



# Cost savings and cost-effectiveness of clinical preventive care

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based on a Research Synthesis  
by Cohen and Neumann

## SUMMARY OF KEY FINDINGS

- > **Preventive services can reduce the prevalence of a targeted disease or condition and help people live longer, healthier lives.** There is wide agreement that preventive care provides important health benefits.
- > **Many preventive services offer good value for increasingly scarce health care dollars.** Benefits for many preventive services come at a relatively low cost and much preventive care is cost-effective.
- > **Most preventive care does not result in cost savings, however.** Costs to reduce risk factors, screening costs, and the cost of treatment when disease is found can offset any savings from preventive care. Additionally, living longer means people may develop other ailments that increase lifetime health care costs.

## Why is this issue important to policy-makers?

- Medical advances have reduced the prevalence of many acute conditions and increased life expectancy. As a result, chronic disease has become the dominant source of mortality in the United States.
- Chronic diseases are driven by risk factors that are largely preventable. Preventive care has the potential to control risk factors, thereby reducing the prevalence of costly chronic conditions.
- With the percentage of gross domestic product spent on health care tripling from 1960 to 2006 (Reference 1), policy-makers are looking to preventive care as a way to slow the rate of growth in health spending.

This synthesis focuses on primary and secondary prevention measures delivered in a clinical setting and does not address community-based preventive services. *Primary prevention* aims to prevent the onset of disease, while the goal of *secondary prevention* is to prevent disease from spreading beyond its initial stage.

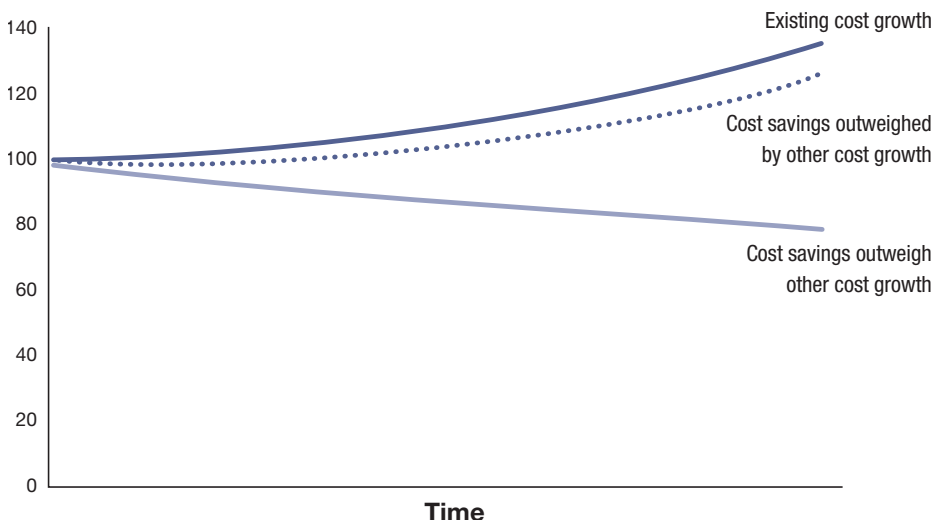
## What concepts are important to consider?

**“Cost-saving” and “cost-effective” are distinct terms that are often mistakenly used interchangeably.** Preventive care that decreases costs is cost-saving. For example, many childhood immunizations are cost-saving. If the benefits are sufficiently large compared to the costs, the intervention is “cost-effective” even if it does not save money.

**Even for preventive care that is cost-saving, the savings may not be large enough to reverse health care cost trends.** Cost savings may slow the growth of health care costs, but be outweighed by other cost growth (Figure 1).

Figure 1: Possible impact of cost-saving intervention

### Total annual costs



# A number of factors influence the cost-effectiveness of a preventive service.

## WHAT IS THE COST-EFFECTIVENESS RATIO?

Cost-effectiveness analysis compares interventions in terms of their impact on health benefits and costs. A service's cost-effectiveness (CE) is expressed as a ratio of its incremental costs to its incremental benefits:

$$\text{CE ratio} = \frac{\text{Incremental Costs (\$)}}{\text{Incremental Health Benefits}}$$

A low ratio means the service delivers good value. A high ratio means a service is expensive because its costs are large, its benefits are small, or both.

Health benefits are often described in terms of the number of quality adjusted life years (QALYs) saved. A QALY takes into account both length of life and quality of life (e.g., freedom from pain or ability to participate in activities). A year in perfect health is defined as 1 QALY. A year with any adverse condition is worth between 0 and 1 QALY.

## WHAT IS A GOOD VALUE?

How low the cost-effectiveness ratio must be to indicate good value depends on the value of a QALY. Values of \$50,000 or \$100,000 per QALY have often been used, but economists complain that these benchmarks lack a sound foundation, and critics suggest these traditional benchmarks are too low (Reference 2). Placing a higher value on a QALY suggests that society is willing to spend more on improving health.

