

University of Kentucky

From the Selected Works of Glen Mays

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Financial and Economic Analysis for Population Health

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Available at: https://works.bepress.com/glen_mays/299/

Financial and Economic Analysis for Population Health

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Today's Agenda

- I. Fundamentals of financial & economic analysis
- II. Tools for economic evaluation in public health
- III. Examples of applying economic & financing principles to public health strategies

Trump meets with GM today.



Which input costs this firm more?

a. Steel

b. Health care

I. Fundamentals

Pop Health questions we can answer with financial and economic analysis

- How much do health problems cost society?
- Who incurs the cost of these problems?
- How much do public health interventions cost?
- Who pays for these interventions?
- Do outcomes achieved by public health interventions justify their costs?
- Where should new investments be directed to achieve their greatest impact?

Related questions of value...

- How much **health** can we produce through public health investments?
- Can public health investments help “bend the curve” to contain **medical costs** or costs incurred by other stakeholders?

Uncertainty and Controversy

THE WALL STREET JOURNAL.

WSJ.com

JUNE 12, 2009

Prevention Efforts Provide No Panacea on Health Costs

By JANET ADAMY

Preventing Chronic Disease: An Important Investment, But Don't Count On Cost Savings

An overwhelming percentage of preventive interventions add more to medical costs than they save.

by Louise B. Russell

HEALTH AFFAIRS - Volume 28, Number 1

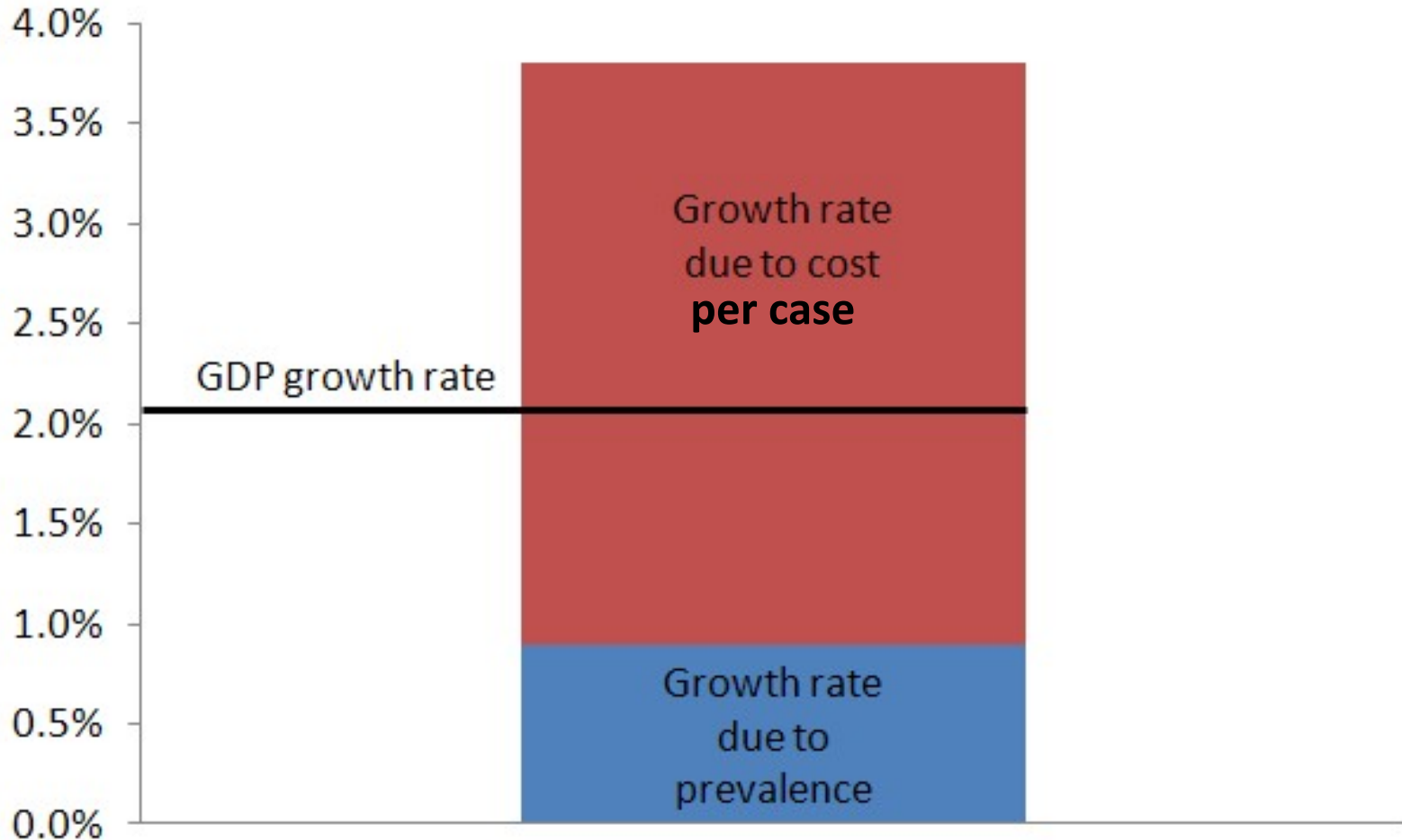
Prevention for a Healthier America:

