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## **CBO's Medicare Beneficiary Cost-Sharing Model: A Technical Description**

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## Abstract

The Congressional Budget Office uses a microsimulation model to estimate the federal budgetary effects of proposed changes to the cost-sharing structure of the Medicare fee-for-service (FFS) program and proposed changes to medigap policies that cover most or all of Medicare's cost sharing. This paper describes the model and the types of analyses it can support. CBO constructed the model using administrative data on enrollment, utilization, and Medicare spending for a large sample of Medicare FFS beneficiaries. The agency used survey data to impute measures of supplemental insurance coverage for the sample. Based on findings from the research literature, CBO uses the model to simulate changes to beneficiaries' total spending on Medicare services in response to changes in their cost-sharing requirements. Those behavioral responses are incorporated in the estimates of the federal budgetary effects of proposed legislation. In addition to estimating effects on Medicare FFS spending, CBO uses the model to estimate other federal budgetary effects that result from interactions between Medicare FFS spending and receipts from Medicare Part B premiums and spending on other federal programs. The paper presents an analysis of an illustrative option for changing Medicare's cost-sharing structure to demonstrate the output generated by the model, including estimates of how changes in Medicare spending and beneficiaries' out-of-pocket spending vary across beneficiaries.

*Keywords:* Federal health care spending, Medicare, private health insurance, microsimulation

*JEL Classification:* H51, I13, I18, C63

## Notes

This paper describes the methods that underlie the Congressional Budget Office's Medicare beneficiary cost-sharing model. CBO updates its model periodically to incorporate new data, changes in law, and improvements to methods.

In this paper, CBO uses the common practice of referring to the traditional Medicare program as the Medicare fee-for-service (FFS) program, even though the program pays for some services on an FFS basis and other services using different methods.

Numbers in the text and tables may not add up to totals because of rounding.

Unless otherwise noted, all years referred to in this paper are calendar years.

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## Introduction and Summary

With about 60 million beneficiaries and \$590 billion in net federal outlays in fiscal year 2018, Medicare represents the largest share of government spending on health care in the United States. About two-thirds of Medicare beneficiaries receive care in the traditional fee-for-service (FFS) program, which pays providers a separate amount for each service or related set of services covered by Part A (Hospital Insurance) or Part B (Medical Insurance).<sup>1</sup> The remaining one-third of beneficiaries receive their care through private plans in the Medicare Advantage (MA) program. Beneficiaries' payments for health care fall into two broad categories: premiums and cost sharing. A premium is a fixed, recurring amount paid by an enrollee in advance for an insurance policy (which then limits financial risk by covering some or all costs of health care goods and services). Cost sharing consists of out-of-pocket payments (such as deductibles, coinsurance, or copayments) that enrollees are required to make when they receive health care. The basic Medicare FFS benefit can leave beneficiaries responsible for a substantial amount of cost sharing, so many people obtain supplemental coverage through a former employer or choose what is known as a medigap plan, an individual insurance policy that covers most or all of Medicare's cost sharing. Others qualify for Medicaid, which—depending on the basis for eligibility—can cover Medicare premiums only or Medicare premiums and cost sharing.

Research has shown that increases in cost-sharing requirements cause people to use less medical care. Those findings have driven interest in using additional cost sharing as a tool to restrain the growth of health care spending. Policymakers could alter Medicare's cost sharing and limit supplemental coverage (such as medigap policies) in various ways to produce savings for the federal government, reduce total health care spending, and create greater uniformity in cost sharing for Medicare enrollees.<sup>2</sup> Those different approaches also would alter the distribution of health care costs between healthier and less healthy enrollees.

This working paper describes a microsimulation model developed by the Congressional Budget Office to analyze an array of policy options involving changes to the cost-sharing structure of FFS Medicare and to medigap coverage. The model yields estimates of how those changes would affect federal spending on Medicare (excluding Part D, the prescription drug benefit) and other federal health care programs. The model is built on characteristics of Medicare beneficiaries that are relevant for estimating their responses to changes in cost-sharing requirements, including detailed information about their health care utilization, Medicare spending, and cost-sharing obligations under current law. Those cost-sharing obligations may be paid by the enrollee directly out of pocket, by third-party payers (who provide supplemental

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<sup>1</sup> In this paper, references to “services” covered by FFS Medicare include all goods and services covered under Part A or Part B. Examples of such services include durable medical equipment and physician-administered drugs.

