

CBO

How CBO Analyzes Approaches to Improve Health Through Disease Prevention



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At a Glance

Preventive medical care includes services that can prevent diseases from occurring (such as vaccinations) and services that can detect diseases before symptoms appear (such as screenings). When legislative proposals would affect such services, the Congressional Budget Office's primary role is to project the federal budgetary effects of the legislation. CBO's cost estimates typically cover a 10-year period because Congressional budget enforcement procedures generally apply to that period.

This report describes how CBO analyzes such proposals. Key takeaways are the following.

- **Costs of Preventive Medical Services.** Delivering preventive medical services results in costs for each person using the service. Vaccinations may cause some of those people to avoid the targeted disease, and screenings may allow some people to receive treatment earlier.
- **Effects on Health.** People who avoid the targeted disease or receive treatment earlier generally benefit from preventive medical services, and their health care costs often decline.
- **Net Effects.** The net result of effects on costs of preventive medical services and effects on health can be decreases or increases in overall health care spending. In many cases, the effects on the federal budget are smaller than the effects on health care spending because the federal government does not pay for all health care. Health improvements can also affect the federal budget if, for example, they increase longevity (which could boost federal outlays and deficits) or reduce disability rates (which could decrease federal outlays and deficits).
- **Historical Experience.** In the cases that have been studied, about 80 percent of preventive medical services have been found to lead to higher health care spending overall.
- **Effects of Future Proposals.** CBO analyzes federal legislative proposals on a case-by-case basis, considering the details of each proposal and drawing on relevant evidence. For example, proposals concerning a vaccine for the 2020 coronavirus could vary widely, as could their budgetary effects, depending on many factors.

Legislation related to a vaccine for the coronavirus differs from proposals involving most other preventive medical services in that it could have major macroeconomic effects, such as a faster rebound of economic activity and increases in tax revenues. By long-standing convention, such effects generally are not reflected in CBO's cost estimates. The size of such effects would depend on many factors, including how a proposal would affect whether and when a vaccine was approved and widely available, the scope of the pandemic when the vaccine became available, the characteristics of the vaccine, and the extent to which mitigation measures and social distancing influenced economic activity.



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Note

As referred to in this report, the Affordable Care Act comprises the Patient Protection and Affordable Care Act (Public Law 111-148), the health care provisions of the Health Care and Education Reconciliation Act of 2010 (P.L. 111-152), and the effects of subsequent judicial decisions, statutory changes, and administrative actions.



Summary

This report describes how the Congressional Budget Office estimates the effects on the federal budget of proposals to expand the use of preventive medical services. CBO analyzes policies on a case-by-case basis: The cost estimate for any legislative proposal depends on the details of the legislation. In addition, some preventive services—such as a vaccine for the 2020 coronavirus—could have broad economic benefits that, by long-standing convention, would not be captured in a typical CBO cost estimate.

A systematic review of the evidence suggests that expanded use of many preventive medical services has led to higher health care costs. Expanded government support for preventive care can improve people's health, and for that reason it might be considered worthwhile even if it increased federal budget deficits in many cases.

The effects on the federal budget and on people's health are just two of many possible factors that policymakers may weigh in considering proposals to expand the use of preventive medical services. Those other considerations may include differing views about the role of the federal government, the effects on people in different circumstances, and the effects on the budgets of state and local governments.

This report focuses on one of those many considerations: the projected effects of preventive medical services on the federal budget. The report also considers other factors—individual behaviors, the environment, and socioeconomic factors—that can affect people's health and the federal budget.

What Are Preventive Medical Services, and Who Uses Them?

Preventive medical services encompass a wide range of interventions. They include vaccinations that prevent diseases from occurring and screening tests designed to detect the presence of a disease before symptoms appear. Several federally supported entities make

recommendations about the use of preventive medical services, some of which are covered by insurance at no cost to patients.

The use of recommended preventive medical services varies by patient and type of service. In general, utilization rates for childhood vaccinations are high, whereas utilization rates for vaccinations and screenings for adults are lower. Use of preventive medical services also varies by patients' race, ethnicity, education, income, and type of insurance. People use fewer preventive medical services if they have to pay more for them or have more difficulty accessing them.

How Can Preventive Medical Services Affect Health and Other Outcomes?

Use of preventive medical services can improve or worsen people's health. By averting the onset of disease or enabling its early detection and treatment, preventive medical services can improve health. The effects of preventive medical services also can extend to people not receiving the service. People who are vaccinated against influenza, for example, will not pass the disease on to others, reducing their chances of getting the disease even if they have not been vaccinated against it themselves. In turn, better health can increase longevity, reduce disability, and boost labor force participation and productivity.

Preventive medical services also can worsen health, however. Use of those services can result in adverse reactions, unnecessary treatment (if a patient who tests positive for a condition does not actually have it), or additional services (if a patient pursues treatment for a condition that would not have needed it otherwise because it would not have progressed to cause symptoms).

How Can Preventive Medical Services Affect Health Care Spending?

Health care spending increases when the costs associated with providing a preventive medical service exceed the savings from providing the service, and it decreases when the savings exceed the costs. All preventive medical

services involve costs: from providing the service, from treating the subset of people who develop adverse reactions, and from treating unrelated conditions that occur because some people live longer as a result of the service. Screening services may result in additional costs for follow-up testing and treatment for patients who test positive. Two main ways that preventive medical services reduce costs are by lessening the incidence of a disease or by detecting it early, when treatment may be more effective and less costly.

The effects of preventive medical services on health care spending may vary over time. For example, preventive medical services may reduce costs initially (by averting disease) but increase costs over time (as longevity increases and patients develop unrelated medical conditions that require treatment).

The effects of preventive medical services on spending per person and overall can differ. For a given person, the costs may be low and the benefits can be considerable, averting or revealing a condition when the cost of treating it is smaller. But providers generally cannot predict which patients will develop specific preventable illnesses. Therefore, preventive medical services must typically be provided to many patients, many of whom may not benefit directly. Even when the cost of a particular preventive medical service for an individual is low, costs can accumulate when many people receive the service, increasing spending.

A systematic review of the literature that analyzed hundreds of studies concluded that 20 percent of preventive medical services improved health and reduced costs. The remaining services either increased costs or worsened health. (That review did not include any studies of services that reduced costs and worsened health.) On the basis of that review, CBO concludes that about 60 percent of preventive medical services do not reduce costs but produce clinical benefits that many people in the health care research community consider to be reasonable relative to those costs.

How Does CBO Estimate the Federal Budgetary Effects of Preventive Medical Services?

CBO's analysis of the effects of preventive medical services on the federal budget comprises three main steps:

- Identifying the number of people who would use the service and their insurance coverage (or participation in other federal programs that pay for health care),
- Estimating the effects on annual health care spending that would result from greater use of the service, and
- Estimating the budgetary effects resulting from changes in annual health care spending that is subsidized by the federal government.

The federal budgetary effects of preventive medical services are usually smaller than the effects on health care spending because any changes in that spending are largely financed through a combination of federal and nonfederal funds. CBO also estimates the budgetary effects of other outcomes, such as longevity or disability, on federal retirement and disability programs.

When estimating how federal policies that expand preventive medical services would affect the budget, CBO takes into account whether and to what extent people already use the service. If some people use the service under current law, a policy that expanded the federal provision of that service would shift some costs from other sources (state and local governments, private plans, or individuals) to the federal government. In addition, CBO reviews the research literature and consults with outside experts to assess the effects of the policy. The agency's cost estimates generally account for any estimated changes in the use of preventive medical services (the direct effects), but the agency considers effects related to improvements in health (the indirect effects) if they are supported by an evidence-based body of research.

CBO's analysis of policies related to preventive medical services focuses on their effects on the federal budget, whereas analyses in the research literature typically take a broader perspective. Differences between the approaches can include the sources of spending, the types of effects, and the period covered in the analysis. For instance, because the Congressional budget process generally focuses on the next 10 years, most of CBO's cost estimates span a 10-year period. (Other analyses may cover a longer period.) CBO's shorter time frame may not capture the full effects of the policies.

The budgetary effects of expanding coverage for a preventive medical service are not the only ones to consider.

Even if CBO estimates that expanding coverage of a certain service would increase federal deficits, the expense might be worthwhile if it improved patients' health.

How Would a Vaccine for the Coronavirus Affect the Federal Budget?

A vaccine for the coronavirus has not yet been approved and made widely available. CBO anticipates that if and when that happens, the effects on the federal budget could be substantial. A vaccine would allow states to lift their mitigation measures, which would enable economic activity to rebound and tax revenues to increase. In addition, federal spending on unemployment insurance would decrease and Medicaid enrollment would drop, among other possible effects. Spending on treatment of patients infected with the coronavirus would decline, but at the same time, spending for health care would increase because of the cost of the vaccine and its administration and because people would use more health care services, including services that may have been deferred because of the pandemic. Lower mortality rates would also boost outlays for programs such as Social Security.

However, much uncertainty surrounds those effects. That uncertainty results, in part, from the timing of a vaccine's approval and broad availability, from the effectiveness of the vaccine, and from the state of the economy at that time. The more mitigation measures are lifted and economy activity rebounds before a vaccine is approved and made widely available, the smaller the impact of that approval and availability on the federal budget.

The effects of legislation that might lead to a vaccine's approval and availability would be measured on the basis of CBO's macroeconomic projections in the absence of that legislation.¹ The budgetary effects that might result from broad economic changes would not be included in related cost estimates for two reasons. First, by long-standing convention, cost estimates (including those for legislation supporting vaccine development) do not

reflect changes that would affect the total output of the economy. However, CBO would update its baseline projections to account for those and other effects when a vaccine was approved and made widely available. Second, to the extent that appropriations related to the vaccine would affect mandatory spending and revenues, those effects would not be treated as offsets under scorekeeping guidelines that the Congress has adopted.² CBO would discuss major changes in mandatory spending, as additional information, if there was a basis to support such changes.

How Does CBO Estimate the Effects of Other Policies on Health and the Federal Budget?

Estimating the budgetary effects of other policies aimed at improving health involves a three-step process similar to that for preventive medical services and also depends on the evidence that is available. In 2012, for example, CBO examined the federal budgetary effects of a hypothetical increase in the federal excise tax on cigarettes and small cigars. For that analysis, CBO was able to draw on a rich literature, which allowed the agency to quantify the budgetary effects of a cigarette tax.

In 2015, CBO examined a hypothetical expansion of coverage for behavioral counseling and obesity drugs among Medicare beneficiaries who are obese. The research literature on that subject is growing rapidly but many aspects lack adequate evidence, so CBO's analysis in that case was less extensive. The literature is also lacking on how policies that focus on nutrition, education, housing, and employment would affect the federal budget through their influences on people's health. An evidence-based body of research would enable CBO to estimate the effects of those policies on the budget.

1. See Congressional Budget Office, *Interim Economic Projections for 2020 and 2021* (May 2020), www.cbo.gov/publication/56351.

2. Mandatory spending consists primarily of payments for benefit programs, such as Social Security, Medicare, and Medicaid. The Congress largely determines funding for those programs by setting rules for eligibility, benefit formulas, and other parameters rather than by appropriating specific amounts each year.



Chapter 1: Background on Preventive Medical Services

By preventing the onset of disease, detecting disease at an early stage, or slowing the progression of a disease after it has been diagnosed, preventive medical services aim to improve people's health. Federally supported entities make recommendations about the types, timing, and frequency of the preventive medical services people should receive. Some recommendations are targeted at specific groups of people.