INVESTMENTS IN DISEASE PREVENTION
YIELD SIGNIFICANT SAVINGS,
STRONGER COMMUNITIES



Public health spending and medical costs

Health spending growth rate 1996-2006



Challenges in demonstrating economic value in public health

- **Time lag** between costs and benefits
- **Distribution** of costs and benefits:
concentrated costs but *diffuse* benefits
- **Measurement** of costs and benefits requires good information systems
- **Attribution** of benefits: the counterfactual

Key ingredients

Costs of the health conditions/problems

- Costs of health problems we want to address
- Who pays?
- Over what time frames?

Costs of implementation/intervention (investments)

- Costs of implementing interventions
- Who pays?
- Over what time frames?

Benefits/Returns

- Valuation of the outputs and outcomes attributable to interventions
- Who realizes returns?
- Over what time frames?
- Compared to what?

Setting and managing expectations

- **Cost savings** – a high bar
- **Cost effectiveness** – value for dollars spent
 - Compared to status quo
 - Compared to other possible investments
 - Compared to doing nothing

...Key concept: **opportunity costs**

Estimating value in public health:

Key considerations

Populations at risk

- Size
- Heterogeneity

Interventions

- Primary, secondary or tertiary prevention programs
- Quality improvement projects
- Cross-cutting capabilities & infrastructure

Perspective

- Federal, state, agency, health system, or societal?

Time Horizon

- How long can you wait to realize benefits?

Estimating value in public health:

Key considerations - Costs

Direct costs

- Costs to treat the health condition(s)
- Cost of implementing interventions/infrastructure

