



Agency for Healthcare Research and Quality

Advancing Excellence in Health Care

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Quality improvement for asthma care: The asthma care return-on-investment calculator

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Tools You Can Use to Make a Difference
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Agenda

- What is the Asthma Care Return-on-Investment calculator?
- Background
 - Definitions
 - Key issues
 - How can the calculator help evaluate asthma care programs? What does it provide?
- How does the calculator work?
- Summary of literature review
- Conclusions
- Resources



What is the Asthma Care ROI Calculator?

■ Purpose

- Help state policy makers and health plans estimate financial returns asthma quality improvement programs

■ Why developed?

- Most studies don't address financial impact, rather clinical and use impacts only
- Clinical or use impacts need to be translated into costs or savings

■ How are estimates generated?

- Combine clinical evidence about impacts on utilization with separate cost data to estimate financial impact





Background: definitions

- Asthma care programs typically follow NAEPP (National Asthma Education and Prevention Program) guidelines
 - Patient education
 - Provider activities
- Financial metrics

$$\text{Return on Investment (ROI)} = \frac{\text{Savings}}{\text{Program Cost}}$$

= \$1 break-even

$$\text{Net Present Value (NPV)} = \text{Savings} - \text{Program Cost}$$

= \$0 break-even

Background: cost vs. quality

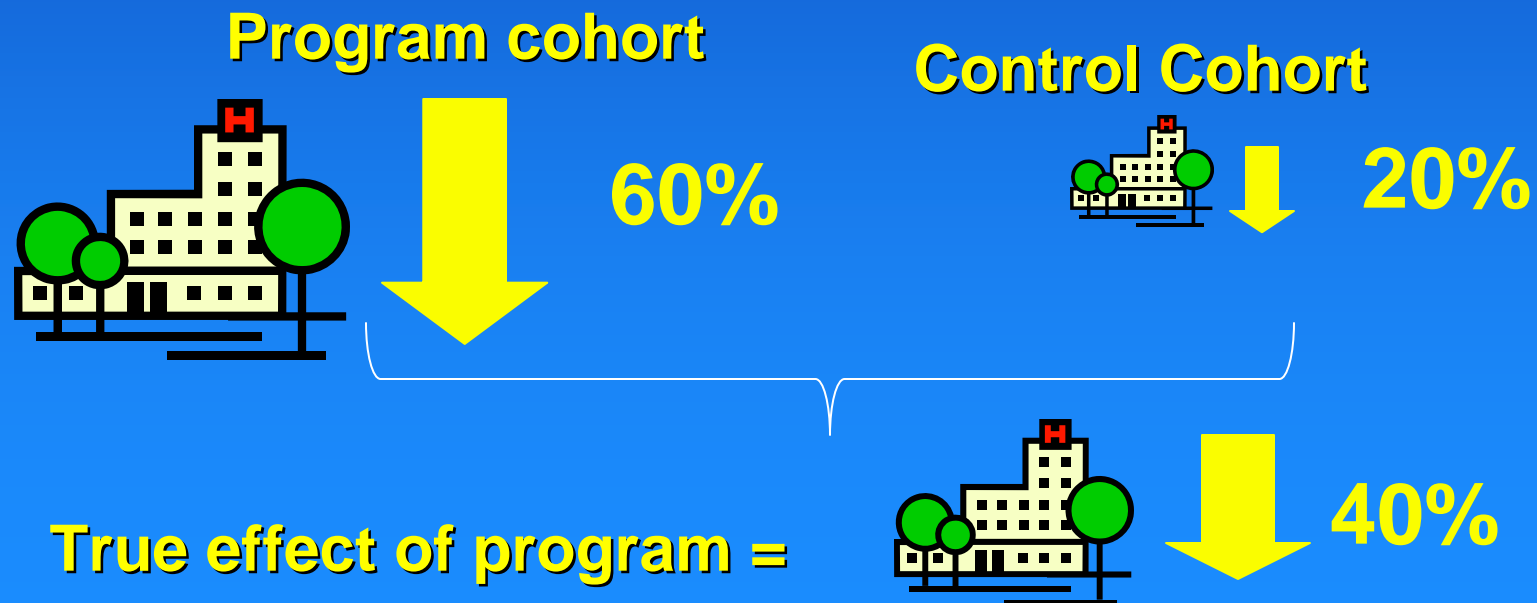
- Programs that improve quality of asthma care may or may not reduce total medical care costs



Background: program evaluation methods

■ Regression to the mean bias

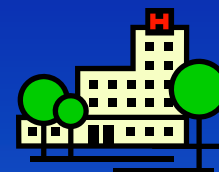
- Sick patients may get better over time, even without the program
- To be successful, a program must “beat” the regression to the mean bias



How does the calculator work?

