



*Agency for Healthcare Research and Quality*

*Advancing Excellence in Health Care*

[www.ahrq.gov](http://www.ahrq.gov)

# **The Asthma Care Return-on-Investment Calculator: How to use it**

---

**Ginger Smith Carls, M.A. and Rosanna Coffey, Ph.D.  
Thomson Reuters (formerly Medstat)**

May 22, 2008

# Outline

- Brief review of calculator
- How to use the calculator
  - Data
  - Interpretation of results
- Limitations and solutions





---

# Review of the Calculator

# Purpose

- To help policy makers (States) with **program design** for asthma care quality improvement
- To estimate **financial return** based on evidence
- To **summarize** a large literature (52 studies)
- To **translate** utilization-based results into costs
- To summarize impacts based on **user interests**



# Methods

Evidence of utilization impact

+

cost data



= financial impact



## ■ Definitions:

Asthma care programs typically follow NAEPP (National Asthma Education and Prevention Program) guidelines

- Patient education
- Provider activities

# How to use the calculator:

## Data



# Data needed: Overview

---

- Number of eligible asthma patients
- Baseline utilization and costs
- Evidence
- Cost to implement the program



# Data needed: Eligible asthma patients

## Options:

- A. Calculate number eligible using own data (i.e. medical claims)
- OR
- B. Use calculator to estimate eligible patients

## More details:

- A. Calculate number eligible using own data (i.e. medical claims)
  - **Define criteria for eligible asthma patients. Example:**
    - Patients with at least one asthma diagnosis
    - Patients with persistent asthma
      - ◆ NCQA HEDIS definition: <http://www.ncqa.org>
      - ◆ See Tables 8 and 10 in detailed report



# Data needed: Eligible asthma patients

## B. Use calculator to estimate eligible asthma patients

### Data Fields

- Percent of enrollees in each age/gender cell
  - Percent enrollees of each race/ethnicity
  - Total number of enrollees
- 
- Options
    - Asthma severity
    - Type of health coverage (Medicaid or employer-sponsored)
  - How calculator estimates eligible patients:
    - Asthma prevalence rates come from MarketScan™ Medicaid or Commercial Claims databases
    - Prevalence rates are adjusted by all of the demographic and asthma severity information entered by user, based on evidence from MarketScan™



# Data needed: Baseline

Baseline = the use and cost patterns of program participants before the asthma care program

## Data Fields

### Use

- Emergency department visits per patient per year
- Hospital stays per patient per year
- Outpatient visits per patient per year

### Cost (payment amount)

- Emergency department cost per visit
- Hospital cost per stay
- Outpatient cost per visit
- Asthma medication cost per patient per year
- Asthma-related ancillary service (lab, imaging, etc.) cost per patient



# Data needed: Baseline

## Data Fields (continued)

Missed work or school (optional)

- Number of missed work or school days per patient per year
- Cost of a missed work or school day

## Advice for calculating data fields:

- Decide what use & cost components to include
- It's okay to combine use & cost from different sources
  - Just make sure measures are calculated the same way for the same population



# Data needed: Baseline

## Source of default data:

### MarketScan Claims Database (2005)

- Medicaid
  - 8 states
  - Geographically dispersed
- Employer-sponsored health insurance
  - Over 100 large self-insured employers
  - Over 15 million lives
  - Geographically balanced

### National Health Interview Survey (2003)

- Number of missed work or school days due to asthma
- U.S. estimate

### Bureau of Labor Statistics (2006)

- Average wage rate
- Federal poverty line (for value of missed work day for Medicaid recipients)



# Data needed: Evidence

## Data Fields

Average annual percent change in:

- Number of asthma-related hospital stays
- Number of asthma-related ER visits
- Number of asthma-related outpatient visits
- Payments for outpatient prescription drugs
- Payments for asthma-related ancillary services
- Number of missed work days (optional)
- Number of missed school days (optional)

## Where to find these data:

- Results from our meta-analysis of the literature is in the calculator
- You may enter these if you have results from a pilot study



# Data needed: Evidence

## Example calculation of percent change in visits

	Rate at baseline (Before)	Rate at end (After)
Treatment Group	A=10	B=5
Control Group	C=10	D=8

1. No control group :  $(B - A) / A * 100 = - 50\%$
2. Randomized controlled study:  $(B - D) / D * 100 = - 38\%$
3. Statistically controlled study:  
Percent change in treatment - percent change in control =  
 $(B-A) / A * 100 - (D-C) / C * 100 = - 50 - (- 20) = - 30\%$



# Data needed: Evidence in calculator

	Age groups included							
	Children only		Adults Only		Both children and adults		TOTAL	
	Total patients	Number of studies	Total patients	Number of studies	Total patients	Number of studies	Total patients	Number of studies
<b>ED visits</b>	13,213	21	714	11	8,812	9	22,739	40
<b>Hospitalizations</b>	17,575	19	7,161	9	2,526	7	27,262	33
<b>Outpatient visits</b>	20,229	18	6,986	4	1,888	5	29,103	25
<b>Missed work/ school days</b>	4,172	11	521	5	443	3	5,136	17
<b>Medication Cost</b>	486	2	301	3	13,580	5	14,367	10
<b>Ancillary service cost</b>	61	1	148	2	0	0	209	3

**Notes: Total studies can be less than the sum of the columns because some studies reported results separately for adults and children  
Total patients includes both treatment and control patients**



# Data needed: Program cost and design

## Data fields

- Annual cost per participant
- Number of years until full impact (i.e. program “ramp-up”)
- Discount rate
- Duration of program

## Questions to consider

- How to choose a discount rate?
- How to estimate annual cost per participant?