<sup>2</sup> Medigap plans are individually purchased health insurance plans that cover some or all of Medicare's cost sharing for beneficiaries enrolled in FFS Medicare.

insurance), or through some combination of the two. The model’s basic structure is illustrated in [Figure 1](#).

This paper begins by providing background information on Medicare’s current cost sharing and sources of supplemental coverage among Medicare enrollees, consisting of Medicaid, medigap, and employer-sponsored retiree health insurance—including retirees in the Federal Employees Health Benefits (FEHB) program and TRICARE (the health care program for uniformed service members, military retirees, and their family members).<sup>3</sup> The paper then provides an overview of the model and describes the development of the “base case”—the current-law estimate of Medicare spending and enrollee cost-sharing obligations for Part A and Part B services in each year of CBO’s 10-year budget window. The sample of enrollees used to construct the base case is derived from Medicare administrative data—specifically, from the Master Beneficiary Summary File (MBSF)—and supplemented with Medicare claims data and survey data from the Medicare Current Beneficiary Survey (MCBS) and the Current Population Survey (CPS). CBO calibrates the sample to match the agency’s current estimates and projections of Medicare FFS enrollment and spending in its baseline, a benchmark for assessing the effects of proposed legislation.

Next, the paper explains the derivation and use of key parameters of the model that govern how beneficiaries respond to changes in out-of-pocket cost sharing; such behavioral changes can arise from policies that modify Medicare FFS cost-sharing rules or that limit medigap. Altogether, changes in Medicare spending relative to current law reflect both the direct effects of those policies—that is, the changes in spending that would occur in the absence of any change in beneficiaries’ behavior—and the additional changes in spending that would occur as a result of those behavioral changes. CBO also uses the model to estimate other federal budgetary effects that result from interactions between Medicare FFS spending and receipts of Medicare Part B premiums and spending on the MA program, as well as spending on other federal programs (specifically, Medicaid, the FEHB program, and TRICARE).<sup>4</sup> The model can also be used to examine distributional outcomes such as differential changes in Medicare spending or cost-sharing obligations across enrollees.

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<sup>3</sup> TRICARE consists of many plans. One plan, TRICARE for Life, provides supplemental coverage to beneficiaries enrolled in Medicare Part A and Part B. In this working paper, “TRICARE” refers to TRICARE for Life.

<sup>4</sup> The model does not take into account the possibility that beneficiaries could switch between FFS Medicare and MA. Estimated effects on federal spending for the MA program are computed from the change in payment rates for MA plans, which are tied to per capita spending in the FFS program, holding MA enrollment at levels projected under current law.

CBO uses its microsimulation model to analyze proposals that would change the cost-sharing rules for Medicare and limit medigap insurance. In its most recent volume of *Options for Reducing the Deficit*, CBO analyzed an option with three alternatives: The first would establish uniform cost sharing across Parts A and B of Medicare, the second would further limit medigap plans, and the third would combine those two alternatives.<sup>5</sup> In this paper, we examine the first alternative (establishing uniform cost sharing) to illustrate how CBO uses the model to measure changes in federal spending and to produce different types of distributional analyses. The estimates for this option could differ from cost estimates that CBO might produce later because of future updates to the model and to CBO’s baseline projections.

CBO will continue to improve the model and develop its capabilities to provide better analyses of the types of proposals made to date and any modifications as they are developed and proposed by policymakers.

## **Medicare’s Current Cost Sharing for Part A and Part B Services**

The cost sharing that enrollees in the traditional FFS portion of the Medicare program face varies significantly depending on the type of service provided. Under Part B, which mainly covers outpatient services (such as visits to a doctor), enrollees face an annual deductible (\$185 in 2019). Once their spending on Part B services has reached that deductible amount, enrollees generally pay 20 percent of allowable costs for most Part B services. Certain services that are covered under Medicare Part B—such as preventive care and laboratory tests—usually require no cost sharing.

