Appendix A. Original List of Patient Safety Practices

PSPs from Making Health Care Safer (MHCS – 2001 AHRQ Report)

Computerized physician order entry (CPOE) with clinical decision support system (CDSS) (Medication errors and adverse drug events (ADEs) primarily related to ordering process)
Clinical pharmacist consultation services (Medication errors and ADEs related to ordering and monitoring)
Use of computer monitoring for potential ADEs (ADEs related to targeted classes (analgesics, KCl, antibiotics, heparin) (focus on detection))
Monitoring for patient safety problems (more general topic of monitoring)
Protocols for high risk drugs: nomograms for heparin (Adverse events related to anticoagulation)
Anticoagulation services and clinics for coumadin\(^8\) (Adverse events related to anticoagulation)
Patient self- management using home monitoring devices (Adverse events related to chronic anticoagulation with warfarin)
Unit-dosing distribution system (ADEs in dispensing medications)
Use of automated medication dispensing devices (ADEs in drug dispensing and/or administration)
Improved hand washing compliance (via education/behavior change; sink technology and placement; washing substance) (Hospital-acquired infections)
Barrier precautions (via gowns & gloves; dedicated equipment; dedicated personnel) (Serious nosocomial infections (e.g., vancomycin- resistant enterococcus, C. difficile))
Hospital-acquired infections (overall topic)
Limitations placed on antibiotic use (Hospital-acquired infections due to antibiotic-resistant organisms)
Use of silver alloy- coated catheters (Hospital-acquired urinary tract infection)
Use of suprapubic catheters (Hospital-acquired urinary tract infection)
Bundles for central venous catheter-related blood infections (overall topic)
Use of maximum sterile barriers during catheter insertion (Central venous catheter-related blood infections)
Antibiotic- impregnated catheters (Central venous catheter-related blood infections)
Cleaning site (povidone-iodine to chlorhexidine) (Central venous catheter-related blood infections)
Changing catheters routinely (Central venous catheter-related blood infections)
Use of heparin (Central venous catheter-related blood infections)
Tunneling short- term central venous catheters (Central venous catheter-related blood infections)
Routine antibiotic prophylaxis (Central venous catheter-related blood infections)
Bundle for ventilator-associated pneumonia (overall topic)
Semi-recumbent positioning (Ventilator- associated pneumonia)
Continuous oscillation (Ventilator- associated pneumonia)
Continuous aspiration of subglottic secretions (CASS) (Ventilator- associated pneumonia)
Selective decontamination of digestive tract (Ventilator- associated pneumonia)
Sucralfate (Ventilator- associated pneumonia)
Localizing specific surgeries and procedures to high volume centers (Mortality associated with surgical procedures)
Surgical checklists (overall topic)
Appropriate use of antibiotic prophylaxis (Surgical site infections)
Maintenance of perioperative normothermia (Surgical site infections)
Use of supplemental perioperative oxygen (Surgical site infections)
Perioperative glucose control (Surgical site infections)
Use of real-time ultrasound guidance during central line insertion (Morbidity due to central venous catheter insertion)
Counting sharps, instruments, sponges (Surgical items left inside patient)
Use of preoperative anesthesia checklists (Complications due to anesthesia equipment failures)
Intraoperative monitoring of vital signs and oxygenation (Critical events in anesthesia)
Use of perioperative beta-blockers (Perioperative cardiac events in patients undergoing noncardiac surgery)
Fall prevention (overall topic)
Use of identification bracelets (Falls)
Interventions to reduce the use of physical restraints safely (Restrainment-related injuries; Falls)
Use of bed alarms (Falls)
Use of special flooring material in patient care areas (Falls and fall-related injuries)
Use of hip protectors (Falls and fall injuries)
Use of pressure relieving bedding materials (Pressure ulcers)
Multi-component delirium prevention program (Hospital-related delirium)
Geriatric consultation services (Hospital-acquired complications (e.g., falls, delirium, functional decline, mortality))
Geriatric evaluation and management unit (Hospital-acquired complications (functional decline, mortality))
Appropriate VTE prophylaxis and methods for implementation (broader topic)
Appropriate VTE prophylaxis (Venous thromboembolism (VTE))
Risk assessment and prevention of contrast-induced renal failure (overall topic)
Use of low osmolar contrast media (Contrast-induced renal failure)
Hydration protocols with theophylline (Contrast-induced renal failure)
Hydration protocols with acetylcysteine (Contrast-induced renal failure)
Various nutritional strategies (Morbidity and mortality in post-surgical and critically ill patients)
H2- antagonists (Stress-related gastrointestinal bleeding)
Education interventions and continuous quality improvement strategies (Clinically significant misread radiographs and CT scans by non-radiologists)
Methods to increase pneumococcal vaccination rate (Pneumococcal pneumonia)
Use of analgesics in patients with acute abdomen without compromising diagnostic accuracy (Inadequate pain relief in hospital patients with abdominal pain)
Pain management (overall topic)
Acute pain service (Inadequate pain relief)
Non-pharmacologic interventions (e.g., relaxation, distraction) (Inadequate postoperative pain management)
Change in ICU structure—active management by intensivist (Morbidity and mortality in ICU patients)
Changes in nursing staffing (Morbidity and mortality)
Promoting a culture of safety (Any safety problem amenable to culture)
Use of human factors principles in evaluation of medical devices (Medical device related adverse events)
Refining performance of medical device alarms (e.g., balancing sensitivity and specificity of alarms, ergonomic design) (Adverse events)
Transitions in care (broader topic)
Information transfer between inpatient and outpatient pharmacy (Adverse events related to discontinuities in care)
Handoff protocols (broader topic)
Standardized, structured sign-outs for physicians (Adverse events during cross-coverage)
Use of structured discharge summaries (Adverse events related to information loss at discharge)
Protocols for notification of test results to patients (Failures to communicate significant abnormal results (e.g., pap smears))
Use of bar coding (Adverse events due to patient misidentification)
“Sign your site” protocols (Performance of invasive diagnostic or therapeutic procedure on wrong body part)
Team training (broader topic)
Application of aviation style crew resource management (e.g., Anesthesia Crisis Management; MedTeams) (Adverse events related to team performance issues)
Simulator-based training (Adverse events due to provider inexperience or unfamiliarity with certain procedures and situations)
Limiting individual provider’s hours of service (Adverse events related to fatigue in health care workers)
Fixed shifts or forward shift rotations (Adverse events related to fatigue in health care workers)
Napping strategies (Adverse events related to fatigue in health care workers)
Specialized teams for inter-hospital transport (Adverse events due to transportation of critically ill patients between health care facilities)
Mechanical ventilation (Adverse events due to transportation of critically ill patients within a hospital)
Asking that patients recall and restate what they have been told during informed consent (Missed, incomplete or not fully comprehended informed consent)
Use of video or audio stimuli (Missed, incomplete or not fully comprehended informed consent)
Provision of written informed consent information (Missed, incomplete or not fully comprehended informed consent)
Computer-generated reminders to discuss advanced directives (Failure to honor patient preferences for end-of-life care)
Use of physician order form for life-sustaining treatment (POLST) (Failure to honor patient preferences for end-of-life care)