Ultimately, decision-makers have to make a judgment as to what they think a QALY is worth.

**Cost-effective preventive care measures that do not slow the growth in spending may provide important health benefits and still be worthwhile.** Cost-effectiveness analysis compares an intervention's benefits and costs and therefore helps identify services that provide health benefits sufficiently large to justify their costs.

## What factors influence the cost-effectiveness of a service?

A preventive service's cost-effectiveness depends on a number of factors:

**Target population:** Cost-effectiveness varies considerably depending on the population targeted. The cost-effectiveness ratio typically improves when preventive services target higher-risk populations (Table 1).

Table 1: Influence of target population on cost-effectiveness

Intervention	Target population	Cost-effectiveness ratio
Screening for diabetes	All 35-year-olds	\$130,000/QALY
	35-year-olds with hypertension	87,000/QALY
	75-year-olds with hypertension	32,000/QALY

Source: Hoerger, et al., 2004 (Reference 3)

**Technology used:** Which technology is used influences both costs and health benefits. For example, colorectal cancer screening cost-effectiveness depends on whether the screening involves a colonoscopy, a sigmoidoscopy, or a fecal occult test.

**Screening frequency:** The cost-effectiveness of screening depends on how often the screening is administered (Table 2). Colorectal cancer screening every year, for example, may be less cost-effective than screening every five years.

Table 2: Influence of screening frequency on cost-effectiveness

Intervention	Screening frequency	Cost-effectiveness ratio
Fecal occult test for colon cancer	Annually	\$4,600 to \$26,000/QALY
	Every 2 years	\$2,900 to \$11,000/QALY

Source: MedPAC, 2006 (Reference 4)

**What the service is compared with:** If a preventive service is compared with "doing nothing," its incremental costs will be large, but its incremental health benefits may also be large. If prevention is compared with an effective disease treatment, its incremental benefits will be smaller, as will its incremental costs.

**Proportion of the population already receiving the service:** Some cost-saving or cost-effective preventive services already reach the vast majority of the target population (e.g., childhood immunizations). Providing the intervention to the hard-to-reach population not already receiving it may be expensive and make the cost-effectiveness of the intervention less favorable.

# Preventive care can be favorably cost-effective, even when it does not save money.

## What preventive care measures are cost-saving or favorably cost-effective?

The literature on the cost-effectiveness of preventive care is extensive. One registry of cost-effectiveness studies lists more than 500 peer-reviewed articles published on primary or secondary prevention through 2006 (Reference 8). Because the literature is so large, this synthesis relies on well-established reviews by others. Reviews conducted by the National Commission on Prevention Priorities (NCPPI), the National Business Group on Health (NBGH), and Russell were selected based on several criteria (Reference 9).

**Two preventive interventions were found to be cost-saving across all three reviews: childhood immunization and counseling adults on the use of low dose aspirin.** Several other preventive measures were found to be favorably cost-effective (Table 3). Evidence for these findings varies across reviews and the results depend on the specific assumptions made, including the target population and the intervention details (e.g., screening frequency and specific technology used) among others.

Table 3: Favorably cost-effective preventive measures (less than \$100,000/QALY)

Intervention	NCPPI	NBGH	Russell	Notes
<b>Medication and immunization</b>				
Childhood immunizations	Cost-saving	Cost-saving	Cost-saving	Russell only included varicella
Influenza immunization – adults	Cost-effective	Cost-saving	Not included	Target population differs
Counseling on use of low-dose aspirin	Cost-saving	Cost-saving	Cost-saving	Target population differs
Counseling on use of folic acid	Cost-effective	Cost-effective	Not included	
<b>Screening</b>				
Hypertension	Cost-effective	Cost-saving	Cost-effective	Target population and screening frequency differ
Cholesterol	Cost-effective	Not quantified	Cost-effective	Target population differs
Diabetes	Not favorably cost-effective	Cost-effective	Cost-effective	Target population and screening frequency differ
Colorectal cancer	Cost-effective	Cost-effective	Cost-effective	
Breast cancer	Cost-effective	Cost-effective	Cost-effective	Target population differs
Cervical cancer	Cost-effective	Cost-effective	Cost-effective	
HIV	Not included	Cost-effective	Cost-effective	NBGH – pregnant women; Russell – one-time screening
Chlamydia	Cost-effective	Cost-effective	Not included	
Abdominal aortic aneurysm for men > 60	Not included	Cost-effective	Cost-effective	Target population differs
Vision screening	Cost-effective	Cost-effective	Not included	Target population differs
<b>Lifestyle modification</b>				
Alcohol screening and counseling	Cost-saving	Cost-saving	Not included	
Tobacco screening and prevention	Cost-saving	Cost-saving	Cost-effective	
Counsel parents on motor vehicle safety	Cost-effective	Cost-saving	Not included	

## WHAT ROLE DOES INCREASED LONGEVITY PLAY IN COST-EFFECTIVENESS ANALYSIS?

Prevention can reduce the incidence of disease, but savings can be partially offset by health care costs associated with increased longevity. Whether these additional “competing risk” costs outweigh savings from avoiding the targeted disease depends on how healthy people are during their added life years.