Part A, which covers hospital inpatient services, care provided in skilled nursing facilities (SNFs), hospice care, and some home health care, does not have an annual deductible. A beneficiary receiving covered hospital inpatient services must pay an initial copayment (\$1,364 in 2019) for each “benefit period.” (The Centers for Medicare & Medicaid Services, or CMS, follows the terminology in the Medicare statute and refers to that initial copayment for inpatient care as a deductible.) The benefit period, also known as a “spell of illness,” begins on the day that an enrollee is admitted to a hospital as an inpatient and lasts until 60 days have passed without the beneficiary’s receiving hospital inpatient or SNF services. Days 61 through 90 of a hospitalization are subject to additional daily copayments equal to one-fourth of the initial hospital inpatient copayment (\$341 in 2019). For days 91 and beyond, beneficiaries may draw from their available 60 “lifetime reserve days,” for which the daily copayment is equal to one-half of the initial hospital inpatient copayment (\$682 in 2019). Beneficiaries are responsible for all costs beyond lifetime reserve days. During a particular benefit period, beneficiaries can receive up to 20 days of care provided in SNFs without any cost sharing. For the 21st through the

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<sup>5</sup> See Congressional Budget Office, *Options for Reducing the Deficit: 2019 to 2028* (December 2018), pp. 61–64, [www.cbo.gov/publication/54667](http://www.cbo.gov/publication/54667).

100th day of SNF care, Medicare assesses a daily copayment equal to one-eighth of the initial inpatient copayment (\$170.50 in 2019). After 100 days, beneficiaries are responsible for all costs. Other services covered under Part A, such as hospice care and some home health care, are typically not subject to cost sharing. However, enrollees who receive hospice services are responsible for 5 percent of the daily payment for inpatient respite care—inpatient care received in order to provide rest for an enrollee’s caregiver.

Charging different cost-sharing amounts for different types of services is not unique to Medicare; private plans do that as well. However, unlike enrollees in most private plans, Medicare patients who incur extremely high medical costs may be obligated to pay significant amounts because the program does not have a catastrophic cap on cost sharing.

## **Current Sources of Supplemental Insurance for Medicare Enrollees**

On average, FFS Medicare pays for 85 percent of total spending on covered services, and the beneficiary is responsible for the remaining 15 percent in the form of cost sharing.<sup>6</sup> To help defray the costs of the cost sharing, most beneficiaries enroll in supplemental coverage plans. Regardless of the type of supplemental insurance, the share of an enrollee’s total FFS spending that is funded by Medicare does not vary because all enrollees face the same cost-sharing structure. However, the amount of spending paid directly by the beneficiary varies depending on the type of supplemental insurance coverage.

In 2013, about 80 percent of people who enrolled in FFS Medicare had some form of supplemental insurance that reduced or eliminated their cost-sharing obligations and protected them from high medical costs (see [Table 1](#)).<sup>7</sup> Approximately 20 percent of FFS enrollees had supplemental coverage that was subsidized by the federal government: About 15 percent received cost-sharing assistance from Medicaid, and 5 percent had supplemental retiree coverage

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<sup>6</sup> Those percentages are derived from CBO’s model (see [Table 1](#)). They reflect spending only on services covered under Part A and Part B and may not match other estimates of Medicare’s share of total spending. See, for example, Kaiser Family Foundation, *How Does the Benefit Value of Medicare Compare to the Benefit Value of Typical Large Employer Plans?: A 2012 Update* (April 2012), [www.kff.org/health-reform/issue-brief/how-does-the-benefit-value-of-medicare](http://www.kff.org/health-reform/issue-brief/how-does-the-benefit-value-of-medicare).

<sup>7</sup> The sources of data and methods used to develop the estimates cited in this paragraph are discussed below in the section titled “Construction of the Base Case.”

through either the FEHB program or TRICARE.<sup>8</sup> In addition, about 35 percent of FFS enrollees had supplemental coverage through nonfederal retiree policies, and about 25 percent of FFS enrollees purchased medigap policies on an individual basis.

Depending on income and assets, dual-eligible beneficiaries—Medicare beneficiaries who are also enrolled in Medicaid—receive either premium assistance alone or assistance with both premiums and cost sharing. For the purposes of this paper, dual-eligible beneficiaries who receive only premium assistance are considered to have no supplemental coverage. Dual-eligible beneficiaries who receive cost-sharing assistance do not pay any of their Medicare cost sharing out of pocket.