Additional PSPs from our prior project and updated review of NQF, Joint Commission, IHI, Leapfrog, PSNet taxonomy, other suggestions from team
Universal protocol/preoperative checklist (Wrong-site surgery, perioperative infections)
Rapid response teams
Medication reconciliation and process redesign (Medication errors- wrong medication or dose)
Non-reimbursable serious reportable events (i.e., do not pay for never events) (CMS)
Do not use abbreviations, acronyms, symbols, and dose designation campaign
(education/campaigns, removal from forms, audit/feedback) (Medication errors – wrong medication) (Joint Commission)
Read back or computerized system (verbal or telephone orders or critical test results)
(Medication errors,
Implement a standardized process to ensure that critical results are communicated quickly to a licensed healthcare provider so that action can be taken. (NQF)
Adverse event reporting
Periodic inspection of medication storage areas (Medication errors – use of contaminated drugs)
Drug labeling (Medication errors – dispensing)
Institute protocols for managing Look Alike, Sound Alike Medications; standard methods for labeling and packaging medications (Medication errors – dispensing, administration) (NQF)
Identify all high-alert drugs, and establish policies and processes to minimize the risks associated with the use of these drugs. (NQF)
Identifying patients at risk for suicide (Patient suicide or attempted suicide) (NQF)
Immunize healthcare workers and patients who should be immunized against influenza (Nosocomial influenza)
Following serious unanticipated outcomes, including those that are clearly caused by systems failures, the patient and, as appropriate, the family should receive timely, transparent, and clear communication concerning what is known about the event (NQF)
Ensure that written documentation of the patient’s preferences for life-sustaining treatments is prominently displayed in his or her chart (NQF)
Implement standardized policies, processes, and systems to ensure accurate labeling of radiographs, laboratory specimens, or other diagnostic studies, so that the right study is labeled for the right patient at the right time. (NQF)
Take actions to improve glycemic control by implementing evidence-based intervention practices that prevent hypoglycemia and optimize the care of patients with hyperglycemia and diabetes. (NQF) –protocols and order sets
When CT imaging studies are undertaken on children, “child-size” techniques should be used to reduce unnecessary exposure to ionizing radiation (NQF)
Institutional safety plan (NQF, PSNet)
Health literacy improvement (PSNet)
Hospitalists (PSNet)
Discharge interventions (care transition interventions, Project Red, calling patients after discharge, etc) (Preventable readmissions)
Techniques to prevent diagnostic errors (teaching heuristics/meta-cognition; artificial intelligence programs)
Red Rules/Stop the Line (Rules that must be followed to the letter- any deviation from a red rule will bring work to a halt until compliance is achieved)
Environmental modifications for health care workers, e.g., quiet place for nurses to mix meds (Medication errors – administration)
Patient engagement strategies (patients questioning their providers; patients on safety committees)
Unit based safety teams
Executive walk rounds
Bundles and checklists as a general strategy (not just for specific indications)
Methods for reducing inappropriate prescribing in the elderly
Cognitive aids as more general strategy – simulations, debriefings
Protocols for standardizing/improving patient transitions/handoffs as a broader category
CT dosage adjustments for height/weight/sex
(Excessive diagnostic imaging increasing lifetime cancer risks)
Evaluating whether diagnostic imaging studies are actually warranted or can be done through non-radiation-based modality (Excessive diagnostic imaging increasing lifetime cancer risks)
Public health messages about harms of over diagnosis
Physician-patient discussion/education about appropriate scenarios for testing (Risks from unnecessary cancer screening)
Institutional algorithms to ensure testing occurs in patients with risk factors for disease (to prevent high number of false positives) (Risks from unnecessary cancer screening)
Review of hospital staffing patterns, nurse-to-patient ratios, physician handovers (Increased morbidity and mortality associated with hospital care on weekends and in evenings) (may be related to work hours, shift work)
Education of hospital staff to be aware of possible changes in care during these time periods (Increased morbidity and mortality associated with hospital care on weekends and in evenings)
Algorithms to determine if patients truly require prophylaxis on admission
Reducing non-indicated prescribing prior to discharge (Harms of inappropriate use of acid-suppressing medications)
Protocols and order sets (Risks from inappropriately dosed chemotherapy)