Economic analyses often omit the costs associated with longer life and competing risks. The omission is, in part, due to the difficulty in estimating such costs, and also to conventions established in the field of health economics (Reference 5).

Although preventing poor health extends life, it may compress the amount of time individuals spend disabled when compared with similar individuals whose health deteriorates earlier (Reference 6). Even when morbidity compression occurs, however, longer life still contributes to additional care costs (Reference 7).

# Policy Implications

While the achievement of cost savings through prevention is beneficial, it is important to keep in mind that the goal of prevention, like other health initiatives, is to improve health. Even those interventions that cost more than they save can still be desirable. Because health care resources are finite, however, it is useful to identify those interventions that deliver the best value. Policy-makers could improve cost-effectiveness analysis and facilitate its use as a means for identifying the most valuable preventive services by:

- > **Playing a role in the production of cost-effectiveness information.** The federal government has produced some of this information through research sponsored by the Agency for Healthcare Research and Quality (AHRQ) and the National Institutes of Health (NIH), but a greater role would help ensure the relevance of the cost-effectiveness information and the transparency of the methodology.
- > **Using systemic evaluations of preventive measures to identify high-value investments.** This effort has begun under the Medicare Improvement and Patient Protection Act of 2008 (MIPPA), which authorized the Department of Health and Human Services (HHS) to include clinical preventive services with high ratings from the U.S. Preventive Services Task Force (USPSTF) in Medicare's national coverage determinations.
- > **Encouraging the use of cost-effective analysis by developers of clinical guidelines.** The USPSTF presents cost-effectiveness information (separately from its recommendations) for measures with evidence of effectiveness. This information helps the medical community understand where limited resources would have the largest impact on population health.

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## REFERENCES

- 1 Ginsburg P. *High and Rising Health Care Costs: Demystifying U.S. Health Care Spending*. Washington, DC: Robert Wood Johnson Foundation, 2008.
- 2 Hirth RA, Chernew ME, Miller E, Fendrick AM, Weisert WG. "Willingness to Pay for a Quality-Adjusted Life Year: in Search of a Standard." *Medical Decision Making*, vol. 20, no. (3): 332–342. 2000.
- 3 Hoerger TJ, Harris R, Hicks KA, Donahue K, Sorensen S, Engelgau M. "Screening for Type 2 Diabetes Mellitus: A Cost-Effectiveness Analysis." *Annals of Internal Medicine* vol. 140, no. (9): 689–699. 2004.
- 4 Medicare Payment Advisory Commission. *Increasing the Value of Medicare*. Washington, DC, 2006.
- 5 Luce B, Manning W, Siegel J, and Lipscomb J. 1996. "Estimating the costs in cost-effectiveness analysis." In *Cost-Effectiveness in Health and Medicine*, eds M Gold, J Siegel, L Russell and M Weinstein, 176–213. New York: Oxford University Press.
- 6 Diehr P, Patrick DL, Bild DE, Burke GL, Williamson JD. "Predicting Future Years of Healthy Life for Older Adults." *Journal of Clinical Epidemiology*, vol. 51, no. (4): 343–353. 1998; Lubitz J, Cai L, Kramarow E, Lentzner H. "Health, Life Expectancy, and Health Care Spending Among the Elderly." *New England Journal of Medicine*, vol. 349, no. (11): 1048–1055. 2003.
- 7 van Baal PH, Polder JJ, de Wit GA, Hoogenveen RT, Feenstra TL, Boshuizen HC, Engelfriet PM, Brouwer WB. "Lifetime Medical Costs of Obesity: Prevention No Cure for Increasing Health Expenditure." *PLoS Medicine*, vol. 5, no. (2): e29. 2008.
- 8 Cohen JT, Neumann PJ, Weinstein MC. "Does Preventive Care Save Money? Health Economics and the Presidential Candidates." *New England Journal of Medicine*, vol. 358, no. (7): 661–663. 2008.
- 9 Maciosek MV, Edwards NM, Coffield AB, Flottemesch TJ, Nelson WW, Goodman MJ, Solberg LI. "Priorities Among Effective Clinical Preventive Services: Methods." *Am J Prev. Med.* vol. 31, no. (1): 90–96. 2006b; National Business Group on Health. *A Purchaser's Guide to Clinical Preventive Services: Moving Science into Coverage*, 2007; Russell L. *Prevention's Potential for Slowing the Growth of Medical Spending*. Washington, DC: National Coalition on Health Care, 2007.