Despite those recommendations, many people do not receive the services, and rates of utilization can differ by age, sex, race, ethnicity, education, income, and insurance status. For example, utilization rates for preventive medical services have been shown to be lower among low-income populations.

Used as recommended, preventive medical services can improve people's health (or, in some cases, harm it), which, in turn, can affect the federal government's spending and revenues. Other factors besides preventive medical services can also influence health. Determinants such as behavioral, environmental, and socioeconomic factors can affect people's health and other outcomes (see Box 1-1). This report focuses on preventive medical services, however.

Types of Preventive Care

Preventive medical services encompass a broad range of interventions. Those services, which are usually provided in a doctor's office or a hospital, fall into three categories.

- Primary prevention comprises services meant to interrupt the mechanism of disease and prevent its occurrence. Examples of primary preventive medical services include vaccinations against communicable diseases, counseling to help people achieve a healthy lifestyle, and counseling to help people stop smoking.
- Secondary prevention encompasses the early detection and diagnosis of disease to reduce its impact. Services such as screening mammography

attempt to identify conditions in their early stages, when they are more susceptible to treatment.

- Tertiary prevention consists of services meant to enhance recovery after the onset of disease or to avoid recurrence or complications. For example, patients can take medications to manage diabetes and prevent complications, such as nerve damage.

The distinction between tertiary prevention and treatment is not always clear, so this report focuses solely on primary and secondary preventive medical services.¹

Federal Recommendations for Preventive Medical Services

Four federally supported entities make recommendations about preventive medical services. For people with certain types of insurance, those recommendations are used to determine which preventive medical services are covered without cost sharing.

The U.S. Preventive Services Task Force (USPSTF), which was formed in 1984, makes independent, evidence-based clinical recommendations about preventive medical services, including medications and screenings. Its recommendations are based on a systematic review and synthesis of peer-reviewed literature.²

Each preventive medical service is assigned a grade. The USPSTF recommends that clinicians offer or provide services with an A or B grade, which have substantial or

1. Academy Health, *Research Insights: The Economics of Prevention* (March 3, 2013), <https://tinyurl.com/rddwpc4>.

2. The USPSTF's recommendations pertain to services provided in a primary care setting or received following a referral from a primary care provider. The recommendations apply to patients who are not exhibiting symptoms. For more information, see U.S. Preventive Services Task Force, "About the USPSTF" (accessed May 11, 2020), www.uspreventiveservicestaskforce.org/uspstf/about-uspstf.

Box 1-1.

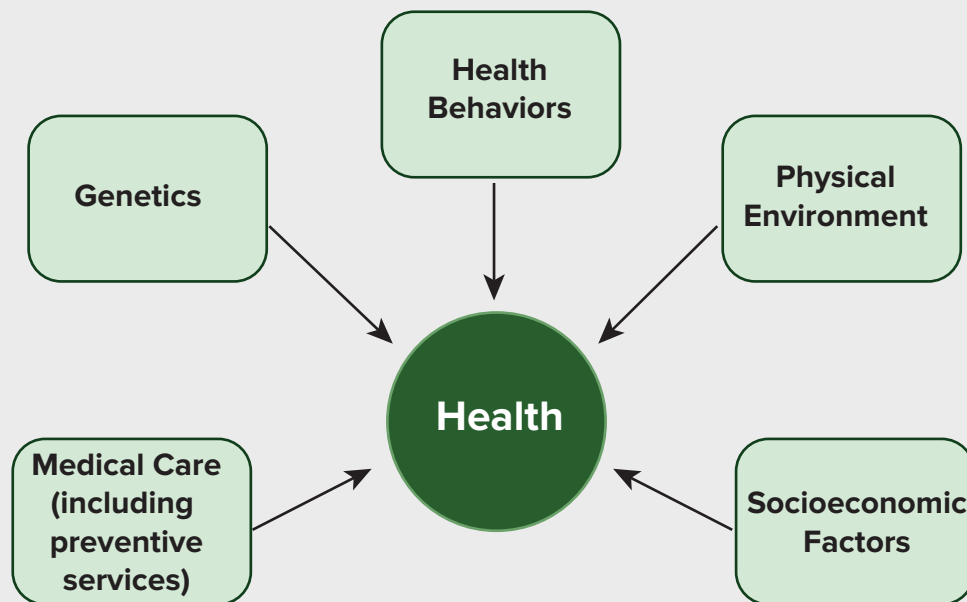
Addressing Other Determinants of Health

The federal government can influence people's health through policies other than just those that focus on medical care (including preventive medical services). Although people's health is partly determined by their genetics, it also is affected by their health behaviors (such as diet, exercise, and consumption of alcohol or cigarettes), the physical environment in which they live and work (and any attendant biological, chemical, or structural hazards), and socioeconomic factors (such as employment, education, housing, and social supports); see the figure below. The extent to which federal policies are able to improve people's health and whether those improvements translate into changes in the federal budget depend greatly on the types of policies that are implemented and the evidence available to support them.

Policies that affect those other determinants of health—such as nutrition, education, housing, and employment services—might affect the use of health care services and costs. To that end, in 2019, 24 states required Medicaid managed care organizations

to help address beneficiaries' unmet social needs.¹ The Accountable Health Communities model, an initiative of the Centers for Medicare & Medicaid Services' Innovation Center, is testing whether identifying and addressing the health-related social needs of Medicare and Medicaid beneficiaries can affect health care use and costs.² Having an evidence-based body of research on how such policies affect health and other outcomes is crucial for the Congressional Budget Office to estimate their effects on the federal budget.

1. Robert Wood Johnson Foundation, "Medicaid's Role in Addressing Social Determinants of Health," *Health Policy in Brief* (February 2019), <https://tinyurl.com/tov5ojq>.
2. For more information, see Centers for Medicare & Medicaid Services, "Accountable Health Communities Model" (updated May 18, 2020), <https://innovation.cms.gov/initiatives/ahcm>.



Source: Congressional Budget Office.

moderate net benefits. Services with a C grade can be recommended to selected patients on the basis of the provider's judgment and the patient's preferences. The USPSTF discourages the use of services with a D grade, which are likely to provide no net benefits or can lead to harm that outweighs the benefits. Services with

insufficient evidence for clinicians to make a recommendation receive an I statement. The USPSTF does not take costs into account when deciding what grade to assign to a particular service. In addition, its recommendations are often tailored to specific groups. For example, the recommendation about which patients should receive

a screening for abdominal aortic aneurysm depends on their sex, age, and history of smoking. The USPSTF updates its recommendations at least every five years.

A second organization, the Advisory Committee on Immunization Practices (ACIP), provides recommendations to the Director of the Centers for Disease Control and Prevention (CDC) on vaccines for the civilian population.³ When making recommendations, the committee takes into account factors such as a vaccine's efficacy and effectiveness, its safety, the quality of evidence reviewed, economic analyses of benefits and risks, and implementation issues.⁴ Vaccines are typically recommended for specific groups. For example, ACIP's recommendations for the cholera vaccine apply to individuals ages 18 to 64 who are traveling to an area with active cholera transmission.⁵

The Health Resources & Services Administration (HRSA) supports recommendations for preventive medical services for specific groups. HRSA's Bright Futures program identifies preventive medical services that are recommended for children from infancy through adolescence.⁶ HRSA also supports the Women's Preventive Services Guidelines, which are based on a 2011 study conducted by the Institute of Medicine (now called the National Academy of Medicine).⁷

3. For more information, see Centers for Disease Control and Prevention, Advisory Committee on Immunization Practices, "ACIP Charter" (June 5, 2018), www.cdc.gov/vaccines/acip/committee/charter.html.
4. A vaccine's efficacy measures the reduction in cases among vaccinated people under ideal conditions, such as in a clinical trial. A vaccine's effectiveness measures the reduction in cases among vaccinated people in typical conditions encountered in actual practice.
5. Karen K. Wong and others, "Recommendations of the Advisory Committee on Immunization Practices for Use of Cholera Vaccine," *Morbidity and Mortality Weekly Report*, vol. 66, no. 18 (May 12, 2017), pp. 482–485, www.cdc.gov/mmwr/volumes/66/wr/mm6618a6.htm.
6. The recommendations of the Bright Futures Periodicity Schedule reflect the consensus of the American Academy of Pediatrics and of Bright Futures. For more information, see Health Resources & Services Administration, "Bright Futures" (March 2018), <https://go.usa.gov/xdHDS>.
7. Recommendations for updates to the guidelines come from the Women's Preventive Services Initiative, a HRSA-supported panel of experts launched by the American College of Obstetricians and Gynecologists. For more information, see Women's Preventive Services Initiative, "Recommendations" (accessed on June 9, 2020), www.womenspreventivehealth.org/recommendations.

Use of Preventive Medical Services

The share of the population that receives recommended preventive medical services varies widely by age and type of service. In general, a large proportion of children receive recommended vaccinations. In 2017, more than 90 percent of infants between 19 and 35 months old received the recommended three or more doses of poliovirus vaccine; one or more doses of the vaccine for measles, mumps, and rubella; and three or more doses of the hepatitis B vaccine.⁸ Among youth ages 6 months to 17 years, 58 percent received the flu vaccine for the 2017–2018 flu season.⁹ In contrast, the proportion of adults receiving recommended vaccinations is much lower. For example, 37 percent of adults age 18 or older received the flu vaccine for the 2017–2018 flu season.¹⁰

In terms of screenings, use of recommended services for people of all ages is low. The CDC reports that millions of infants, children, and adolescents do not receive recommended screenings.¹¹ (The share varies by type of service.) Approximately 1 in 4 adults between the ages of 50 and 64 are up to date on recommended preventive medical services (such as screenings for colorectal cancer, hypertension, and high blood sugar) identified in the older adult section of Healthy People 2020, a set of goals designed by the Department of Health and Human Services (HHS) to improve the health of the nation over a 10-year period. Of adults over the age of 65, less than half are up to date on recommended preventive medical services.

The use of preventive medical services also varies on the basis of other characteristics. Women are more likely than men to receive blood pressure checkups and flu

8. National Center for Health Statistics, *Health, United States, 2018* (2019), Table 31, [www.cdc.gov/nchs/data/18.pdf](http://www.cdc.gov/nchs/data/hus/18.pdf) (1.6 MB).
9. Centers for Disease Control and Prevention, "Estimates of Flu Vaccination Coverage Among Children—United States, 2017–18 Flu Season" (October 5, 2018), www.cdc.gov/flu/fluview/coverage-1718estimates-children.htm.
10. Centers for Disease Control and Prevention, "Estimates of Influenza Vaccination Coverage Among Adults—United States, 2017–18 Flu Season" (November 5, 2018), www.cdc.gov/flu/fluview/coverage-1718estimates.htm.
11. Centers for Disease Control and Prevention, "Use of Selected Clinical Preventive Services to Improve the Health of Infants, Children, and Adolescents—United States, 1999–2011" *Morbidity and Mortality Weekly Report*, vol. 63, no. 2 (September 12, 2014), pp. 1–107, www.cdc.gov/mmwr/pdf/other/su6302.pdf (2.1 MB).

vaccines, for example.¹² In addition, the use of preventive medical services is lower for some patients: those from some racial or ethnic backgrounds and those with less education, lower income, or no (or very limited) health insurance. According to recent analyses by HHS, 62 percent of adults ages 50 to 75 received a recommended screening for colorectal cancer in 2015. When that overall share is broken down by group, the numbers vary. The percentage of adults receiving the screening varied by race and ethnicity (ranging from 49 percent among American Indians, Alaskan Natives, and Hispanics to 65 percent among non-Hispanic whites), by education (ranging from 46 percent among people with less than a high school education to 76 percent among people with advanced degrees), by income (ranging from 46 percent for people living below the poverty threshold to 73 percent for people living at or above 600 percent of the poverty threshold), and by insurance status (ranging from 25 percent among the uninsured population to 62 percent for people with private insurance).¹³

The use of preventive medical services is generally low among adults for many different reasons:

- Health care providers may prioritize addressing the condition that is the reason for the patient’s visit, as opposed to focusing on preventive services.
- Patients may not be aware of the preventive medical services recommended for them, and the health care delivery system does not clearly assign responsibility for ensuring that patients receive the recommended services.
- Patients may be uninsured or uncertain about their insurance plan’s coverage of preventive medical services, and they may not know how much they would have to pay out of pocket for the service.

