.91 1.75 Changed work organization to empower workers 19.0 2.20** 1.70** Revised job descriptions 11.6 2.06 1.75 Changes in resources Purchased new technology or equipment 13.7 1.97 1.76 Hired more staff 9.6 1.98 1.78 Reallocated staff from other activities to care related to QM 9.4 1.97 1.76 Increased wages/benefits 8.9 2.19 1.76 Other initiatives to hire or retain staff 7.8 1.80 1.78 Contracted for more staff 1.7 2.00 1.76 Changes in leadership Changed nursing director 4.6 2.13 1.78 Changed ownership 0.6 1.75 1.76 Changed medical		

Author Year	1. Study Purpose	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/Type	4. Sample/Population Procedure	5. Outcomes	6. Name of Public Report or Subject Matter	7. Results	8. Summary	9. Funder of Research
							director 0.3 4.50** 1.75** Communication with customers Explained scores to patients and families 27.0 1.87 1.75 Other activities Increased private-pay prices 4.0 1.96 1.75 Changed the type of patient admitted 3.6 1.72 1.76 Other 1.6 2.55 1.75d * p<.10; ** p<.05		
Van Nie 2010 ²⁰⁰	To test an internet report card about NHs that contains quality indicators, consumer satisfaction and quality of care.	Netherlands	Lab-type Experiment	3 Convenience samples #1 Members of a panel from a Dutch consumer-of-care organization predominately for nursing homes and home care. (300 invited, 181 participated--63%) #2 University students in health sciences (42 invited, 38 participated--91%) #3 Representatives of nursing homes including managers, quality coordinators and staff. (70 invited, 59 participated-66%). Participants were recruited by mail or in person. They	General Assessment of Report Card a) Aspect of Card Most Important for Quality Assessment b) Quality Assessments of NH c) Associated with Variations in the Report Card	Hypothetical report cards on Nursing Homes	Aspect of card most important for quality assessment (% of respondents selecting response, multiple responses possible) Results of the annual measurement of quality indicators (15%) Assessment of consumers' satisfaction (63%) Assessments of quality of care by Government Agency (39%) Additional information (such as certification) (9%) No opinion (8%) Symbols presenting data of assessment of quality of care by NHCI Warning triangle (50%)	General Overall rating of the internet report cards were high (7.1 out of 10) and did not differ across the samples (p=0.33). On specific aspects of the report card, care consumers rated it lower on completeness and understandable (p=0.01). Ranking of Content When asked to rate the sections of the report card all groups prioritized consumers' satisfaction, followed by information provided by the government agency based on visits, with quality of care indicators lower. Format Respondents preferred the use of warning	The Netherlands Organization for Health Research and Development

Author Year	1. Study Purpose	2. Geographic Location (e.g., New York, USA, etc.)	3. Study Design/Type	4. Sample/Population Procedure	5. Outcomes	6. Name of Public Report or Subject Matter	7. Results	8. Summary	9. Funder of Research
				<p>were presented with a training case and randomly assigned six cases that differed on one aspect of the report card. Participants read the case, looked at the hypothetical report card, and then answered questions about the quality of the nursing home, whether they would choose and about the report card content and format.</p>			<p>Stars (35%) Colors (11%) Other (4%)</p> <p>Report Card Characteristics that resulted in higher overall quality ratings, willing to chose and willing to recommend (p<.0001)</p> <p>A. Positive annual measurements B. Positive government assessments C. All information present (as opposed to listed as missing)</p> <p>Characteristics that did not result in significantly lower overall quality ratings A and B Missing only one of annual measurement or government assessment C. Statement that NH has been placed under supervision.</p>	<p>triangles to stars or colors to indicate issues with the government survey.</p> <p>Respondents rated NHs better when the information provided was positive. Missing information was interpreted as lower quality.</p> <p>Asked about what else should be included respondents asked for more information about the opinions of relatives, informal care givers and volunteers. A majority also asked for more explanation of the terms used in the report.</p>	

Appendix P. Strength of Evidence

Table P1. Strength of evidence assessment by key questions

Key Question						
Outcome	Setting (Number of studies)	Risk of Bias	Consistency	Directness	Precision	Overall Strength of Evidence
Key Question 1:						
Mortality	Hospitals(18) Individual Clinicians (1)	Medium	Inconsistent	Direct	Imprecise	Moderate
Quality and process indicators	Hospitals (5) Health Plans (5) Long-term Care (9)	Medium	Consistent	Indirect	Imprecise	High
Key Question 2:						
Mortality	Hospitals (1)	-	-	-	-	Insufficient
Inappropriate diagnosis treatment	Hospitals (1)	-	-	-	-	Insufficient
Access restrictions	Hospital (8) Individual Clinicians(2) Long-term Care (2)	Medium	Inconsistent	Indirect	Imprecise	Low
Unintended provider behavior	Individual Clinicians (1) Health Plans (2) Long-term Care (2)	Low	Consistent	Indirect	Imprecise	Moderate
Key Question 3:						
Provider actions	Hospitals (4) Individual Clinicians(1) Long- term Care (5)	Medium	Consistent	Direct	Imprecise	Moderate
Key Question 4:						
Selection (market share/volume)EF FECT	Hospitals (15) Individual Clinicians (9) Health Plans (17) Long-term Care (6)	Medium	Inconsistent	Indirect	Imprecise	Moderate
Key Question 5:						
Mode and tone of message	Individual Clinicians (1)	-	-	-	-	Insufficient
Accuracy and usefulness	Individual Clinicians (1)	-	-	-	-	Insufficient
Key Question 6:						
Competitive market	Hospitals (2) Long term care (5)	Medium	Consistent	Direct	Precise	High
Baseline performance	Health Plans (2) Long-term Care (3)	Medium	Consistent	Direct	Precise	High
Nursing home characteristic	Long-term Care (6)	Medium	Inconsistent	Indirect	Imprecise	Low
Patient characteristics/ subgroups	Health Plans (1) Individual Clinicians (2)	Medium	Inconsistent	Indirect	Imprecise	Low
Variation in quality	Health Plans (1)	-	-	-	=	Insufficient

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