# Data needed: Wrap-up

## ■ Types of data needed

- Number of eligible asthma patients
- Baseline utilization and costs
- Evidence
- Program cost and design

## ■ Putting it all together

- Ideally, find data from a single source
- If not possible, be sure that the underlying populations that generated the data are similar
  - Use claims data to obtain number of eligible asthma patients and their baseline utilization and costs
  - Find evidence that studied a similar population

# Data needed: Discussion

- Ideas for data sources?
  - Evidence
  - Number of eligible asthma patients
  - Baseline utilization and cost
  - Program cost
  
- What technical assistance do you need from AHRQ to find data?
  
- Questions?





---

# How to use the calculator

# Interpretation of results



# Example results

---

- Results from default data
  - Nationwide
  - Program lasts for 5 years
  - Takes 2 years to ramp up
  - Discount rate is 3%
  - Evidence from randomized controlled studies



# Results using default data

	(1)	(2)	(3)	(4)
<b>Options (not all are shown)</b>				
<b>Type of Insurance</b>	Medicaid	Medicaid	Medicaid	Employer sponsored
<b>Age groups</b>	Adults and children	Children	Children	Children
<b>Asthma severity</b>	Persistent asthma	Persistent asthma	Persistent asthma	Persistent asthma
<b>Annual program cost</b>	\$395	\$395	\$100	\$100
<b>Medical costs included</b>	All payments	All payments	All payments	All payments
<b>Productivity costs included</b>	No	No	No	No
<b>Number of eligible patients with asthma (nationwide)</b>	1.97 million	850 thousand	850 thousand	1 million
<b>Results</b>				
<b>Net Present Value (per participant)</b>	(\$1,552)	(\$1,228)	\$123	(\$60)
<b>ROI</b>	\$0.14	\$0.32	\$1.27	\$0.87
<b>Break Even Program Cost</b>	\$56.04	\$126.76	\$126.76	\$86.97



# Results using default data

	(5)	(6)	(7)	(8)
<b>Options (not all are shown)</b>				
<b>Type of Insurance</b>	Employer sponsored	Employer sponsored	Employer sponsored	Employer sponsored
<b>Age groups</b>	Children	Children	Adults	Adults
<b>Asthma severity</b>	Persistent asthma with acute visits	Persistent asthma with acute visits	Persistent asthma	Persistent asthma
<b>Annual program cost</b>	\$100	\$100	\$100	\$100
<b>Medical costs included</b>	All payments	Only plan costs	Only plan costs	Only plan costs
<b>Productivity costs included</b>	No	No	No	Yes
<b>Number of eligible patients with asthma (nationwide)</b>	200 thousand	200 thousand	2.2 million	2.2 million
<b>Results</b>				
<b>Net Present Value (per participant)</b>	\$822	\$561	(\$812)	\$2,264
<b>ROI</b>	\$2.80	\$2.22	(\$0.77)	\$5.94
<b>Break Even Program Cost</b>	\$279.54	\$222.39	(77.30)	\$594.44



# How to use calculator

- Forecast financial impact
- Assess impact of key assumptions about proposed program
  - Examine alternative types of programs to assess tradeoffs
  - Are assumptions “reasonable” compared to other evidence?
- Estimate “cost hurdle” needed to break-even
  - Negotiate with vendors
- Observe components of calculator in planning an evaluation of an asthma care program



# Uses: How it helps with policy

- **Michigan Pediatric Asthma Coalition:** Funding decision for a county asthma program
- **New York Department of Health:** Evaluation components for a housing improvement project that should reduce asthma symptoms
- **Iowa Medicaid Medical Officer:** Considering value of asthma care improvements for Medicaid





---

# Limitations and possible solutions

# Caveats

- Limited evidence for some components:
  - Few studies (7) reported **program cost** – wide range:
    - Average = \$395 dollars per patient per year
    - Min = \$81 automated general educational mailing
    - Max = \$989 program for highest cost patients
  - Few studies (10) reported asthma **medication costs**:
    - Studies **without a control group** reported larger increases in medication costs
    - **Baseline** asthma medication costs varied
- AHRQ does not plan updates at this time





# Caveats & Solutions

## Problems:

- Literature continues to grow
- Baseline data becomes obsolete
- Cost estimates are for 2006

## Solutions for users:

- Monitor literature post April 2007 & input results
- Use your own data to populate the calculator
- Inflate findings beyond 2006, using the CPI-M

# Discussion

- Other limitations, concerns?
- Ways the calculator could be made more useful?
- Questions about interpretation of results?





# Additional assistance:

## Technical Assistance:

- Margie Shofer, [Marjorie.Shofer@ahrq.hhs.gov](mailto:Marjorie.Shofer@ahrq.hhs.gov)  
Senior Program Analyst, Office of Communications and Knowledge Transfer

## Copy of calculator or questions about the tool:

- Please e-mail [AHRQ\\_quality\\_tools@academyhealth.org](mailto:AHRQ_quality_tools@academyhealth.org)

## For more information about AHRQ Quality Tools:

- <http://www.academyhealth.org/ahrq/qualitytools/index.htm>