12. Varun Vaidya, Gautam Partha, and Monita Karmakar, “Gender Differences in Utilization of Preventive Care Services in the United States,” *Journal of Women’s Health*, vol. 21, no. 2 (February 1, 2012), pp. 140–145. <https://doi.org/10.1089/jwh.2011.2876>.

13. For more information and additional examples of variation in the use of preventive medical services by patients’ characteristics, see Department of Health and Human Services, Office of Disease Prevention and Health Promotion, “Clinical Preventive Services” (accessed September 12, 2019), <https://go.usa.gov/xvsuN>.

- Patients may face nonfinancial barriers, such as transportation, language, culture, disability, and fear.¹⁴
- The health benefits and the potential risks of preventive medical services may seem more straightforward for children than for adults, which could partially explain the differences in vaccination rates between the groups.

Insurance Coverage for Preventive Medical Services

If a person has health insurance coverage for a specific preventive medical service, he or she is more likely (although not certain) to use that service. Different types of health insurance—public and private—cover preventive medical services to varying degrees. The Affordable Care Act (ACA) included provisions that expanded insurance coverage of preventive medical services by eliminating out-of-pocket costs, for example.¹⁵ Patients use fewer preventive medical services when they bear some of the cost, either through deductibles, copayments, or coinsurance.¹⁶

Private Plans

The ACA mandated that employment-based plans governed by the Employee Retirement Income Security Act (ERISA) and private health plans purchased on the individual market cover—at no cost to patients—these four categories of preventive medical services:

- Services with a grade of A or B from the USPSTF,
- Immunizations recommended by ACIP,

14. Nancy Aldrich and William F. Benson, “CDC Focuses on Need for Older Adults to Receive Clinical Preventive Services,” *Critical Issues Brief* (Centers for Disease Control and Prevention, 2012), www.cdc.gov/aging/pdf/cps-clinical-preventive-services.pdf (99 KB).

15. For a discussion of insurance coverage for preventive medical services, see Naomi Seiler and others, “Coverage of Clinical Preventive Services Under the Affordable Care Act: From Law to Access,” *Public Health Reports*, vol. 129, no. 6 (November–December 2014), pp. 526–532, <https://doi.org/10.1177/003335491412900611>.

16. Amanda Cassidy, “Health Policy Brief: Preventive Services Without Cost Sharing,” *Health Affairs* (December 28, 2010), <https://doi.org/10.1377/hpb20101228.861785>.

- Services recommended for infants, children, and adolescents by Bright Futures, and
- Services for women recommended in the Women’s Preventive Services Guidelines.

Those services are codified in section 2713 of the Public Health Service Act and are sometimes referred to as section 2713 services.¹⁷

Medicaid

Medicaid is a joint federal-state program that funds medical care for certain low-income, elderly, and disabled people. The program’s coverage of preventive medical services differs for children and adults. In all states, Medicaid provides coverage to enrolled children and adolescents (up to age 21) under the Early and Periodic Screening, Diagnostic, and Treatment (EPSDT) benefit, which generally does not have cost-sharing requirements.

Coverage of preventive medical services for adults depends on how they qualify for the program. Adults eligible for Medicaid through the ACA’s expansion can access section 2713 services without cost sharing. States have the option of covering preventive medical services for adults otherwise eligible for Medicaid. The federal government offers an incentive to states to cover preventive medical services for those enrollees. States that provide adults with free coverage of preventive medical services recommended by the USPSTF and ACIP receive a one percentage-point increase in their Federal Medical Assistance Percentage (FMAP).¹⁸ (The FMAP determines the share of Medicaid costs paid by the federal government.) In 2013, according to a survey completed by 39 states and the District of Columbia, eight states covered all preventive medical services without cost sharing.

In the remaining states, some of the preventive services required cost sharing.¹⁹

Children’s Health Insurance Program (CHIP)

CHIP provides health insurance to children and adolescents up to age 19 whose families have income that is low or moderate (but too high for them to qualify for Medicaid). Seven states, the District of Columbia, and five U.S. territories operate CHIP as an extension of Medicaid and include the EPSDT benefit. Children covered under CHIP in states that have programs separate from Medicaid have less comprehensive coverage of preventive medical services. (Those states are not required to cover EPSDT or section 2713 services.)

Medicare

The Medicare program provides subsidized medical insurance to people age 65 or older and to some people with disabilities. Coverage of preventive medical services under Medicare is mixed. For example, coverage is provided for the “Welcome to Medicare” visit, which includes certain screenings without cost sharing. Some preventive medical services are covered only when they are administered by certain providers in certain settings, though. In addition, some vaccines have cost-sharing requirements as part of Medicare Part D (the prescription drug benefit). Medicare also covers a yearly wellness visit at which beneficiaries receive a customized schedule of preventive medical services based on USPSTF and ACIP recommendations. Whether Medicare covers USPSTF-recommended services without cost sharing is at the discretion of the Centers for Medicare & Medicaid Services (CMS).²⁰

17. Certain plans that were in effect before the ACA was enacted are exempted from covering those recommended services. For additional discussion of related provisions—such as cost sharing for office visits associated with preventive medical services, cost sharing for treatment provided after a preventive screening, and coverage for services from out-of-network providers—see Naomi Seiler and others, “Coverage of Clinical Preventive Services Under the Affordable Care Act: From Law to Access,” *Public Health Reports*, vol. 129, no. 6 (November–December 2014), pp. 526–532, <https://doi.org/10.1177/003335491412900611>.

18. Ibid.

19. Alexandra Gates, Usha Ranji, and Laura Snyder, *Coverage of Preventive Services for Adults in Medicaid* (Kaiser Family Foundation, November 13, 2014), <https://tinyurl.com/y8wxxsm5u>.

20. Researchers estimate that the ACA’s elimination of cost sharing for preventive medical services provided under Medicare Part B had little or no effect on beneficiaries’ use of those services. That may be because many Medicare enrollees already had coverage of preventive medical services without cost sharing because they were enrolled in Medicare Advantage or medigap plans. For more information, see Gail A. Jensen and others, “A Slow Start: Use of Preventive Services Among Seniors Following the Affordable Care Act’s Enhancement of Medicare Benefits in the U.S.,” *Preventive Medicine*, vol. 76 (July 2015), pp. 37–42, <https://doi.org/10.1016/j.ypmed.2015.03.023>.

Potential Effects of Preventive Medical Services

Preventive medical services can have beneficial effects on patients and others. In certain cases, though, they can cause adverse reactions and potentially avoidable use of additional health care services. They can affect other outcomes, too, including disability, productivity, labor force participation, health care spending, and longevity.

Effects on Health

In addition to improving the patient's health, certain preventive medical services may provide benefits that extend to people who do not receive the service. For example, vaccinations can make people who are not vaccinated less likely to contract the disease because vaccination has reduced the number of people who contract and spread the disease. Preventive medical services can also potentially reduce the time that family members spend caring for relatives who are sick.²¹

Preventive medical services can have unintended adverse effects on patients' health, too. Some adverse reactions, such as bowel perforation from a colonoscopy, need to be addressed with subsequent treatment. In addition,

21. Gillian D. Sanders and others, "Recommendations for Conduct, Methodological Practices, and Reporting of Cost-Effectiveness Analyses: Second Panel on Cost-Effectiveness in Health and Medicine," *JAMA*, vol. 316, no. 10 (September 13, 2016), pp. 1093–1103, <https://doi.org/10.1001/jama.2016.12195>.

patients may receive false positive results from screenings, which can then cause them to undergo additional testing and unnecessary treatments. (A false positive result indicates that a person has a specific disease or condition when the person does not.) Another cause of unnecessary testing and treatment is overdiagnosis, which is the identification of a condition that would not have subsequently caused symptoms that required treatment. False positives and overdiagnosis can take an emotional toll on patients and may cause a financial burden, because cost sharing is often higher for medical treatments than it is for preventive medical services.²²

Effects on Other Outcomes

Expanded use of preventive medical services might reduce rates of disability. Prevented disease might also enable some people to continue working and might boost productivity, which could increase wages. In addition, the labor force participation rate might be pushed up if people delayed retirement.²³

22. For an example that quantifies the financial costs among women receiving mammography screening, see Mei-Sing Ong and Kenneth D. Mandl, "National Expenditure for False-Positive Mammograms and Breast Cancer Overdiagnoses Estimated at \$4 Billion a Year," *Health Affairs*, vol. 34, no. 4 (April 2015), pp. 576–583, <https://doi.org/10.1377/hlthaff.2014.1087>.

23. For details about CBO's approach to estimating the effects of preventive medical services on the federal budget, see Chapter 3.



Chapter 2: Effects of Preventive Medical Services on Health Care Spending

Preventive medical services can decrease or increase overall health care spending. A comprehensive review of the literature found that about 20 percent of preventive medical services reduced health care spending. The outcome depends on how the costs of the preventive medical service compare with the combined savings and spending that would result from greater use of the service. The effects of a particular preventive medical service on overall health care spending are determined by the characteristics of the service, the nature of the disease it is intended to prevent, and the characteristics of the population that receives it. This chapter illustrates the role of those factors by presenting a framework for estimating the effects of primary and secondary prevention—using vaccinations and screenings as examples—on health care spending.

The Effects of Vaccinations on Spending

The costs of preventive medical services accrue for *all people* who receive the service, not just for those who avoid illness. For vaccinations, a type of primary prevention intended to prevent disease, the costs generally include the costs of the vaccine, its administration, and the treatment of any adverse reactions. The potential savings from vaccination occur among the *subset* of individuals who would have developed the disease in the absence of vaccination and for whom the vaccination is effective. For some vaccinations, those potential savings also can occur among people who are not vaccinated, because vaccination reduces the number of people who contract and spread the disease. Those health care savings could be offset by higher spending if patients live longer and thus require treatment for other, unrelated medical conditions.

In sum, vaccinations reduce health care spending only if the savings from avoided treatment costs owing to the prevention of the targeted disease exceed the combined costs of the vaccine, its administration, and the treatment of adverse reactions, as well as the costs associated with treating unrelated medical conditions that stem from increased longevity (see Table 2-1).

The Effects of Screenings on Spending

As with vaccinations, the costs of screenings, a type of secondary prevention that aims to detect disease early on to lessen its impact, are incurred by *all people* who receive the service. Those costs include the costs of the initial screening, of treating any adverse reactions to it, of follow-up testing and treatment for patients who test positive (including those who do not have the condition or who would not have otherwise required treatment), and of treating other, unrelated medical conditions among people whose longevity is increased as a result of the screening. Screenings can also produce findings that are unrelated to the condition for which the patient is being tested. Those results, known as incidental findings, can lead to additional tests and treatments and thus additional costs.¹ Potential savings from screenings come from the *subset* of individuals who have undetected disease, who are screened and receive a positive result, and whose treatment costs are lower because the condition is detected earlier, when treatment may be more effective.