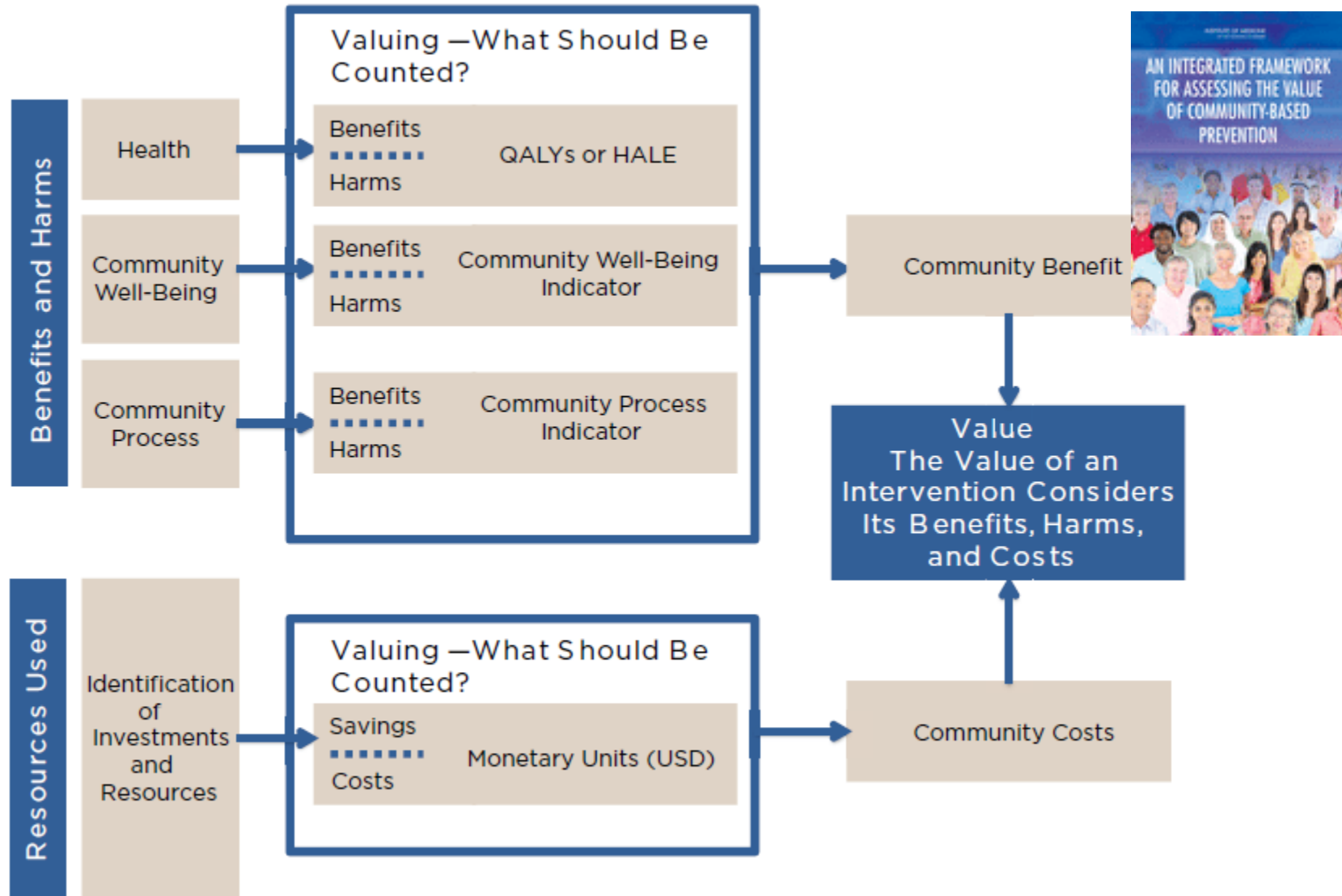
Indirect costs

- Economic value of productivity gains/losses or time savings/costs attributable to the intervention

Intangibles

- Quality of life, satisfaction, self-efficacy, social capital

Valuing Prevention & Public Health



Institute of Medicine. An Integrated Framework for Assessing the Value of Community-Based Prevention. Washington, DC; 2012.

<https://www.nap.edu/catalog/13487/an-integrated-framework-for-assessing-the-value-of-community-based-prevention>

Estimating value in public health:

Key considerations

Participation/Adherence

- ✦ What proportion of the population at risk engages in the program/intervention?

Break even

- ✦ How long does it take to recoup investment?

Maintenance/Persistence

- ✦ How long do the benefits last?
- ✦ Recurring costs?

II. Tools

Tools for estimating costs of health conditions

CDC Chronic Disease Cost Calculator

<https://www.cdc.gov/chronicdisease/calculator/>

USDA Costs of Foodborne Illness

<https://www.ers.usda.gov/data-products/cost-estimates-of-foodborne-illnesses/>

Medical Expenditure Panel Survey – query tool

https://meps.ahrq.gov/data_stats/meps_query.jsp

Implementation Costs: why we need to know?

“Poor costing systems have disastrous consequences. It is a well-known management axiom that what is not measured cannot be **managed or improved**. Since providers misunderstand their costs, they are unable to **link cost to process improvements or outcomes**, preventing them from making good decisions....Poor cost measurement [leads] to huge **cross-subsidies across services**...Finally, poor measurement of costs and outcomes also means that effective and efficient providers **go unrewarded**.”



- R.S. Kaplan and M.E. Porter, The big idea: how to solve the cost crisis in health care. *Harvard Business Review*; 2011.

Toward a deeper understanding of costs in public health

2012 Institute of Medicine Recommendations

- Identify the components and **costs of a minimum package** of public health services
 - Foundational capabilities
 - Basic programs
- Implement a **national chart of accounts** for tracking spending and flow of funds
- Expand **research on costs and effects** of public health delivery



Institute of Medicine. For the Public's Health: Investing in a Healthier Future. Washington, DC: National Academies Press; 2012. <https://www.nap.edu/catalog/13268/for-the-publics-health-investing-in-a-healthier-future>

Implementation Cost Tools

- **Prospective “expected cost” methods (micro-costing)**
 - Vignettes
 - Surveys with staff and/or administrators
 - Delphi group processes
- **Concurrent “implementation cost” methods (micro-costing)**
 - Time studies with staff
 - Activity logs with staff
 - Direct observation
- **Retrospective “cost accounting” methods (micro-costing or gross-costing)**
 - Administrative records, financial reports, billing data
 - Decomposition, allocation or modeling
 - Surveys with staff and/or administrators

**Drug
Abuse
Treatment
Cost
Analysis
Program**

*CostIt Software ©
(Costing Interventions templates)*

Substance Abuse Services Cost Analysis Program

SASCAP™

Examples: Survey methods



SPECIAL REPORT

The NEW ENGLAND
JOURNAL of MEDICINE

Results and Policy Implications of the Resource-Based Relative-Value Study

William C. Hsiao, Ph.D., Peter Braun, M.D., Daniel Dunn, Ph.D., Edmund R. Becker, Ph.D., Margaret DeNicola, M.P.H., and Thomas R. Ketcham, M.P.H.