**New Potential Device-related Technologies (some overlap with list above)**

Free-flow protection in IV’s (Medication error- administration – prevent overdose)
Smart pumps (Medication errors – wrong dose, wrong drug)
Radiofrequency identification (RFID) tags (Retained foreign bodies following surgery)
Dose reduction technologies for CT systems to prevent unnecessary radiation exposure
Processes related to reprocessing single-use medical devices (Healthcare associated infections) – *1.6
Remote monitoring of ICU patients by critical care physicians (Reduce in-hospital mortality and/or complications from cardiac events)
Operating room (OR) data integration and display systems (Surgical adverse events resulting from lack of availability of critical patient information and access to intraoperative consults from remote providers)
Robot assisted surgery (Reduce surgical complications)
Color-coded patient wristbands (Apprise staff of patient risk factors for adverse events and to reduce risk of inappropriate care)
Device-related strategies for preventing tubing misconnections (e.g., labeling lines, color coding) (Adverse events related to tubing misconnections (e.g., connecting drains to nasogastric tubes))
IV infiltration alarms to prevent infiltration/extravasations (Complications from intravenous therapy)
Patient lift devices (Falls and caregiver injury)
Environmental modifications to prevent patient self-harm (e.g., hinge less door systems) (Reduce suicide or other self-harm)
Active electrode monitoring for laparoscopic electro surgery (Perioperative burns)
Air embolism detection devices for CT contrast injectors (Pulmonary emboli)
Alarm integration systems (Adverse events related to caregiver response time to patients in need of assistance)
Electro surgery return electrode contact quality monitors (Perioperative burns)
Endoscope reprocessors (Healthcare-associated infections)
Ferromagnetic detectors in MR suites (Patient and provider injury from metal objects being drawn into the MRI bore)
Laser resistant endotracheal tubes (Surgical fire)
Surgical and exam gloves (i.e., to prevent infection from clinician to patient)
RFID-type tracking of patient location (e.g., for wandering) (Wandering and elopement in patients/residents with dementia, or infant abduction)
Treatment planning systems for radiation therapy (Radiation under/overdoses)
Use of Vocera-style communication devices for alarm notification (Adverse events related to caregiver response time to patients in need of assistance)