The reduction of cost-sharing liabilities among Medicare beneficiaries with retiree insurance coverage varies depending on the type of coverage. For Medicare beneficiaries enrolled in the FEHB program, the extent to which Medicare cost sharing is covered varies across plans. Plans offered by Blue Cross and Blue Shield, the carrier used by two-thirds of FEHB policyholders in 2015, cover the Part B deductible and cost sharing for nearly all services.<sup>9</sup> Exceptions include cost sharing for chiropractic and physical therapy visits that exceed a plan’s maximum number of visits and certain stays at hospitals or skilled nursing facilities. Similarly, for most services, Medicare beneficiaries with TRICARE coverage have no out-of-pocket spending. Those beneficiaries are responsible for paying cost-sharing liabilities for services covered by Medicare but not TRICARE—for instance, chiropractic services—and for long-term stays in hospitals and skilled nursing facilities.<sup>10</sup> Collecting information on out-of-pocket spending for Medicare beneficiaries with nonfederal retiree coverage is challenging. Based on a Kaiser/Hewitt survey

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<sup>8</sup> Medicare enrollees whose cost sharing is paid for by Medicaid include two groups. The first group consists of Medicare enrollees who are eligible for full Medicaid benefits—known as full dual-eligible beneficiaries. The second group consists of Medicare enrollees whose only Medicaid-provided benefits are payments for Medicare premiums and cost sharing. That group of partial dual-eligible beneficiaries participates in the Qualified Medicare Beneficiary program; they are referred to as QMB-only beneficiaries. For some other groups of Medicare enrollees, Medicaid pays for their Medicare premiums, but the enrollees do not get assistance with Medicare cost sharing nor do they receive other Medicaid benefits. Those include people enrolled in the Specified Low-income Medicare Beneficiary program (known as SLMB-only beneficiaries), the Qualified Individual (QI) program, or the Qualified Disabled and Working Individual (QDWI) program.

<sup>9</sup> For more information on enrollment among health insurance carriers, see Figure 1 in Annie L. Mach and Ada S. Cornell, *Federal Employees Health Benefits (FEHB) Program: An Overview*, Report for Congress R43922 (Congressional Research Service, updated February 3, 2016), <https://go.usa.gov/xVjav> (PDF, 1.1 MB). For information on Blue Cross Blue Shield Federal Employee Program in 2019, see “2019 Medicare and Blue: Blue Cross and Blue Shield Service Benefit Plan Summary” (accessed July 16, 2019), [https://media.fepblue.org/-/media/PDFs/Brochures/2019\\_Medicare\\_Book.pdf](https://media.fepblue.org/-/media/PDFs/Brochures/2019_Medicare_Book.pdf) (3.2 MB).

<sup>10</sup> For more information on TRICARE’s coverage of Medicare cost sharing, see “TRICARE for Life Costs,” <https://tricare.mil/tflcosts>.

that was conducted in 2006, CBO concludes that private employer-sponsored retiree health plans reduce coverage of Medicare cost sharing but not to the same extent as federal retiree plans.<sup>11</sup>

Similarly, the extent to which Medicare beneficiaries enrolled in medigap plans pay Medicare cost sharing out of pocket depends on the plan. Federal law requires medigap plans to conform to one of 10 standard plan types that vary by the extent of their coverage of cost sharing.<sup>12</sup> Plans that offer “first-dollar” coverage pay the Medicare Part B deductible in addition to all other Medicare FFS cost sharing. Roughly two-thirds of medigap enrollees choose a plan that offers first-dollar coverage. (Starting in 2020, new Medicare beneficiaries will be prohibited from purchasing such medigap plans.) Other medigap plans reduce, but do not eliminate, beneficiaries’ cost-sharing liabilities—generally by covering all Part A cost sharing and all cost sharing above the deductible for Part B.

Evidence suggests that supplemental insurance leads to higher Medicare spending by making medical care less expensive at the point of use—a phenomenon known as moral hazard. Therefore, policies that would reduce the generosity of supplemental coverage would be expected to reduce Medicare spending. Determining the effects of supplemental coverage on Medicare spending is challenging, however, because higher spending among enrollees with supplemental insurance can also result if supplemental insurance attracts enrollees with expected above-average costs—a phenomenon known as adverse selection. For example, beneficiaries who are in poorer health or who have a greater preference for seeking medical care may be more likely to sign up for supplemental coverage.