N Engl J Med 1988; 319:881-888 | [September 29, 1988](#) | DOI: 10.1056/NEJM198809293191330

Three dimensions of work:

- Mental effort and judgment
- Technical skill and physical effort
- Stress

Examples: Survey methods



The
JO

Results and Relative-Val

William C. Hsiao, Ph.D.,
Thomas R. Ketcham, M.
N Engl J Med 1988; 319:

Table 4

**Summary of Estimated Cost of Data Collection
(in 1991 dollars)**

Collection Method	Total Cost ^a	No. of Completes	Cost per Complete ^b	Cost per Rated Service ^c
Telephone	\$105,000	1200	\$87.50	\$175.00
1-Round Mail	\$65,500	1200	\$54.58	\$109.17
2-Round Mail	\$80,000	1267 ^d	\$63.14	\$133.33
Panel	\$88,000	n/a	n/a	\$146.67

^aTotal cost of data collection includes all field activities (e.g., interviewing, survey distribution, data reduction), supervision, management, and instrument/materials development.

^bCost per complete is derived by dividing the total cost of data collection by the number of completed cases. (This calculation is not applicable to the panel-rating methodology.)

^cCost per service is derived by dividing the total cost of data collection by the 600 rated services.

^d667 completes for the first round and 600 completes for the second round.

Examples: Survey methods



- Surveys program managers
- Refers to expenditure records (not budgets)
- Explicit allocation of resources across multiple programs
- Available at:
 - <https://www.rti.org/publication/substance-abuse-services-cost-analysis-program-sascap-new-method-estimating-drug>

Examples: Survey methods

SASCAP™

Substance Abuse Services Cost Analysis Program

SASCAP™ LABOR MODULE

Time Allocation Table for Non-Medical Direct Care Staff

1	2	3	Hours Spent in Average Week Providing Specified Patient Services											Hours Spent in Average Week Doing Administrative and Other Support Activities				
			4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Job Type	# of People	Total Hours Worked Per Week by All the People Indicated in Column 2	Initial Patient Assessment and/or Orientation	Initial Medical Services	Ongoing Medical Services Other Than Pharmacological Dosing	Methadone Dosing	Other Pharmacological Dosing	Individual, Couples, and Family Counseling	Group Counseling	Patient Educational Services Outside of Counseling	Case Management/Case Support	Patient-Specific Administrative	Any Other Patient Services	Quality Assurance	Program Evaluation	Staff Education	General Administrative	Any Other Activity
EXAMPLE: Social Worker (MSW/DSW)	2	60	20								20	20						
Non-Medical Direct Care Staff																		
Case Manager (certified)																		
Case Manager (non-certified)																		
Degreed Counselor (licensed or certified)																		
Degreed Counselor (non-licensed)																		

Zarkin GA, Dunlap LJ, Homs G. The substance abuse services cost analysis program (SASCAP): a new method for estimating drug treatment services costs, **Evaluation and Program Planning** 2004; 27(1): 35-43,

ASTHO's Public Health ROI Calculator

- **Goal:** Develop approaches to assess value of improvements in public health capacity, infrastructure, administrative processes
- **Near-term:** capture effects on labor costs, time costs, productivity
- **Longer-term:** capture effects on program delivery (reach, effectiveness), population health



Public Health
Prevent. Promote. Protect.

ASTHO's Public Health ROI Calculator

- Requires data on:
 - Operating costs before and after implementation of your public health strategy
 - Revenues (if any) before and after implementation of your public health strategy
 - Measures of outputs/services before and after
 - Measures of health and economic outcomes (if available) before and after



<http://www.astho.org/t/article.aspx?artid=869>



Public Health
Prevent. Promote. Protect.

More resources for implementation costing

- USDHHS Assistant Secretary for Planning and Evaluation. **Guide to Analyzing the Cost-Effectiveness of Community Public Health Prevention Approaches.**

www.aspe.hhs.gov/health/reports/06/cphpa/report.pdf

- Haddix AC et al (CDC). **Prevention Effectiveness: A Guide to Decision Analysis and Economic Evaluation.** Oxford University Press.