In sum, screenings reduce health care spending only if those savings exceed the combined costs of administering the screening, treating adverse reactions, treating false positives, treating conditions identified because of overdiagnosis, and treating unrelated conditions that result from increased longevity (see Table 2-2).

To determine the conditions under which early detection from screening may increase or decrease health care spending per person, the Congressional Budget

1. According to one recent survey of physicians, 87 percent reported that the subsequent testing and treatment of incidental findings had negative consequences for patients. The three most common types of consequences reported by physicians were physical harm, treatment burden, and financial burden. See Ishani Ganguli and others, “Cascades of Care After Incidental Findings in a U.S. National Survey of Physicians,” *JAMA Network Open*, vol. 2, no. 10 (October 16, 2019), e1913325, <https://doi.org/10.1001/jamanetworkopen.2019.13325>.

Table 2-1.

Effects of Vaccinations on Health Care Spending per Person

Factor	Effects on Spending	Affected Population
Costs of the Vaccine and Its Administration	Increase	All people who receive the vaccination
Costs of Treating Adverse Reactions	Increase	Subset of people who have an adverse reaction
Changes in Spending From Disease Reduction	Decrease	Subset of people who would have developed the disease without the vaccination
Changes in Spending From Increased Longevity ^a	None or increase	Subset of people who live longer because they would have developed the disease without the vaccination

Source: Congressional Budget Office.

The effects on spending may not occur at the same time. Changes in spending associated with the service itself—the costs of the vaccine and its administration as well as the costs of treating adverse reactions—would tend to show up quickly, whereas changes in spending owing to disease reduction and longevity could take longer to emerge.

a. Some vaccinations may prevent disease without increasing longevity.

Office examined three screening scenarios based on these characteristics:

- Whether in the absence of screening a person's undetected condition would have progressed to the point at which it would cause symptoms and require treatment,
- Whether the total costs of treating the condition would be lower or higher if treatment was started early rather than late, and
- How treating the condition in its early stages would affect a patient's longevity.

The effects of screenings on health care spending depend on how those characteristics interact. To examine that topic, CBO considered three scenarios—A, B, and C—based on different combinations of those characteristics and assessed their effects on health care spending (see Table 2-3).

In scenario A, the targeted condition, if not detected through screening, would not progress to the point of causing symptoms and would, therefore, not require treatment. In that scenario, screening leads to the treatment of conditions that would otherwise not have been treated, resulting in higher health care spending.

In scenarios B and C, the targeted condition, if not detected through screening, would eventually progress to cause symptoms and require treatment. Screening in those scenarios would lead to earlier treatment of the targeted condition. In scenario B, the costs of treating the condition when it is discovered early are greater than the costs of treating the condition when it is discovered late. (That scenario might occur with conditions that have poor prognoses, such as certain cancers. In those cases, early treatment differs from late treatment not so much in the effectiveness of the treatment but rather in the length of the treatment.) In scenario C, the costs of treating the condition when it is discovered early are lower than the costs of treating the condition when it is discovered late. In both scenarios, early treatment either has no effect on longevity or increases it. Such increases would be associated with higher health care spending on other, unrelated conditions.

Only in scenario C is screening potentially associated with reduced health care spending:

- For screenings to decrease health care spending for a *particular person* under scenario C, the savings from treating the condition earlier would have to exceed the costs of the screening (along with treatment costs for any adverse reactions) and the additional health care spending associated with any increased longevity.

Table 2-2.

Effects of Screenings on Health Care Spending per Person

Factor	Effects on Spending	Affected Population
Costs of the Screening and Its Administration	Increase	All people who receive the screening
Costs of Treating Adverse Reactions	Increase	Subset of people who have an adverse reaction
Costs of False Positive Results	Increase	Subset of people who test positive for the condition but do not have it
Costs of Overdiagnosis	Increase	Subset of people who test positive for the condition but do not benefit from treatment
Changes in Spending From Early Detection	Decrease or increase ^a	Subset of people who have the condition, test positive for it, and receive appropriate treatment
Changes in Spending From Increased Longevity ^b	None or increase	Subset of people who have the condition, test positive for it, receive appropriate treatment, and live longer

Source: Congressional Budget Office.

A false positive result indicates that a person has a specific disease or condition when the person does not. Overdiagnosis is the identification of a condition that would not have subsequently caused clinical symptoms and that leads to unnecessary testing and treatment.

The effects on spending may not occur at the same time. Changes in spending associated with the service itself—the costs of the screening and its administration as well as the costs of treating adverse reactions—would tend to show up quickly, whereas changes in spending owing to early detection and longevity could take longer to emerge. Costs associated with false positive results and overdiagnosis would tend to occur initially but could be long lasting.

- a. For patients who would have developed symptoms and thus would have been treated in the absence of screening, early detection could decrease costs (if the costs of early treatment were lower than the costs of later treatment) or increase costs (if the opposite was true). For patients who would not have developed symptoms and thus would not have been treated in the absence of screening, early detection would increase costs.
- b. Some screenings may result in the early detection of disease without increasing longevity.

- For screenings to decrease health care spending for a *population* under scenario C, the savings from treating the condition earlier must exceed the total costs of the screening for all people, which include the costs of the screening itself (along with treatment costs for any adverse reactions and false positives), and any additional spending associated with increased longevity.

Characteristics of Preventive Medical Services That Affect Health Care Spending

The combination of various factors determines whether a preventive medical service increases or decreases health care spending. Those factors include the price of the service and its administration, the incidence and severity of adverse effects, the incidence of the condition in the absence of prevention and the effectiveness of services to prevent and treat the condition, the characteristics of the population receiving the service, and the frequency with

which the service is provided. The effects of those factors and what is known about them can change over time.

Price

When the price of a preventive medical service (and any ensuing treatment) is low, savings do not need to be as large for health care spending to decrease as a result of the service. Prices of preventive medical services vary considerably by type of service. According to the Centers for Disease Control and Prevention's vaccine price list, for example, private-sector prices for vaccinations for adults in 2020 range from \$25.88 for tetanus and diphtheria toxoids to \$227.93 for HPV-Human Papillomavirus 9 Valent.² For screenings, the resources used depend,

2. Centers for Disease Control and Prevention, "CDC Vaccine Price List" (accessed on May 1, 2020), <https://go.usa.gov/xdHQc>. The list shows prices only for vaccines available through the CDC's contracts.

Table 2-3.

Three Scenarios That Show How Early Treatment of a Condition Detected Through Screening Could Affect Health Care Spending per Person

	Scenario A	Scenario B	Scenario C
Whether the Targeted Condition (in the Absence of Screening) Would Have Caused Symptoms That Require Treatment	No	Yes	Yes
Changes in Spending From Early Treatment	Increase	Increase	Decrease
Changes in Longevity From Early Treatment	None	None or increase	None or increase
Overall Changes in Spending From Early Treatment	Increase	Increase	Depends on the magnitude of savings from early treatment relative to the costs from increased longevity, if any

Source: Congressional Budget Office.

Early treatment is treatment that occurs as a result of a condition’s being detected through screening. Late treatment is treatment that occurs after symptoms develop.

In scenario A, the condition being screened for, if not detected through screening, would not progress to the point of causing symptoms and would, therefore, not require treatment.

In scenarios B and C, the targeted condition, if not detected through screening, would eventually progress to cause symptoms and require treatment. In scenario B, the costs of treating the disease when it is discovered early are greater than the costs of treating the disease when it is discovered late, whereas in scenario C, the costs of treating the condition when it is discovered early are lower than the costs of treating the condition when it is discovered late.

in part, on the time, expertise, and equipment required to provide the service. As a result, the prices paid vary widely. For example, Medicare pays less than a hundred dollars for depression screenings but several hundred dollars to over a thousand dollars for colonoscopies.

Adverse Effects

When adverse effects to preventive medical services are less frequent and less severe, savings do not need to be as large for health care spending to decrease as a result of the service. The frequency and severity of adverse reactions and the frequency of false positives and overdiagnosis related to preventive medical services vary widely. For example, serious adverse events can result from colonoscopies, although they occur infrequently: There are an estimated four bowel perforations and eight major bleeds per 10,000 colonoscopies.³ The adverse effects of mammography include false positive results and overdiagnosis. Mammograms yield 121 false positives per 1,000 women ages 40 to 49; that rate varies with age, family history, and

breast density.⁴ Overdiagnosis has been estimated to occur less frequently—at a rate of about 1 case of breast cancer for every 1,000 women age 40 or older.⁵

For vaccinations, adverse reactions are classified as local (for example, redness), systemic (for example, fever), or allergic (for example, anaphylaxis). Severe adverse reactions rarely occur following vaccinations.⁶ For many vaccinations, for example, anaphylaxis occurs at a rate of approximately one event per million doses. For screenings, evidence about the adverse effects is typically

3. Jennifer S. Lin and others, *Screening for Colorectal Cancer: A Systematic Review for the U.S. Preventive Services Task Force*, Evidence Synthesis No. 135, AHRQ Publication No. 14-05203-EF-1 (Agency for Healthcare Research and Quality, June 2016), <https://go.usa.gov/xdHQ2> (3.83 MB).

4. Heidi D. Nelson and others, “Factors Associated With Rates of False-Positive and False-Negative Results From Digital Mammography Screening: An Analysis of Registry Data,” *Annals of Internal Medicine*, vol. 164, no. 4 (February 2016), pp. 226–235, <https://doi.org/10.7326/M15-0971>.

5. H. Gilbert Welch and others, “Breast-Cancer Tumor Size, Overdiagnosis, and Mammography Screening Effectiveness,” *New England Journal of Medicine*, vol. 375 (October 2016), pp. 1438–1447, <https://doi.org/10.1056/NEJMoa1600249>.

6. See Centers for Disease Control and Prevention, “Vaccine Recommendations and Guidelines of the ACIP: Preventing and Managing Adverse Reactions” (last reviewed July 12, 2017), <https://go.usa.gov/xd6rK>.

inadequate.⁷ Some screenings, such as mammograms, have been studied more extensively, however.⁸

Effectiveness and Incidence

The effect of a preventive medical service on health care spending depends on the effectiveness of the service (and any ensuing treatment) and the lifetime incidence of the condition in the absence of prevention. The effect on spending of a service that is highly effective or that targets a common condition (such as screening for colorectal cancer) may differ from that of a service that is only partly effective or that targets a rare condition (such as screening for thyroid cancer in asymptomatic patients).⁹

Demographic Characteristics

The characteristics of the population of patients that receives the service, which can include age, sex, race, and risk factors (for example, presence of symptoms and medical history), can be associated with whether the service increases or decreases health care spending. When a preventive medical service is targeted to a high-risk population, it becomes more likely that the medical benefits of the service will exceed the adverse effects, thus lowering health care spending.¹⁰ However, interventions targeted at older or sicker populations may increase those patients' unhealthy years of life, during which they would tend to accrue higher medical costs for treatment of other, unrelated medical conditions.¹¹

Frequency

The costs and savings of a preventive medical service depend on the frequency with which it is provided.

Providing a service, such as a screening, more often (for example, every year instead of every three years) increases the proportion of cases detected early. However, it also increases spending on the service.¹²

Changes Over Time

Calculations of the effects of preventive medical services can change over time for various reasons. Shifts in the use of existing technology and the emergence of new technologies can cause the effectiveness of preventive medical services to change, for example. The calculation of benefits and harms can also change as new information about the effects of interventions becomes known.¹³ For example, in 2018, the U.S. Preventive Services Task Force's recommendation for prostate cancer screening for men ages 55 to 69 changed from a grade of D to a grade of C.¹⁴ In other words, the service can now be recommended to selected patients based on the provider's judgment and the patient's preferences. (For men age 70 or older, the recommendation of not getting the screening remains unchanged because the expected benefits do not outweigh the expected harm.)