A study conducted for the Medicare Payment Advisory Commission (MedPAC) used regression methods to account for observable differences—in age, sex, education, income, health, and functional status, for instance—between Medicare enrollees with and without supplemental insurance. According to that study, Medicare spends 27 percent more per person on elderly enrollees who have medigap coverage and 14 percent more per person on enrollees who have supplemental coverage from a former employer than it does on enrollees without supplemental

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<sup>11</sup> See Kaiser Family Foundation and Hewitt Associates, *Retiree Health Benefits Examined: Findings From the Kaiser/Hewitt 2006 Survey on Retiree Health Benefits* (December 2006), [www.kff.org/wp-content/uploads/2013/01/7587.pdf](http://www.kff.org/wp-content/uploads/2013/01/7587.pdf) (718 KB). More recent versions of the survey are available but do not include information on the generosity of retiree coverage.

<sup>12</sup> For more information on medigap plans, see America’s Health Insurance Plans (AHIP), “State of Medigap 2018: Trends in Enrollment and Demographics” (June 2018), <https://tinyurl.com/yxf4lhue> (PDF, 633 KB). Besides those 10 plans, some Medicare beneficiaries are enrolled in four plans that are no longer available for purchase (although people with policies in effect prior to June 1, 2010, can generally keep them). Others are enrolled in plans available in Massachusetts, Minnesota, and Wisconsin that are offered through a federal waiver.

coverage.<sup>13</sup> Those estimates are largely consistent with the results of other studies that explore the relationship between supplemental coverage and Medicare spending and also account for individual characteristics.<sup>14</sup> Although those studies (including the MedPAC study) account for observable differences across beneficiaries, those who decide to purchase a medigap or retiree policy may be different from other beneficiaries for reasons that could not be accounted for in the studies. Such differences might include individual attitudes toward risk or preferences for using medical care, which are difficult to measure but can affect the use of medical services. One statistical approach to disentangling the effects of supplemental coverage from the impact of those underlying differences on spending is through a randomized experiment. In such an experiment, a group of beneficiaries in the Medicare FFS program would be randomly assigned either a supplemental policy with a specified cost-sharing structure or no supplemental coverage. Since the two groups would be similar, on average, in terms of characteristics associated with Medicare spending, a reliable estimate of the effects of supplemental coverage on Medicare spending could be obtained by comparing spending for the two groups. However, such experiments in health economics research are rare, and no such experiments have been conducted to estimate the effects of supplemental insurance.

The broader literature in health economics has found that health care utilization and spending rise when people are required to pay a lower share of the total cost of their care.<sup>15</sup> The most influential study on this topic is the RAND Health Insurance Experiment (HIE), which remains

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<sup>13</sup> See Christopher Hogan, *Exploring the Effects of Secondary Coverage on Medicare Spending for the Elderly* (submitted by Direct Research to the Medicare Payment Advisory Commission, August 2014), <http://go.usa.gov/x8XvP> (PDF, 389 KB).

<sup>14</sup> See Adam Atherly, “The Effect of Medicare Supplemental Insurance on Medicare Expenditures,” *International Journal of Health Care Finance and Economics*, vol. 2, no. 2 (June 2002), pp. 137–162, [www.jstor.org/stable/3528916](http://www.jstor.org/stable/3528916); Marika Cabral and Neale Mahoney, “Externalities and Taxation of Supplemental Insurance: A Study of Medicare and Medigap,” *American Economic Journal: Applied Economics*, vol. 11, no. 2 (April 2019), pp. 37–73, <http://dx.doi.org/10.1257/app.20160350>; Susan L. Ettner, “Adverse Selection and the Purchase of Medigap Insurance by the Elderly,” *Journal of Health Economics*, vol. 16, no. 5 (October 1997), pp. 543–562, [https://doi.org/10.1016/S0167-6296\(97\)00011-8](https://doi.org/10.1016/S0167-6296(97)00011-8); and references therein. One study estimated a smaller difference in spending among beneficiaries with and without supplemental coverage. See Jeff Lemieux, Teresa Chovan, and Karen Health, “Medigap Coverage and Medicare Spending: A Second Look,” *Health Affairs*, vol. 27, no. 2 (March/April 2008), pp. 469–477, <http://dx.doi.org/10.1377/hlthaff.27.2.469>.