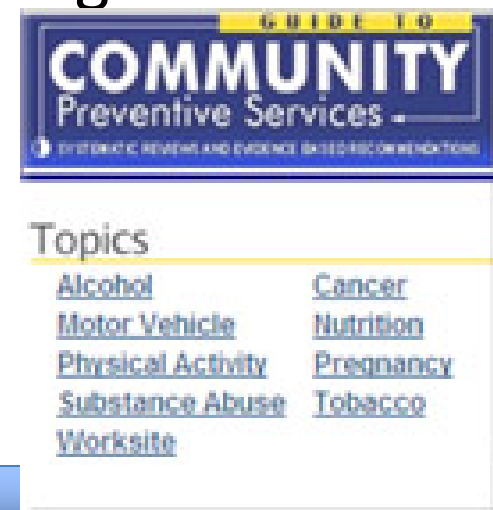
- **WHO Cost-It template**

http://www.who.int/choice/toolkit/cost_it/en/

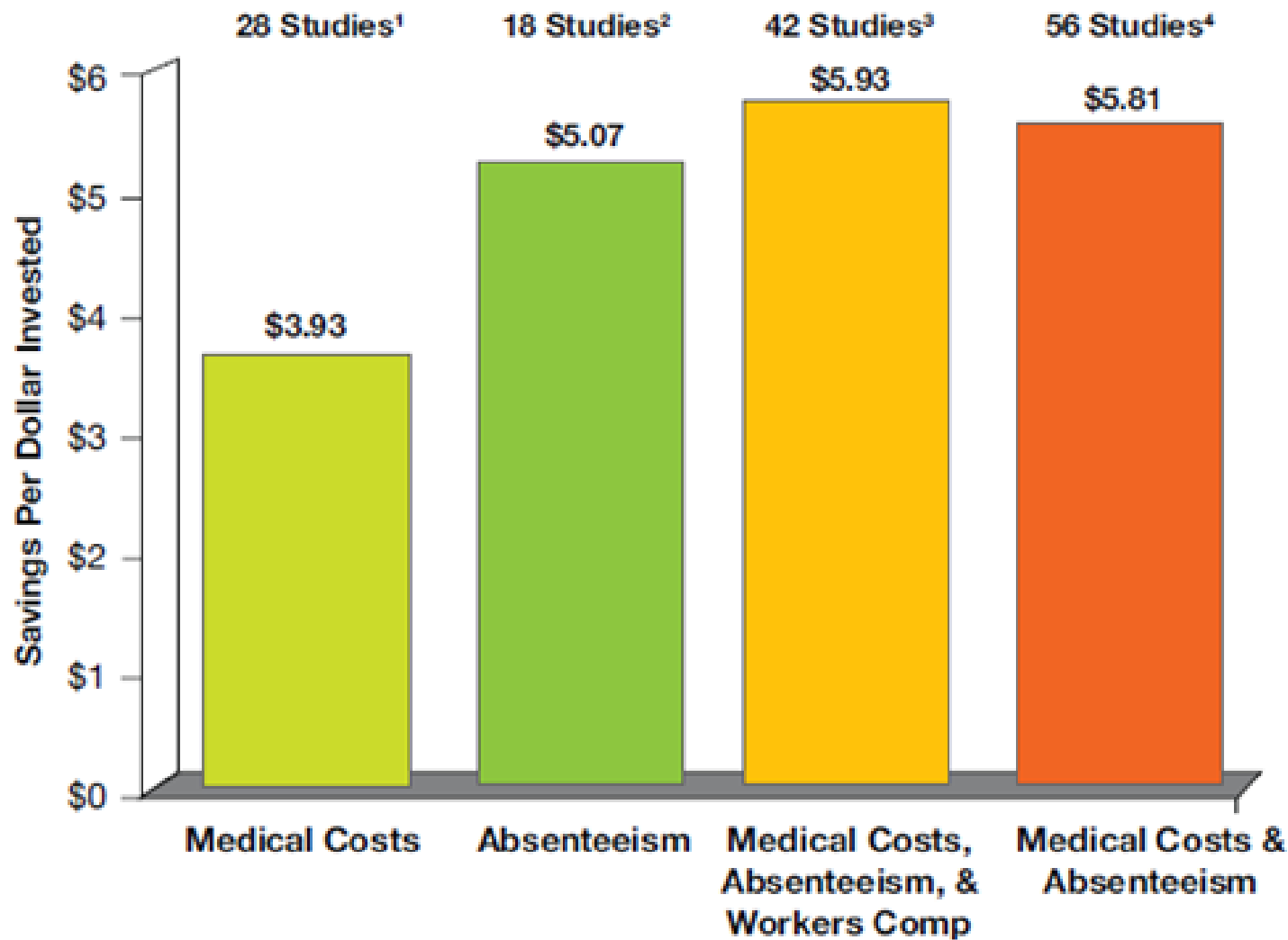
III. Examples

Examples: Intervention-level analysis

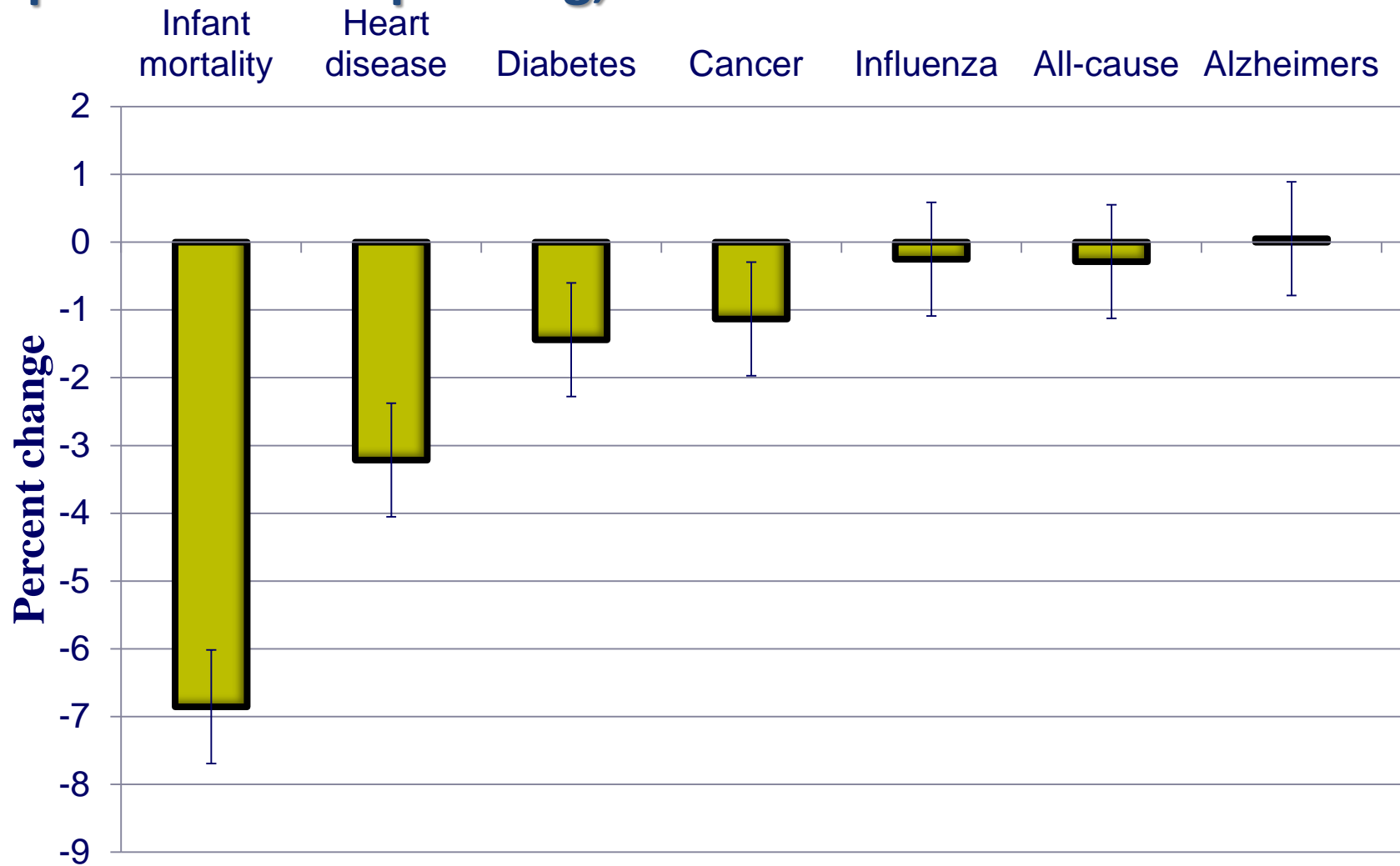
- Smoking cessation interventions cost an estimated \$2,587 for each life-year gained
- \$1 spent on STD and pregnancy prevention produces \$2.65 in medical cost savings
- \$1 spent on preconception care for diabetic women produces \$5.19 in medical cost savings
- \$1 spent on childhood immunization produces \$6.30 in medical cost savings



ROI of worksite wellness



Example: Mortality reductions attributable to local public health spending, 1993-2008



Aggregate value of spending

Source

Cost per Life- Year Gained

Medical care spending, 1990-2000
(Cutler et al. NEJM, 2006)