Review of the Literature on the Cost-Effectiveness of Preventive Medical Services

Numerous studies have estimated the effects of preventive medical services on health care costs and health outcomes. Using a registry of preventive medical services and treatments, a 2008 review of almost 600 published studies found that approximately 20 percent of those services reduced health care costs while also improving health; the remaining 80 percent increased costs and had mixed effects on health.¹⁵ (That review did not include any studies of services that reduced costs and worsened health.)

7. Iris R. Mabry-Hernandez and others, "U.S. Preventive Services Task Force Priorities for Prevention Research," *American Journal of Preventive Medicine*, vol. 54, no. 1S1 (January 2018), pp. S95–S103, <https://doi.org/10.1016/j.amepre.2017.08.014>.

8. Heidi D. Nelson and others, "Harms of Breast Cancer Screening: Systematic Review to Update the 2009 U.S. Preventive Services Task Force Recommendations," *Annals of Internal Medicine*, vol. 164, no. 4 (February 2016), pp. 256–267, <https://doi.org/10.7326/M15-0970>.

9. See, for example, Shaan S. Patel and Meredith L. Kilgore, "Cost Effectiveness of Colorectal Cancer Screening Strategies," *Cancer Control*, vol. 22, no. 2 (April 2015), pp. 248–258, <https://doi.org/10.1177/107327481502200219>; and U.S. Preventive Services Task Force, "Thyroid Cancer: Screening" (May 9, 2017), <https://tinyurl.com/ybdqfzph>.

10. For example, see Joshua T. Cohen and Peter J. Neumann, *The Cost Savings and Cost-Effectiveness of Clinical Preventive Care*, Research Synthesis Report No. 18 (Robert Wood Johnson Foundation, September 2009), <https://tinyurl.com/y5mfdtm7>.

11. Ibid.

12. Ibid.

13. Michael Maciosek and others, "Updated Priorities Among Effective Clinical Preventive Services," *Annals of Family Medicine*, vol. 15, no. 1 (January/February 2017), pp. 14–22, <https://doi.org/10.1370/afm.2017>.

14. U.S. Preventive Services Task Force, "Screening for Prostate Cancer: U.S. Preventive Services Task Force Recommendation Statement," *JAMA*, vol. 319, no. 18 (May 8, 2018), pp. 1901–1903, <https://doi.org/10.1001/jama.2018.3710>.

15. Joshua T. Cohen, Peter J. Neumann, and Milton C. Weinstein, "Does Preventive Care Save Money? Health Economics and the Presidential Candidates," *New England Journal of Medicine*, vol. 358 (February 2008), pp. 661–663, <https://doi.org/10.1056/NEJMp0708558>. For their analysis, the authors used the predecessor to the Cost-Effectiveness Analysis Registry. The current version of the registry is available at the Center for the Evaluation of Value and Risk in Health, "CEA Registry," <https://cevr.tuftsmedicalcenter.org/databases/cea-registry>.

Even if a preventive medical service increases health care costs, the spending may still be worthwhile. Cost-effectiveness ratios are widely used to determine the health benefit for the amount spent. The cost-effectiveness ratio of an intervention is defined as the net change in health care spending divided by the gain in health. (For more details, see Box 3-4 on page 26.) On the basis of that measure, approximately 60 percent of the preventive medical services examined in the 2008 review had additional costs that many people in the health care research community consider to be reasonable relative to their clinical benefits—a cost-effectiveness ratio below \$100,000. The remaining 20 percent of services either increased costs by an amount too large to justify their health benefits or worsened health.

A 2014 analysis by the Government Accountability Office built on that work by reviewing 29 studies published between January 2007 and April 2014 of health care services that were either cost-saving or cost-effective.¹⁶ That analysis yielded evidence that supported the findings of the 2008 study: Approximately 25 percent of preventive medical services reduced costs. The analysis further showed that the value of interventions depends on various factors, including the risk level of the targeted population.

16. Government Accountability Office, *Health Prevention: Cost-Effective Services in Recent Peer-Reviewed Health Care Literature* (attachment to a letter to the Honorable Ron Wyden, the Honorable Tom Harkin, and the Honorable Sheldon Whitehouse, August 11, 2014), www.gao.gov/products/GAO-14-789R.



Chapter 3: CBO’s Analysis of Policies to Expand Preventive Medical Services

The Congressional Budget Office is required to provide the Congress with cost estimates that assess the likely effects on the federal budget of policies to expand preventive medical services, commonly over a 10-year period.¹ Producing such estimates requires analyzing the complex effects of greater use of such services on health care spending and other outcomes (see Chapter 2). That process can involve a great deal of analysis by the agency and empirical evidence from which CBO can draw.

Examples of policies aimed at increasing the use of preventive medical services include those that expand insurance coverage for such services or reduce people’s cost-sharing amounts for the services. Such policies could affect all or a subset of the types of health insurance subsidized by the federal government—for example, Medicare, Medicaid, the health insurance policies sold in the marketplaces established under the Affordable Care Act, and employment-based plans.² The federal government could also support the development of new preventive medical services in other ways—by establishing and implementing prize competitions, for example. (See Box 3-1 for a discussion of the issues related to prize competitions and the federal budget.)

CBO’s Approach to Analyzing Policies Related to Preventive Medical Services

CBO’s analytic approach involves three main steps:

- First, CBO identifies the population affected by the policy—the number of people who would use the

1. In some cases, CBO also analyzes the policies’ longer-term effects. For example, see Congressional Budget Office, *Raising the Excise Tax on Cigarettes: Effects on Health and the Federal Budget* (June 2012), www.cbo.gov/publication/43319.

2. By excluding health care premiums from income and payroll taxes, the federal government subsidizes a portion of the costs of employment-based health insurance. For a detailed description of federal subsidies for people under age 65, see Congressional Budget Office, *Federal Subsidies for Health Insurance Coverage for People Under Age 65: 2019 to 2029* (May 2019), www.cbo.gov/publication/55085.

preventive medical service and their source of health insurance coverage.³

- Second, CBO estimates the costs of the preventive medical service and the effects on health care spending and other outcomes that would result from greater use of it. Those effects include estimated savings from disease reduction or early detection and any costs associated with adverse effects, false positives (in the case of screenings), and increased longevity.
- Third, CBO estimates the budgetary effects—including effects on federal outlays and revenues—resulting from changes in health care spending that is subsidized by the federal government.⁴

Such estimates take into account the extent to which preventive medical services are used and funded under current law. As a result, policies that expanded insurance coverage of preventive medical services that are used under current law would shift costs to the federal government without accruing any potential savings.

Participation

Estimating the number of people who would use a preventive medical service consists of two parts: identifying the population that would be targeted by the policy and projecting the number of people who would use the service. To identify the targeted population, CBO may use administrative or survey data. Those data are best suited

3. The federal government directly pays for some preventive medical services—for example, vaccinations provided by the Indian Health Service. To determine the costs of policies that would expand access to those services, CBO’s estimates would account for the costs of the services and, if applicable, any effects of greater use of that care on other health care spending that is federally subsidized.

4. For more information, see Congressional Budget Office, *How CBO Prepares Cost Estimates* (February 2018), www.cbo.gov/publication/53519.

Box 3-1.

The Effects on Federal Spending of Prize Competitions to Improve Health Outcomes Through Preventive Medical Services

To spur innovation, the Congress can direct federal agencies to offer prize competitions.¹ For example, the 21st Century Cures Act (Public Law 114-255) directed the National Institutes of Health (NIH) to establish and implement prize competitions to improve health outcomes through disease prevention and treatment. Other federal prize competitions include the creation of an interactive video game for women or girls to support obesity prevention or weight control; the development of a forecast for the timing, peak, and intensity of the influenza season; the capture of data on people's health-related behavior—including sleep, nutrition, and physical activity—from mobile applications, social media, and wearable devices to encourage practices that improve health; and the detection of illegal opioids in international mail to curtail the spread of those drugs.²

Prizes have some advantages over traditional methods of government funding. Unlike grants and contracts, prizes are awarded only when a solution has been produced. Also, unlike grant applications, prizes do not require applicants to specify their proposed approach in advance. Therefore, investigators pursuing a prize may be more willing to try novel approaches to identify solutions. Prizes may also encourage investigators who do not normally apply for grants and contracts to tackle a problem.³

Federal agencies may request and accept funds from state and local governments and from for-profit and nonprofit entities in the private sector for prize competitions. Those funds can be used to design and administer the competition as well as for

the prize itself.⁴ In 2017 and 2018, about half of all prize competitions had at least one nonfederal partner.⁵

For purposes of Congressional budget enforcement, only certain types of spending effects can be considered in determining the budgetary effects of a prize competition. Scorekeeping guidelines, which were developed to address specific situations in which there are ambiguities in applying established budgetary concepts, govern that treatment. (Those guidelines were set forth by the Congress in the conference report for the Balanced Budget Act of 1997 and are updated occasionally upon agreement by the full group of scorekeepers—which consists of people from the House and Senate Committees on the Budget, the Congressional Budget Office, and the Office of Management and Budget.)

One of those scorekeeping guidelines prohibits cost estimates from including any changes in mandatory spending resulting from changes in the amount of discretionary appropriations provided for any activity. (A mandatory spending program is one that does not require annual appropriations—for example, Medicare or Social Security. Discretionary programs—including, for example, the research programs of NIH—are funded anew each year in an appropriation bill.) Consequently, the guideline prohibits cost estimates from including anticipated savings stemming from annual appropriations as a result of research programs, including prize competitions.⁶ CBO would discuss major changes in mandatory spending, as additional information, if there was a basis to support such changes.

1. For more information on background and Congressional budget authority, see Marcy Gallo, *Federal Prize Competitions*, Report for Congress R45271 (Congressional Research Service, updated April 6, 2020), <https://crsreports.congress.gov/product/pdf/R/R45271> (1.2 MB).
2. For current and archived federal prize competitions, see "Challenge.gov" (accessed October 22, 2019), www.challenge.gov.
3. Thomas Kalil, *Prizes for Technological Innovation*, Discussion Paper 2006-08 (Brookings Institution, December 2006), www.brookings.edu/research/prizes-for-technological-innovation.

4. Marcy Gallo, *Federal Prize Competitions*, Report for Congress R45271 (Congressional Research Service, updated April 6, 2020), <https://crsreports.congress.gov/product/pdf/R/R45271> (1.2 MB).
5. Executive Office of the President of the United States, Office of Science and Technology Policy, *Implementation of Federal Prize and Citizen Science Authority: Fiscal Years 2017–18* (June 2019), <https://go.usa.gov/xdsVt> (5.7 MB).
6. Congressional Budget Office, letter to the Honorable Nathan Deal on the budgetary effects of expanding governmental support for preventive care and wellness services (August 7, 2009), www.cbo.gov/publication/20967.

for policies that would target broad populations, such as people of a certain sex, people who receive federally subsidized insurance coverage, or people in a particular age group.

Identifying narrower populations using those types of data can be more challenging, especially if the eligibility criteria are based on risk factors that are not commonly available in administrative or survey data (for example, clinical data based on test results). In those cases, CBO would rely on evidence from the research literature or consultation with experts. For example, to determine the targeted population for a policy that covered a screening service for people enrolled in Medicare who have genes associated with a susceptibility to a specific cancer, CBO could use populationwide estimates of the prevalence of those mutations from the literature and make any necessary adjustments to better reflect the characteristics of the Medicare population.