72,777 participants who
average

0.25 ED visits per year



18,194 annual visits to ER

Asthma
program



30%



5,458 visits to ER saved

Each visit
costs **\$88**



\$480,304 saved

Repeat for each component asthma-related costs

Compare change in medical care expenditures with program cost

How does the calculator work?

Cost components

- Asthma-related medical care
 - Emergency department visits
 - Hospital stays
 - Outpatient visits
 - Medications
 - Ancillary testing

- Productivity (optional)
 - Missed school or work days



Data sources

1. Population demographics

- Medicaid (CMS 2003)
- Employer sponsored health insurance (CPS 2003-2005)
 - State employees (BLS 2003-2005)

2. Large, nationwide, medical claims database (MarketScan™)

- Prevalence rates
- Utilization and costs for asthma patients

3. Literature review (52 studies)

- Impact of asthma care programs
- Cost to implement asthma care programs

4. You!

- Virtually all data used by the model can be changed by the user

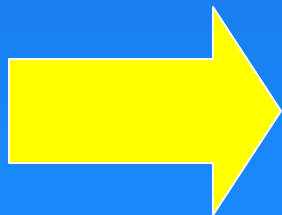


Calculator features

- **Ability to examine how the following factors may change financial impact of program**
 - Who is included in the program
 - What benefits are counted?
 - Length of the program
 - Cost to implement the program
- **Options to describe benefits and costs from a third-party payer or society perspective.**

Calculator features

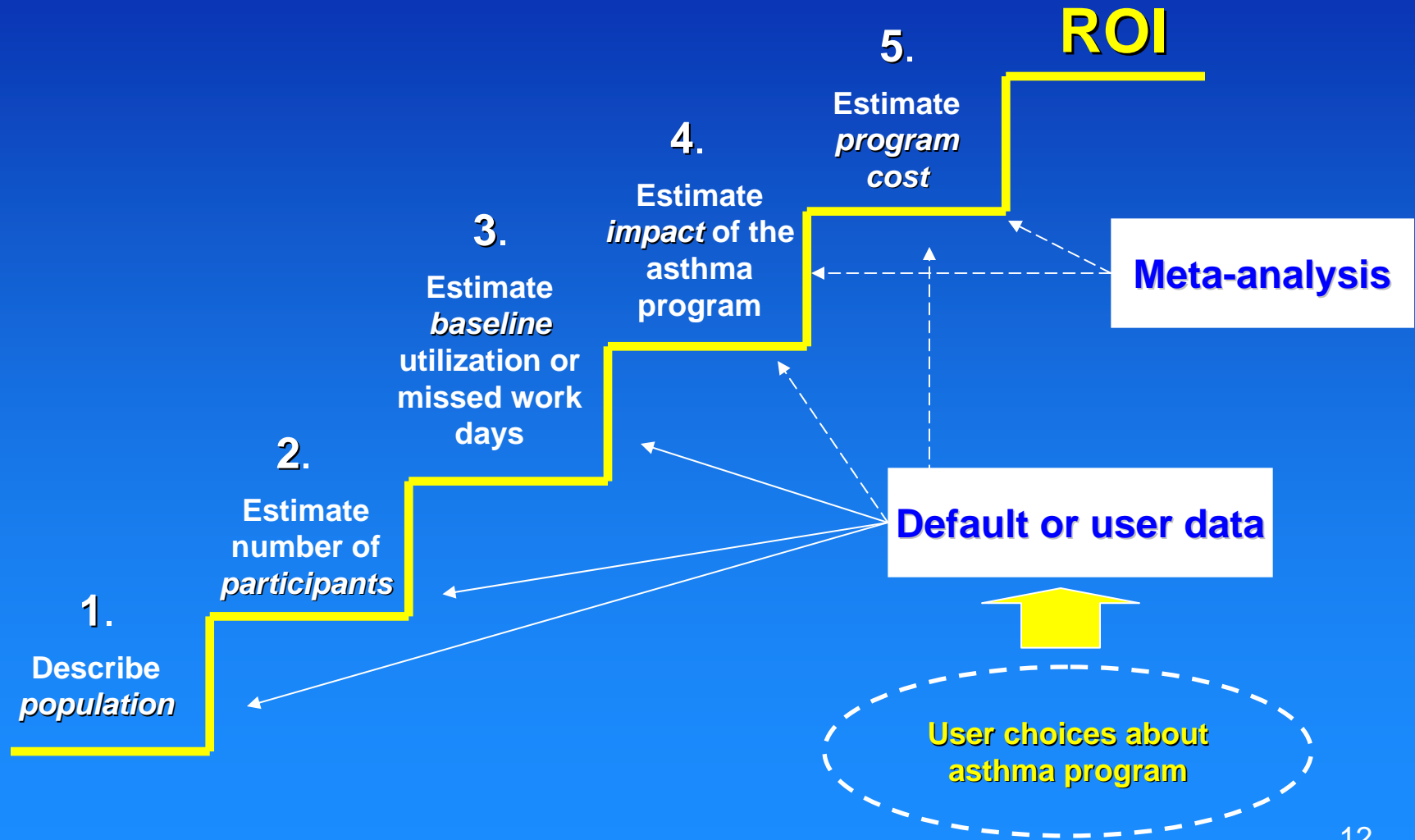
- Ability to choose the research design to use in estimating savings
 - Studies without a control group
 - Use as a benchmark for preliminary results
 - Studies with a control group
 - shows expected **true savings**