\$36,300

Public health spending, 1993-2005

\$12,200-\$25,600

THE NEW ENGLAND JOURNAL OF MEDICINE

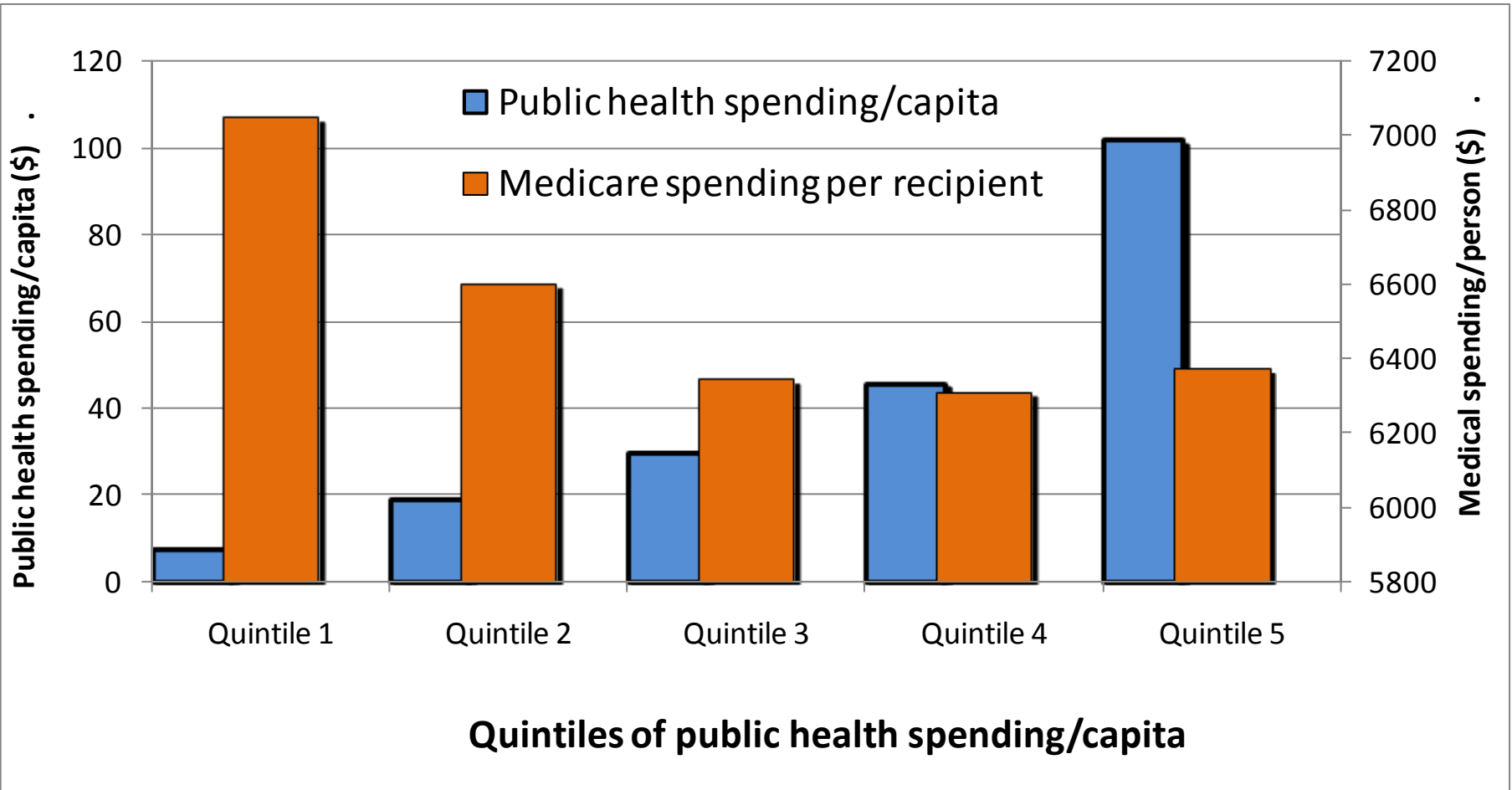
SPECIAL ARTICLE

The Value of Medical Spending in the United States, 1960–2000

David M. Cutler, Ph.D., Allison B. Rosen, M.D., M.P.H., Sc.D.,
and Sandeep Vijan, M.D.

Example: Medical Care Offsets Attributable to Local Public Health Spending, 1993-2008

Medical Cost Offset = 0.088%



Example: Projecting effects of new public health spending

- 1% increase in public health spending in average community over 10 years:

Public health cost	\$7.2M
Medical cost offset	-\$6.3M (Medicare only)
Deaths averted	175.8
Life years gained	1758
Net cost/LY	\$546

Examples: Program ROI

Arkansas Community Connector Program

- Use community health workers & public health infrastructure to identify people with unmet social support needs
- Connect people to home and community-based services & supports
- Link to hospitals and nursing homes for transition planning
- Use Medicaid and SIM financing, savings reinvestment
- Costing with electronic time logs