Once the targeted population has been identified, CBO estimates how many of those eligible people would use the preventive medical service. That estimate takes into account factors that would affect a person's ability or willingness to access the service, such as the expected out-of-pocket costs, awareness about the need for the service, the risk of adverse effects, and the willingness or ability of providers to offer the service. The estimate would be based on evidence about current use of the service or similar services. CBO might also examine changes in the use of other preventive medical services resulting from prior changes in law that aimed to increase the use of those services. For example, CBO might consider what happened to utilization rates in the past when insurance coverage was expanded to other preventive medical services or when cost sharing for those services was eliminated.

CBO would also take into account whether the policy would mandate coverage of a preventive medical service or make such coverage optional. For example, to analyze a policy that would make a preventive medical service an optional benefit under Medicaid, CBO would estimate how many people live in states that would decide to cover the service. All else being equal, a policy that made a preventive medical service a new optional benefit under Medicaid would be expected to have a smaller effect on the federal budget than a proposal that made it a mandatory benefit, because some states might choose not to cover it.

Effects on Health Care Spending and Other Outcomes

Once CBO has estimated the number of people who would use the preventive medical service and their type of insurance coverage, the agency would project the cost of the preventive service itself and the change in annual health care spending that would result from greater use of the service. That change would depend on the specific features of the proposed legislation, including whether it involved primary prevention (such as vaccinations) or secondary prevention (such as screenings).

For a policy involving primary prevention, CBO would develop a model to simulate the group of people who would be affected by the policy as they age. Then, for each year of the budget period, CBO would use that model to estimate the likelihood that people would develop the condition targeted by the policy under current law and under the proposed legislation, as well as the likelihood that people would experience adverse reactions as a result of the preventive medical service they received. Each of those outcomes—developing the condition or not and developing an adverse reaction or not—would have an associated amount of health care spending.

For a policy involving secondary prevention, CBO would develop a model with different inputs than those used for primary prevention to simulate the group of people who would be affected by the policy as they age. CBO would then use the model to estimate for each year of the budget period four outcomes: the likelihood that the condition targeted by the policy would cause symptoms and require treatment under current law, the likelihood that people would experience adverse reactions as a result of the preventive medical service, the likelihood that people would test positive for the condition targeted by the policy but would not have it, and the likelihood that people would test positive for the condition and would have it. Again, each of those outcomes would have an associated amount of health care spending. As a final step for both types of policies—those involving primary or secondary prevention—CBO's analysts would use the models to calculate annual health care spending under current law and under the proposed legislation and the difference between the two.

If the research literature indicated that the targeted preventive medical service would result in improved longevity (thus increasing the size of the population and changing its age distribution) or decreased participation

in disability programs, CBO would incorporate those changes in its analysis. Such changes could affect federal spending and revenues.

Effects on the Federal Budget

After CBO estimates changes in annual spending for health care by insurance category, the agency then estimates how those changes in spending would affect the federal budget in each year of the budget period. In many cases, the effect on the federal budget would be smaller than the effect on health care spending because the change in health care spending would be financed through a combination of federal funds and funds from nonfederal sources (for example, state or local governments, private plans, or individuals). The effects on the federal budget would depend on the programs affected by the policy:

- Changes in health care spending arising from a policy that affected people enrolled in Medicare would be borne in part by the federal government and in part by beneficiaries (through out-of-pocket payments and premiums). Because some beneficiaries have supplemental insurance, some or all of their changes in spending would be borne by third-party payers.
- Changes in health care spending arising from a policy that affected people enrolled in Medicaid would be borne by the federal government and state governments according to the Federal Medical Assistance Percentage (which determines the share of Medicaid costs paid by the federal government).
- Changes in health care spending arising from a policy that affected people enrolled in employment-based health insurance would probably alter the premiums they pay. In CBO's estimation, those changes would affect the share of total compensation provided as taxable wages and salaries and the share provided as nontaxable health benefits. For example, a reduction in premiums for such coverage would increase the share of compensation that takes the form of taxable wages and salaries and therefore boost federal revenues. An increase in premiums would have the opposite effect.
- Changes in health care spending arising from a policy that affected people enrolled in nongroup (individual) coverage obtained through the health insurance marketplaces established under the

Affordable Care Act would alter the premiums they paid, which would affect federal revenues and outlays for premium tax credits.⁵ Smaller premiums would decrease those tax credits, reducing federal outlays and increasing revenues; larger premiums would have the opposite effect.

- Changes in health care spending arising from a policy that affected people enrolled in health care programs of the Department of Defense or the Department of Veterans Affairs would be borne in part by the federal government and in part by beneficiaries (through out-of-pocket payments). Because some beneficiaries have other types of health insurance coverage, some or all of their changes in spending would be borne by third-party payers.

The federal budget would also be affected if the expanded use of a preventive medical service led to improved longevity and lower rates of disability. Improved longevity would increase outlays for federal programs that subsidize health insurance, for retirement benefits provided by Social Security's Old-Age and Survivors Insurance (OASI) program, and for disability benefits provided by Social Security's Disability Insurance (DI) program and the Supplemental Security Income (SSI) program.⁶ Lower disability rates would reduce outlays for the DI program, the SSI program, and Medicaid and Medicare.⁷ Expanded use of preventive medical services may also affect people's labor force participation and productivity through improved health. However, those effects are typically not incorporated in CBO's cost estimates, which reflect the assumption that the overall output of the economy would not change.

5. Premium tax credits cover a portion of eligible people's health insurance premiums. Because those credits are refundable, they can exceed individuals' tax liability.

6. The OASI program pays benefits to retirees, their eligible spouses and children, and some survivors of deceased workers. The DI program pays benefits to workers who become disabled before reaching the normal retirement age for the OASI portion of the Social Security program and to their eligible spouses and children. The SSI program provides income support payments to elderly and disabled people with very low income. Whereas DI beneficiaries qualify for health coverage under Medicare, most SSI recipients qualify for health coverage under Medicaid.

7. Reductions in spending for Medicaid and Medicare would be offset to the extent that people enrolled in other forms of federally subsidized insurance.

Box 3-2.**Why Cost Estimates for the Expanded Use of Preventive Medical Services May Not Show Savings**

Lawmakers frequently ask the Congressional Budget Office why its estimates of preventive health services may not show savings. Because those services would identify and treat diseases early on, some people expect that their expanded use would lower health care costs. CBO's cost estimate might not show savings for several reasons:

- The costs of paying for the preventive medical service for many people might exceed the savings for a smaller subset of people who avoided the disease because they received the service.
- Preventive medical services can have unintended costs from adverse effects, such as reactions to vaccines.
- Because the federal government subsidizes a portion of health care spending, any savings in federal spending on health care from avoided disease may be smaller than savings in health care spending overall. (Savings may also accrue to state and local governments, private plans, or individuals.) Additional savings may arise if disability rates decrease. However, any federal savings could be offset by increased federal outlays for health care, retirement, and disability if the preventive medical service increased longevity.
- Some people may already be getting the preventive medical service, so the benefits of that service being provided have already been realized. If the federal government expanded its coverage of the service, its costs would increase without corresponding savings from avoided disease.
- Depending on the policy, any savings from avoided disease may not fully emerge within the 10-year budget period used by CBO.

Each cost estimate is unique, and other factors could also affect the calculation of costs and savings. CBO analyzes all policies for preventive medical services on a case-by-case basis. Even over the 10-year projection period, estimates of costs and savings are uncertain. Uncertainty may stem from empirical evidence that is not sufficient or not applicable to the population affected by the policy that CBO is analyzing, among other factors.

The effects of providing federal subsidies for a preventive medical service also depend on whether that service is already being used and paid for by nonfederal sources (such as state or local governments, private plans, or individuals). To the extent that people already use the preventive medical service targeted by the policy—or will do so in the future—the estimated effect of such a policy would be measured against that trend. The policy might increase the number of people who use the service, but for people who would have used the service to the same extent under the policy as under current law, the policy would shift some of the costs of the service to the federal government and provide no offsetting savings.

Once CBO has estimated a proposed policy's effects on outlays and revenues for the various federal programs, the agency then sums those effects to calculate total changes in federal outlays and revenues by year during the budget period. Sometimes those estimated effects may show costs rather than the savings that some lawmakers may have expected. (For a discussion

of why CBO's cost estimates may not show savings, see Box 3-2.) Even when CBO estimates that a policy related to a preventive medical service would increase the federal budget deficit, lawmakers may consider it worthwhile if it improves people's health.

Although a vaccine for the coronavirus has not been approved and made available as of this report's writing, recent legislation included provisions to eliminate cost-sharing requirements for such a vaccine for most types of insurance. Because the information needed to estimate the costs of such provisions is largely unknown—including the effectiveness, number of doses, and price of a possible vaccine—CBO could not estimate the federal budgetary effects of those provisions. (For more details, see Box 3-3.)

Timing of Federal Budgetary Effects

The effects of a policy that expands coverage of a preventive medical service may not be the same each year over the 10-year budget period. They could differ in size and,

Box 3-3.

Coronavirus Vaccine Provisions and Their Budgetary Effects

The effects of the coronavirus pandemic on people's health and the U.S. economy have been immense. As of this report's writing, a vaccine for the coronavirus has not been approved, although clinical trials are under way. The availability of an effective vaccine could have significant effects on the federal budget.

Legislation With Vaccine Provisions

To address the pandemic and its economic fallout, policy-makers have enacted four laws since March 6: the Paycheck Protection Program and Health Care Enhancement Act (Public Law 116-139), the CARES (Coronavirus Aid, Relief, and Economic Security) Act (P.L. 116-136), the Families First Coronavirus Response Act (P.L. 116-127), and the Coronavirus Preparedness and Response Supplemental Appropriations Act (P.L. 116-123). Taken together, those laws provided funds to support the research, development, and purchase of a coronavirus vaccine.¹ If and when a vaccine becomes available, the Department of Health and Human Services could provide it to the public through mandatory health care programs (including Medicare, Medicaid, and the Children's Health Insurance

Program) and discretionary health care programs (including those of the Department of Veterans Affairs).²

Budgetary Effects of a Vaccine

The successful deployment of a vaccine would allow states to lift their mitigation measures, which would enable economic activity to rebound and tax revenues to increase. In addition, federal spending on unemployment insurance would decrease, and Medicaid enrollment would drop, among other possible effects. Spending on treatment of patients infected with the coronavirus would decline, but at the same time, some spending on health care would increase because of the cost of the vaccine and its administration and because people would use more health care services, including services that may have been deferred because of the pandemic. Lower mortality rates would also boost outlays for programs such as Social Security.

However, much uncertainty surrounds those effects. That uncertainty results, in part, from the timing of a vaccine's approval and broad availability, from the effectiveness of the vaccine, and from the state of the economy at that time. The more mitigation measures are lifted and economy activity rebounds before a vaccine is approved and made widely available, the smaller the impact of that approval and availability on the federal budget.

1. See Congressional Budget Office, cost estimate for H.R. 266, the Paycheck Protection Program and Health Care Enhancement Act (April 22, 2020), www.cbo.gov/publication/56338; cost estimate for H.R. 748, the CARES Act, Public Law 116-136 (April 16, 2020), www.cbo.gov/publication/56334; cost estimate for H.R. 6201, the Families First Coronavirus Response Act (April 2, 2020), www.cbo.gov/publication/56316; and cost estimate for H.R. 6074, the Coronavirus Preparedness and Response Supplemental Appropriations Act, 2020 (March 4, 2020), www.cbo.gov/publication/56227.