Use calculator in planning an asthma care program

Framework of calculator may be useful for evaluating an asthma care program

Steps in the ROI calculator





Microsoft Excel - Asthma_ROI_model_20070601.xls

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Population

Select the type and geography of the general population (people with and without asthma) that you are considering for asthma care quality improvement. For a general discussion of this page, click on the black question mark. ? For information on a particular item, select a blue question mark.

Population type ? Geographic location ?

Size of population ?

Age & gender of population ?

	Male	Female
1 - 4	6.2%	9.1%
5 - 17	15.0%	21.9%
18 - 34	9.2%	13.7%
35 - 44	4.6%	6.7%
45 - 54	3.7%	5.6%
55 - 64	1.8%	2.5%
Sum =	100.0%	

The sum should be 100%.

Race of population ?

White	43.8%
African American	23.1%
Hispanic	22.1%
Asian or Pacific Islander	3.5%
American Indian / Alaskan Native	1.5%
Other / Unknown	6.0%
Sum =	100.0%

The sum should be 100%.

Data sources ?

Microsoft Excel - Asthma_ROI_model_20070601.xls

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Participants

For a general discussion of this page, click on the black question mark. ?

Do the following on this page:

1) Select the age group and asthma severity that you want to target for a quality improvement program. (If you want to target people through emergency departments or hospital inpatient settings, select "persistent asthma with an acute visit".)

2) Review the number of people eligible for program and the percent expected to participate in the program. Modify if needed.

Age Group: ?

Select children, adults, or both

☒ Child

☒ Adult

Asthma Severity/Definition: ?

☐ All asthma (intermittent & persistent asthma)

☒ Persistent asthma only

☐ Persistent asthma with an acute visit

Number of patients eligible for the program, by age & gender

	Male	Female
1 - 4	135,966	128,581
5 - 17	285,481	300,304
18 - 34	101,469	172,338
35 - 44	81,146	190,717
45 - 54	100,414	270,990
55 - 64	79,246	149,804

? Asthma patients eligible for program:

1,996,456

(Calculated from population, age group, asthma severity/definition, and prevalence rates.)

? Percent of eligibles who will participate:

25.0%

View asthma prevalence rates*

? Expected patients who will participate:


499,114

Microsoft Excel - Asthma_ROI_model_20070601.xls

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Baseline Data

For a general discussion of this page, click on the black question mark. ?

Make two decisions on this page:

- 1) Select a treatment definition and cost perspective for calculating results.
- 2) Review the baseline utilization and cost estimates. Modify them if you have pre-program estimates for your population



Please select a type of treatment definition: ?

☒ Asthma Treatment
 ☐ Any Treatment

Please select a cost perspective: ?

☐ Program / plan
 ☒ Pgm / plan & patient

Annual emergency department visits per patient ?	0.24	Cost of an emergency department visit ?	\$86
Annual hospital stays per patient ?	0.06	Cost of a hospital stay ?	\$6,431
Annual outpatient visits per patient ?	1.16	Cost of an outpatient visit ?	\$38
Annual cost of asthma medications per patient ?	\$735	Annual cost of asthma-related ancillary services per patient ?	\$35
Annual missed work days per adult from asthma ?	5.82	Cost of a missed work day ?	\$64.36
Annual missed school days per child from asthma ?	4.84	Cost of a missed school day ?	\$35.00



Microsoft Excel - Asthma_ROI_model_20070601.xls

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Program Impact

For a general discussion of this page, click on the black question mark. ?

This page shows the impact estimates from a meta-analysis of the research literature on asthma quality improvement and disease management. You have one decision to make and one option on this page.

- 1) Select the type of study you want to use for results.
- 2) Freeze the impact values if you want to compare different scenarios when the impact stays the same.