Felix, Mays et al. 2011

<http://content.healthaffairs.org/content/30/7/1366.abstract>

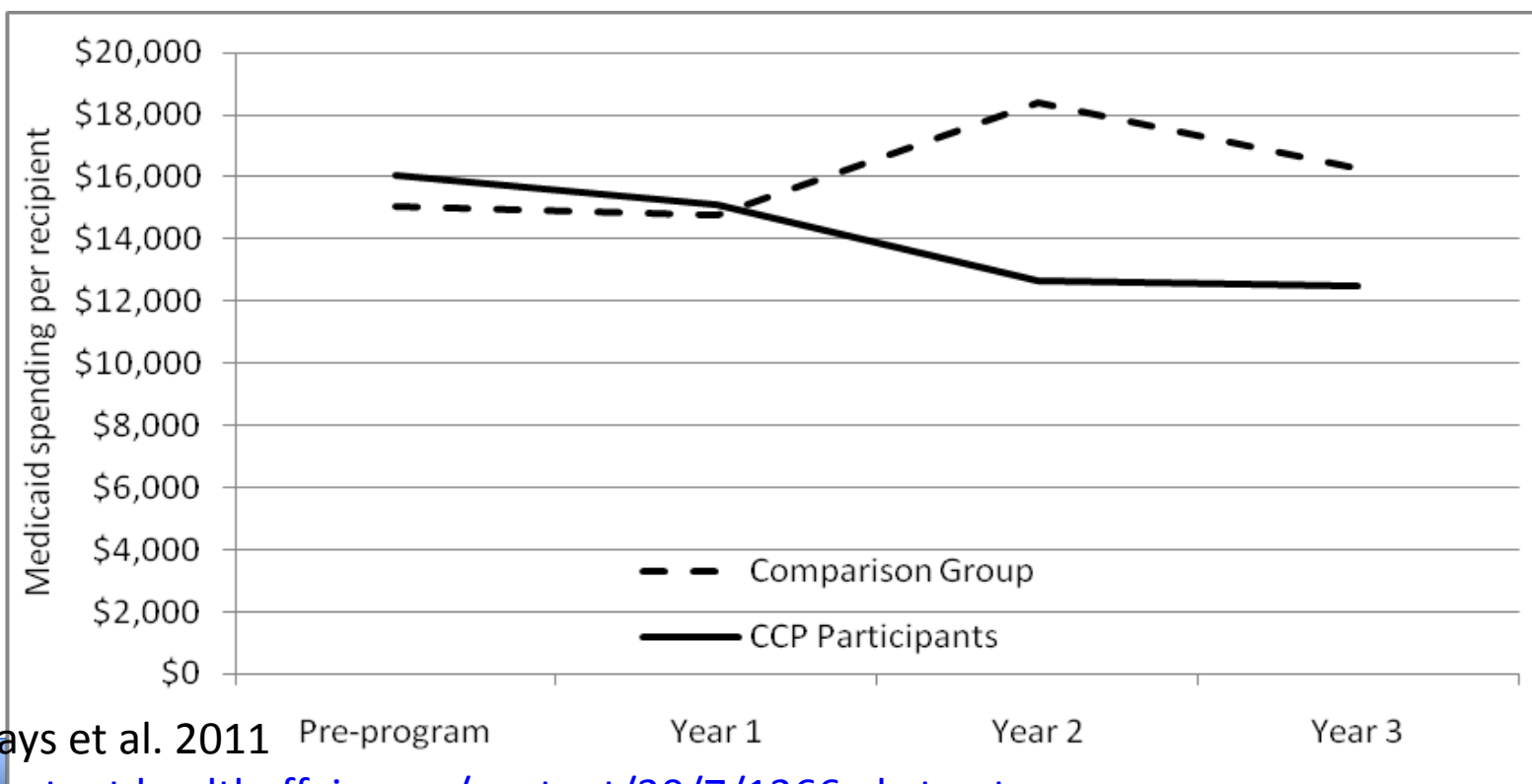
Examples: Program ROI

By Holly C. Felix, Glen P. Mays, M. Kathryn Stewart, Naomi Cottoms, and Mary Olson

THE CARE SPAN

Medicaid Savings Resulted When Community Health Workers Matched Those With Needs To Home And Community Care

HealthAffairs



Felix, Mays et al. 2011 Pre-program

Year 1

Year 2

Year 3

<http://content.healthaffairs.org/content/30/7/1366.abstract>

Examples: Program ROI

Three Year Aggregate Estimates

➤ Combined Medicaid spending reductions:	\$3.515 M
➤ Program implementation costs:	\$0.896 M
➤ Net savings:	\$2.629 M
➤ ROI:	\$2.92

Felix, Mays et al. 2011

<http://content.healthaffairs.org/content/30/7/1366.abstract>

Interpreting & using results:

Key considerations

- Uncertainty and sensitivity analysis
- Measurement error
- Attribution and threats to validity
- Scenario analysis
- Upper-bound and lower-bound estimates

Advancing Economic Analysis in Public Health

- Enhanced tracking of public health expenditures
- Enhanced monitoring of program performance
 - Reach/targeting
 - Effectiveness
 - Efficiency
 - Equity
- Analysis of cross-cutting infrastructure needed to implement/maintain programs

For More Information

Systems for Action

National Coordinating Center

Systems and Services Research to Build a Culture of Health

Supported by The Robert Wood Johnson Foundation

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