2. Changes in the amount of discretionary funds provided in the laws (such as those for the vaccine's development and purchase) can affect mandatory spending and revenues. Under scorekeeping guidelines that the Congress has adopted, those effects are not treated as offsets to additional discretionary spending in estimates of the costs of legislation used for budget enforcement purposes.

Continued

in some cases, direction (an increase in federal spending may become a decrease or vice versa, for instance).

At the beginning of the budget period, the costs of expanding a preventive medical service and addressing any adverse effects may push federal spending up, revenues down, or both, depending on the programs affected by the policy. It may take several more years or longer for the policy's full effects on health from lower spending per person to emerge—pushing federal spending down and revenues up, for example.

Furthermore, the effects of some policies may not be captured within the 10-year period. For instance, a preventive medical service similar to an influenza vaccine would probably produce health improvements fairly quickly, so the budgetary effects would appear within the 10-year period. In contrast, a preventive service like the human papillomavirus vaccine, which is recommended for children ages 11 to 12 and is intended to prevent cancers later in life, would result in health improvements and corresponding budgetary effects outside the 10-year period. Policies that resulted in longevity improvements within or outside the budget period would increase

Box 3-3.

Continued

Coronavirus Vaccine Provisions and Their Budgetary Effects

The effects of legislation that might lead to a vaccine's approval and availability would be measured on the basis of CBO's macroeconomic projections in the absence of that legislation. The budgetary effects that might result from broad economic changes, which could be significant, would not be included in related cost estimates for two reasons. First, by long-standing practice, CBO's conventional estimates of the budgetary effects of legislation do not reflect changes that would affect the total output of the economy. However, CBO would update its baseline projections to account for those and other effects when a vaccine was approved and made widely available. Second, to the extent that appropriations related to the vaccine would affect mandatory spending and revenues, those effects would not be treated as offsets under scorekeeping guidelines that the Congress has adopted. CBO would discuss major changes in mandatory spending, as additional information, if there was a basis to support such changes.

The recently enacted laws also included provisions related to cost sharing for a coronavirus vaccine. For example, states and territories would receive additional funds if their Medicaid plans waived cost sharing for patients who get the vaccine. Several types of health insurance plans would be required to pay for the vaccine in full without cost sharing or to adjust the timing of their coverage. Among them are most private health insurance plans and Medicare Part B.

Before those recent laws took effect, coverage for vaccinations differed. If a coronavirus vaccine had been developed in the

absence of recent legislation and had received an A or B grade from the U.S. Preventive Services Task Force (USPSTF) or a recommendation from the Advisory Committee on Immunization Practices (ACIP), most private health plans would have had to cover it without cost sharing no later than one year after the recommendation was made.³ The recently enacted legislation expedited that timeline, so plans now need to provide the vaccine at no cost without delay if it receives an A or B grade from USPSTF or a recommendation from ACIP. Previously, Medicare's coverage of recommended vaccines without cost sharing under Part B of the program was at the discretion of the Centers for Medicare & Medicaid Services, but now coverage without cost sharing for the coronavirus vaccine is mandatory.

CBO did not have enough information to estimate the costs of those cost-sharing provisions in some cases. For the provision that would eliminate cost sharing under Medicare Part B, for example, CBO could not estimate the federal budgetary effects. A coronavirus vaccine has not yet been developed, and its effectiveness is unknown. Also unknown are the number of doses that would be required and the price of the vaccine. As more information becomes available, CBO will use it to inform estimates of the costs of any future legislative provisions related to a coronavirus vaccine. The estimated budgetary effects, including direct effects from vaccine provision and other effects from changes in health care utilization, would depend on the features of the policy.

3. Preventive medical services that receive a grade of A or B from the USPSTF have substantial or moderate net benefits.

federal outlays for some programs. The occurrence of those budgetary effects and how they materialized over time would depend on the specific preventive medical service that was targeted. Whereas CBO's analyses of policies related to preventive medical services focus on their effects on the federal budget—generally over 10 years—analyses in the research literature typically take a broader perspective (see Box 3-4 on page 26).

An Example of CBO's Approach

CBO's approach to analyzing the effects of an expansion of a primary preventive medical service comprises

the three steps described earlier (see "CBO's Approach to Analyzing Policies Related to Preventive Medical Services"). First, CBO identifies the population—the number of people and their source of health insurance coverage—that would use the primary preventive medical service, such as a vaccination. Then, CBO estimates the current and future prevalence of the condition the policy aims to prevent—both under current law and under the policy, taking into account the effectiveness of the preventive medical service—among various groups of people (see Table 3-1). In particular, CBO identifies three subsets

Table 3-1.

Population Groups That Would Be Affected by an Illustrative Policy That Expanded a Primary Preventive Medical Service

Group	Current Law		Illustrative Policy		Change in the Cost of the Service	Change in People’s Health
	People Who Use the Service	People Who Develop the Condition	People Who Use the Service	People Who Develop the Condition		
1a	No	No	Yes	No	Increases	None
1b	Yes	No	Yes	No	Shifts	None
2a	No	Yes	Yes	Yes	Increases	None
2b	Yes	Yes	Yes	Yes	Shifts	None
3	No	Yes	Yes	No	Increases	Improves

Source: Congressional Budget Office.

A primary preventive medical service is one meant to interrupt the mechanism of disease and prevent its occurrence.

The people in groups 1a, 2a, and 3 do not use the preventive medical service under current law, so the cost of that service to the federal government would be new.

The people in groups 1b and 2b use the preventive medical service under current law, so the cost of that service would be shifted—partially or fully, depending on the policy—from other sources to the federal government.

For simplicity, people who use the service under the illustrative policy would have no adverse reactions.

of people for whom health care spending funded by the federal government would change:

- People not expected to develop the condition under current law or under the policy, some of whom would not have used the preventive medical service under current law but who would use it under the policy (Group 1a), and others who would have used the preventive medical service under current law and under the policy (Group 1b);
- People expected to develop the condition under current law and under the policy, some of whom would not have used the preventive medical service under current law but who would use it under the policy (Group 2a), and others who would have used the preventive medical service under current law and under the policy (Group 2b); and
- People expected to never develop the condition under the policy after using the preventive medical service but who would have developed the condition under current law without using that service, meaning that the primary preventive medical service was effective (Group 3).

Once each subset of the population has been identified, CBO estimates the costs of the preventive medical service by multiplying the number of people who would use the service by the unit cost of the service for each type of health insurance. CBO then estimates annual health care spending per person for the affected population under current law and under the proposed policy, as weighted averages of spending for people who would and would not develop the condition.⁸ Next, the agency expresses changes in annual health care spending per person relative to annual health care spending for the U.S. population.

8. For example, if 5 percent of people would have developed the condition in the first year in the absence of the policy, then, under current law, average health care spending would equal (0.95 x average health care spending for people who do not develop the condition) + (0.05 x average health care spending for people who develop the condition). If the policy lowered the probability of developing the condition to 4 percent, then average health care spending under the policy in the same year would equal (0.96 x average health care spending for people who do not develop the condition) + (0.04 x average health care spending for people who develop the condition). There would be no changes in annual health care spending for people who use the service under current law and who would continue to use the service under the policy, beyond the change resulting from the direct cost of the service.

Then, CBO uses those percentage changes to calculate the federal budgetary effects of the policy. For instance, if Medicaid expanded coverage for a new vaccination, CBO's estimate would include the costs of the vaccination and the change in federal Medicaid spending, which CBO calculates by applying the change in annual spending per person relative to overall annual spending per person to Medicaid's annual federal spending per person.

As part of its estimate, CBO might consider the effects of improved health on longevity or disability if those links were justified empirically. If the policy increased longevity, then more people would be alive in the future than would be the case under current law. Those additional people could develop other medical conditions, the treatment of which could result in increased outlays and reduced revenues (depending on people's health insurance). Increased longevity could also boost outlays for Social Security's OASI program, which pays benefits to retirees. If the policy lowered rates of disability, CBO would take into account the resulting changes in participation rates for the DI and SSI programs—and any resulting changes in spending for Medicare and Medicaid—that would come from improvements in people's health and, if applicable, longevity.

CBO's Use of Evidence to Estimate the Effects of Proposals

Each step involved in estimating the cost of a policy proposal can require a significant amount of analysis. That analysis is based on modeling work by CBO's analysts, an evaluation of the relevant empirical literature, and, in some cases, consultation with a range of outside experts (including academics and clinicians). In reviewing the existing literature—which, in some cases, may have substantial gaps—CBO critically assesses the evidence, placing a stronger emphasis on well-designed studies.

Gathering evidence to inform the agency's analyses might be challenging for a number of reasons. A lack of information in surveys or administrative data could make it difficult for CBO to identify the size of the targeted population and measure current rates of disease prevalence and use of services. Furthermore, the empirical evidence on how certain preventive medical services affect health and health care spending might be sparse or inconclusive.⁹ Also, the empirical evidence might not reflect the

particular population (for example, a certain age group) or setting (for example, a controlled clinical environment versus a community setting) defined by the policy.

After reviewing the available evidence, CBO decides the extent to which it can answer questions necessary to estimate federal budgetary effects. CBO's estimates generally include the direct effects of a policy, which result from greater use of the service. Depending on the strength of the empirical evidence, CBO's estimates also may include the indirect effects of a policy, which result from improvements in people's health. When the evidence is incomplete, CBO uses its judgment. The agency might refer to prior estimates that are similar in nature or might include estimates for certain aspects of the policy for which evidence exists (for example, a subset of the targeted population or a subset of the effects).¹⁰ If CBO had no evidence bearing on the indirect effects, then it would not include those effects. CBO monitors new, related research and incorporates any pertinent findings in its analyses for future estimates.

Uncertainty and Transparency in Estimates

Estimating the budgetary effects of federal policies that affect the health of the population inevitably involves a significant amount of uncertainty. That uncertainty arises from the various challenges inherent in making budget projections under current law. It also stems from the many parameters needed to estimate the effects of policies that aim to improve health that CBO develops on the basis of its own analyses, distillation of the research literature, and discussion with experts. To assess the uncertainty of its estimates, CBO often performs sensitivity analyses to generate a range of likely outcomes.

When communicating the estimated effects of legislative proposals, CBO strives to be transparent, providing clear, concise, and complete explanations. In addition, the agency provides details on the key components underlying each estimate—highlighting, for example, major elements of the analysis, sources of data and information, and significant areas of uncertainty.

affected by selection bias. Selection bias arises when treated individuals (for instance, people who get a vaccination) differ from untreated individuals (for instance, people who do not get the vaccination) for reasons other than the treatment itself in ways that can affect the outcome being studied (for instance, the effect of the vaccination on health care costs). A related issue is publication bias, which makes studies that find strong relationships more likely to be published.

9. For example, studies with weak research designs can have a limited ability to capture causal relationships, potentially making their findings inconclusive. Such studies include those that are

10. A cost estimate would not include parameters that were estimated to be negligible or zero.

Box 3-4.**How CBO's Approach to Estimating the Effects of Preventive Medical Services Differs From Other Approaches**

The Congressional Budget Office is required to provide the Congress with estimates of the effects of proposed legislation on the federal budget. Its estimates of the costs of preventive medical services differ from approaches that take different perspectives and that are performed for different purposes. Examples of those approaches include cost-benefit analysis (CBA) and cost-effectiveness analysis (CEA).

CBO's Approach

CBO's analysis of policies related to preventive medical services focuses on their effects on the federal budget. That analysis accounts for changes in annual health care spending that is subsidized by the federal government. In addition, CBO takes into account whether people already use the service. If some people use the service under current law, a policy that expanded the federal provision of that service would shift some costs from other sources (state and local governments, private plans, or individuals) to the federal government. CBO also estimates the budgetary effects of other outcomes, such as longevity or disability, on federal health, retirement, and disability programs when the evidence supports those effects. CBO's cost estimates typically assess the likely effects of policies over a 10-year budget period, so CBO's analysis may not capture the full impact of policies whose effects take longer to emerge.