Select a study design: Randomized controlled studies

Check to keep impact at current values: ☐ Freeze impact values

Healthcare Measures:	Productivity Measures:
Program impact on emergency department visits?* -25%	Program impact on missed work days per adult?* -86%
Program impact on hospital stays?* -37%	Program impact on missed school days per child?* -57%
Program impact on outpatient visits?* -21%	
Program impact on the cost of ancillary services?* -66%	
Program impact on the cost of asthma medications?* 16%	

* Negative percents are a decrease and positive percents are an increase in health care use or cost or missed days.



Microsoft Excel - Asthma_ROI_model_20070601.xls

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Program Cost

For a general discussion of this page, click on the black question mark. ?

Review four decisions that will affect calculations of the cost of the program to be implemented. Modify if appropriate.

- 1) Length of operation planned for the program.
- 2) Time until the full-impact of program is expected.
- 3) Cost of the program per person per year (consider changing based on costs estimates for specific programs from vendors).
- 4) Discount rate for valuing savings and costs that occur in different years.
(If immediacy of results is essential in your program, you may want to raise the discount rate.)

How long will the program operate (1 to 10 years)?	<input type="text" value="5"/>	What is the annual program cost per participant?	<input type="text" value="\$395"/>
How many years until the program achieves full impact?	<input type="text" value="2"/>	What is the discount rate for ROI calculation?	<input type="text" value="3%"/>

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Return

2007	2008	2009	2010	2011	2012
0.24	0.21	0.18	0.18	0.18	0.18
0.06	0.05	0.04	0.04	0.04	0.04
1.16	1.04	0.92	0.92	0.92	0.92
\$20.64	\$18.06	\$15.48	\$15.48	\$15.48	\$15.48
\$386	\$314	\$243	\$243	\$243	\$243
\$44.08	\$39.45	\$34.82	\$34.82	\$34.82	\$34.82
\$35.00	\$23.45	\$11.90	\$11.90	\$11.90	\$11.90
\$735.00	\$793.80	\$852.60	\$852.60	\$852.60	\$852.60
5.82	3.32	0.81	0.81	0.81	0.81
4.84	3.46	2.08	2.08	2.08	2.08
\$374.58	\$213.51	\$52.44	\$52.44	\$52.44	\$52.44
\$169.40	\$121.12	\$72.84	\$72.84	\$72.84	\$72.84

Results from the literature review

Savings are more likely for some populations than others, depending on the component of care. For example:

- Interventions for people with **persistent asthma** (versus all asthma) had:
 - Higher savings on ED visits and outpatient visits
 - Similar savings on missed work/school days
 - Lower savings on hospitalizations
 - Smaller increases in medication costs (so higher savings)

Results from the literature review

- Interventions in **Medicaid** populations (versus other coverage) had:
 - Higher savings on hospitalizations, outpatient visits, missed work/school days
 - Lower savings on ED visits
- Interventions for **children** (versus adults) had:
 - Higher savings on outpatient visits and asthma medications
 - Lower savings on ED visits, hospitalizations, and missed work/school days
- **Controlled studies** showed lower savings than non-controlled studies



Results from literature

- Few studies reported **program cost**; those that did reported a wide range (7 studies)
 - Average of \$395 dollars per patient per year
 - Low of \$81 for automated educational mailing to general populations
 - High of \$989 per year, targeted to highest cost patients



Results from literature

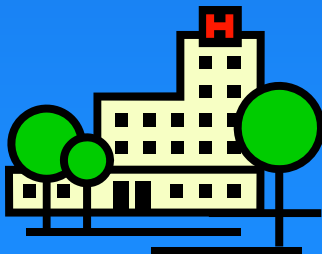
- Few studies reported the impact on **asthma medication** use (10 studies)
 - Studies **without a control group** reported larger increases in medication costs
 - **Baseline** asthma medication costs varied



Conclusions

What are the key drivers of ROI?

- Decrease in costs due to hospitalizations
- Increase in medication use
- Cost to implement the program



Conclusions

What can the asthma care calculator do?

- Help **forecast** the **financial** impact of asthma care programs
- Summarizes published evidence from **52 studies** on the impact of asthma care programs on use of medical care services and productivity





Resources

- Breakout sessions
 - Policy implications
 - Hands-on-Training
- Detailed report available on request
 - Documents methods, definitions used for the default baseline data
 - List of studies included in the literature review
- Send questions, suggestions and stories about the use of the calculator to:
Ginger Carls (Ginger.Carls@thomson.com) or
Rosanna Coffey (Rosanna.Coffey@thomson.com)