Cost-Benefit Analysis

Cost-benefit analysis takes into account the costs and benefits of a given intervention from a societal perspective. In addition to capturing the effects of an intervention on federal spending, a CBA includes the effects on the private sector and the effects on other levels of government (for example, state and local). Costs and benefits are estimated using inflation-adjusted dollars (which account for changes in prices over time) and expressed in present-value terms (which are determined by discounting future dollars to make the benefits and costs incurred in different time periods equivalent). The period of time over which a proposal's effects are evaluated is typically based on the expected duration of those effects. The results of a CBA can often be expressed in net-present-value terms, and all effects (including, for example, lives saved) are expressed in dollar-value terms (that is, monetized). Proposals with a positive net present value have benefits that exceed costs, and proposals with a negative net present value have costs that exceed their benefits.

Cost-Effectiveness Analysis

Cost-effectiveness analysis is a widely used tool that compares the relative benefits and costs of different interventions. The overall analytic approach is often similar to a CBA, although this approach avoids expressing lives saved from an intervention in monetary terms. Typically, when used to analyze health care, a CEA is expressed in terms of a cost-effectiveness ratio (CER). In that ratio, the numerator is the net change in health care spending, and the denominator is the gain in health, commonly expressed in quality-adjusted life years (QALYs).

The CER is negative when interventions reduce costs and positive when they increase them. Interventions are considered cost-effective when the CER is positive but deemed small. Although researchers have often used thresholds of \$50,000 to \$100,000, meaning that interventions with CERs below those thresholds are cost-effective and interventions with CERs above those amounts are not cost-effective, determining the appropriate threshold for deciding whether an intervention is considered cost-effective is not straightforward.¹

Comparison With CBO's Approach

In general, CBA and CEA are more comprehensive than CBO's analysis. For instance, they often account for more factors (such as productivity), and they cover a longer time period. To compare the approaches in greater detail, CBO has summarized how they would apply to a hypothetical screening for opioid use disorder, a problematic pattern of opioid use that leads to significant impairment or distress (see the table).

CBA and CEA have some limitations. They can take more time and resources to conduct and can be more uncertain, because of the broader set of effects they evaluate. Both CBA and CEA often involve judgments about the value of benefits and discount rates. For example, CBA requires assigning a monetary value to improvements in health. More important, because of all the differences between the approaches, gleaning the effects of prevention on the federal budget from CBA and CEA can be challenging.

1. Peter J. Neumann, Joshua T. Cohen, and Milton C. Weinstein. "Updating Cost-Effectiveness—The Curious Resilience of the \$50,000-per-QALY Threshold," *New England Journal of Medicine*, vol. 371, no. 9 (August 28, 2014), pp. 796–797, <https://doi.org/10.1056/NEJMp1405158>.

Box 3-4.

Continued

How CBO's Approach to Estimating the Effects of Preventive Medical Services Differs From Other Approaches

Three Analytic Approaches to Estimating the Effects of a Hypothetical Screening for Opioid Use Disorder

	CBO's Approach for Cost Estimates	Methodology	Cost-Benefit Analysis	Cost-Effectiveness Analysis
How Results Are Reported	Effect on federal budget		Net present value	Cost per QALY ^a
Adjustment for Inflation	No		Generally, yes	
Use of Discounting	No		Yes	
Time Period Covered	Generally, 10 years		Period over which benefits and costs occur	
		Factors		
Costs of Administering Screening and Interpreting Results by Clinician	Includes federal costs		Includes spending by all sources (for example, patients and federal, state, and local governments)	
Changes in Spending on Treatment From Earlier Identification of the Disorder	Includes changes in federal costs		Includes changes in spending by all sources	
Increase in Longevity	Includes increased federal health care spending on unrelated medical conditions and retirement and disability benefits ^b		Includes QALY saved as a benefit (monetized for CBA)	
Reduction in Disability	Includes avoided spending on Social Security, Medicaid, and Medicare as reduced federal spending if screening results in avoided disability; that reduction would be offset to the extent that the affected people enrolled in other forms of federally subsidized insurance ^b		Includes all avoided disability costs as a benefit if screening results in avoided disability	
Increase in Productivity	Typically excludes increased federal government tax revenues from higher wages or labor force participation ^c		Includes increased tax revenues at all levels of government from higher wages; includes increased productivity in wage-earning activities (potentially measured by the increase in after-tax income) and increased productivity in non-wage-earning activities (for example, volunteering)	
Improved Ability of Patients to Care for Their Children	Includes reductions in federal spending on foster care (including Medicaid spending for children's health care) if the service results in an improved ability of parents to care for their children ^b		Includes reductions in foster care costs if the service results in an improved ability of parents to care for their children; also counts reductions in child care burden on other family members (for example, grandparents) and positive effects on the children of improved care by their parents	
Reduction in Criminal Justice Costs	Includes reductions in federal spending ^{b,d}		Includes reductions in federal, state, and local spending; also counts savings to victims from crimes avoided	

Source: Congressional Budget Office.

Under CBO's analytic approach, certain factors that might affect the budget would not be included in a cost estimate if their effects were estimated to be negligible.

This illustrative example takes the societal perspective. CBA and CEA can be conducted from different perspectives (for example, that of a particular payer). If a different perspective was used, some of the effects in this table might be calculated differently or might not be included.

CBA = cost-benefit analysis; CEA = cost-effectiveness analysis; QALY = quality-adjusted life years.

- The outcome is an incremental cost-effectiveness ratio reported as cost per health outcome. QALY is used in this illustrative example; however, alternative health outcomes can also be used.
- The effect of this factor would be included in CBO's analysis only if it was supported by sufficient evidence.
- Such effects are not included because CBO's cost estimates typically do not account for changes in the size of the economy.
- Most federal spending on criminal justice is discretionary. As a result, any reductions in such spending would be subject to future appropriations and, therefore, would not be counted as savings to direct spending in a cost estimate for opioid screening.

Analysis of Two Provisions Related to Preventive Medical Services in One of CBO's Past Cost Estimates

The Affordable Care Act included several provisions related to preventive medical services. CBO's analysis of the federal budgetary effects of those provisions was included in the agency's cost estimate for the ACA, which was published in 2010.¹¹

In its analysis of one provision in that bill, CBO estimated that covering tobacco cessation services for pregnant women under Medicaid would reduce federal spending for that program by \$100 million over the 2010–2019 period. That estimate reflected CBO's analysis of the number of pregnant women who would use tobacco cessation services, the cost of the services, the effect of the services on tobacco use among pregnant women, and the resulting effect on the health of their babies. In CBO's estimation, the tobacco cessation services would reduce the incidence and severity of health problems among the babies, which would decrease Medicaid spending, and those savings would more than offset the costs of providing the tobacco cessation services.

In its analysis of another provision in that bill, CBO estimated that expanding Medicare's benefit package to waive cost sharing for the "Welcome to Medicare" visit and include a new annual wellness visit with no cost sharing would increase federal spending on that program by \$3.6 billion over the 2010–2019 period.¹² That estimate reflected CBO's analysis of the use of the "Welcome to Medicare" wellness visit and patients' payments for those services (under current law in 2010, when the estimate was done), which the agency used to estimate the amount of cost sharing that would be waived and the estimated increase in "Welcome to Medicare" and annual

wellness visits. In CBO's estimation, the cost of providing those services (including the cost of any recommended follow-up testing, such as screening for diabetes or heart disease) would outweigh the federal budgetary savings from any avoided diseases. Nevertheless, those visits could result in improved health.

Two Other CBO Analyses Related to Policies That Affect Health

Two additional CBO analyses show the complexities involved in analyzing policies related to health. In a 2012 report, CBO analyzed the federal budgetary impact of an illustrative increase in the federal excise tax on cigarettes and small cigars.¹³ That report was more comprehensive than CBO's typical cost estimates in two respects: It provided estimates for the longer term (defined in that analysis as roughly 70 years after the illustrative policy would have taken effect) instead of ending after 10 years, as most estimates do; and it considered changes in the overall output of the economy, which is not usually done in CBO's 10-year estimates.¹⁴

CBO found that the tax increase would reduce federal budget deficits between 2013 and 2021, largely because of additional cigarette tax receipts. Over that period, improved health would decrease outlays, on net, and increase revenues from greater labor force participation and lower insurance premiums.¹⁵ Beyond the 10-year period, when projections are even more uncertain, the policy's effects on longevity would probably increase. As a result, after 2025, federal outlays would exceed those projected under current law. Over the longer term, the effects on the federal budget would continue to be driven mostly by the additional cigarette tax receipts.

In a 2015 analysis, CBO examined the information required to estimate a policy that expanded coverage of behavioral counseling and obesity drugs among Medicare

11. See Congressional Budget Office, letter to the Honorable Nancy Pelosi providing an estimate for H.R. 4872, Reconciliation Act of 2010 (Final Health Care Legislation), Table 5 (March 20, 2010), www.cbo.gov/publication/21351.

12. The "Welcome to Medicare" visit is a onetime visit for beneficiaries in their first year of enrollment in Part B of the program, which covers physicians' services and other outpatient services. At that visit, a health care provider reviews a patient's health history and risk factors and recommends preventive tests and screenings. Once beneficiaries have had Part B coverage for longer than 12 months, they qualify for a wellness visit each year; previously, they received the "Welcome to Medicare" visit only once, upon entering the program. All Medicare beneficiaries are eligible for the new yearly wellness benefit.

13. Congressional Budget Office, *Raising the Excise Tax on Cigarettes: Effects on Health and the Federal Budget* (June 2012), www.cbo.gov/publication/43319.

14. In particular, the report estimated revenue changes stemming from changes in earnings as a result of increased labor force participation and longevity. Typically, those effects would not be considered in cost estimates for proposed legislation.

15. Spending on health care programs would decline slightly as people's health improved; on net, spending on income support programs (for example, Social Security) would increase slightly as some people lived longer.

beneficiaries who are obese.¹⁶ To estimate the effects of such a policy, CBO would use an approach similar to the one it uses to estimate policies related to preventive medical services: identify how many people would use the newly available treatment, how the treatment would affect weight loss, and how weight loss would affect health care spending and the federal budget. CBO determined that the available evidence did not support the conclusion that such a policy would generate significant savings for the federal government as a result of people's improved health. As a result, if CBO had been

asked to estimate the costs of such a policy, it would have included estimates for the direct effect—an increase in outlays from the greater use of weight-loss services—but not an indirect effect from improved health.

The available literature on smoking and obesity informed CBO's analyses. There is a robust established literature on the effects of tax increases on rates of smoking and on the effects of smoking on health care spending, longevity, and other outcomes. The literature on weight loss, although growing, was not sufficient to support a comparably detailed analysis of the effects of policies to promote weight loss on health care spending. New research or analysis, however, could affect CBO's future estimates.

16. Congressional Budget Office, "Estimating the Effects of Federal Policies Targeting Obesity: Challenges and Research Needs," *CBO Blog* (October 26, 2015), www.cbo.gov/publication/50877.



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About This Document

This report was prepared at the request of the Chairman of the House Budget Committee. In keeping with the Congressional Budget Office's mandate to provide objective, impartial analysis, the report makes no recommendations.

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CBO continually seeks feedback to make its work as useful as possible. Please send any comments to communications@cbo.gov.

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Director
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