<sup>15</sup> The *Handbook of Health Economics* reviewed approximately 30 studies on this topic. See Chapter 11 of David M. Cutler and Richard J. Zeckhauser, “The Anatomy of Health Insurance,” vol. 1 of *Handbook of Health Economics*, A. J. Culyer and J. P. Newhouse, eds. (2000), pp. 563–643. More recently, the 2010 literature review by Swartz reviewed 135 studies, and a 2018 article by Einav and Finkelstein cites more than 15 studies published since 2011. See Katherine Swartz, “Cost-Sharing: Effects on Spending and Outcomes,” *The Synthesis Project*, Research Synthesis Report No. 20 (December 2010), <https://www.rwjf.org/en/library/research/2011/12/cost-sharing--effects-on-spending-and-outcomes.html>; and Liran Einav and Amy Finkelstein, “Moral Hazard in Health Insurance: What We Know and How We Know It,” *Journal of the European Economic Association*, vol. 16, no. 4 (May 2018), pp. 957–982, <http://dx.doi.org/10.1093/jeea/jvy017>.

the only source of experimental evidence on the way people respond to different cost sharing for the full range of medical services. More recent studies have relied on quasi-experimental variation in cost sharing for specific services, such as prescription drugs, emergency department visits, or behavioral health care.<sup>16</sup> In a quasi-experimental design, researchers compare outcomes for people who were subject to an intervention or policy change (such as a change in cost-sharing requirements) with outcomes for people who were not. In such studies, the two groups are not assigned randomly, although researchers typically use statistical methods to control for differences between the two groups in characteristics that are correlated with the outcomes being studied. From this quasi-experimental literature, a 2010 study by Chandra, Gruber, and McKnight (hereafter referred to as CGM) is of particular interest to CBO in modeling how changes in cost sharing affect Medicare spending.<sup>17</sup> Their study of Medicare beneficiaries enrolled in a retiree supplemental insurance plan showed that Medicare beneficiaries reduced both the number of visits to physicians and the use of prescription drugs when those services were made subject to cost sharing, to a degree roughly consistent with the results of the RAND experiment.<sup>18</sup> Furthermore, the gross savings generated by higher cost sharing for visits to physicians and prescription drugs were partially offset by increases in hospital spending, perhaps because people delayed treatment until a condition worsened. The findings of those studies are used to specify parameters of CBO’s model that characterize how beneficiaries respond to changes in cost sharing. Those behavioral responses are discussed in greater detail in the section titled “Modeling Beneficiaries’ Behavior.”

## Overview of CBO’s Model

CBO designed its model to analyze the budgetary impacts of four main policy levers for altering cost sharing in FFS Medicare. The Part B deductible could be increased or decreased, or a combined deductible could be established for Parts A and B; coinsurance rates and copayments

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<sup>16</sup> For a summary of the literature that explores cost sharing for prescription drugs, see Dana P. Goldman, Geoffrey F. Joyce, and Yuhui Zheng, “Prescription Drug Cost Sharing: Associations With Medication and Medical Utilization and Spending and Health,” *JAMA*, vol. 298, no. 1 (July 2007), pp. 61–69, <http://dx.doi.org/10.1001/jama.298.1.61>. For one example of a study that explores cost sharing for emergency department visits, see John Hsu and others, “Cost-Sharing for Emergency Care and Unfavorable Clinical Events: Findings From the Safety and Financial Ramifications of ED Copayments Study,” *Health Services Research*, vol. 41, no. 5 (October 2006), pp. 1801–1820, <https://doi.org/10.1111/j.1475-6773.2006.00562.x>. For one study of cost sharing for behavioral health care, see Bradley Stein, Maria Orlando, and Roland Sturm, “The Effect of Copayments on Drug and Alcohol Treatment Following Inpatient Detoxification Under Managed Care,” *Psychiatric Services*, vol. 51, no. 2 (February 2000), pp. 195–198, <https://doi.org/10.1176/appi.ps.51.2.195>.

<sup>17</sup> See Amitabh Chandra, Jonathan Gruber, and Robin McKnight, “Patient Cost-Sharing and Hospitalization Offsets in the Elderly,” *American Economic Review*, vol. 100, no. 1 (March 2010), pp. 193–213, <http://dx.doi.org/10.1257/aer.100.1.193>.

<sup>18</sup> The policy changes that CGM studied occurred before the introduction of Medicare Part D, so the supplemental retiree plan they studied included prescription drug coverage.

could be changed; a catastrophic cap could be added; and additional limits could be imposed on medigap plans' coverage of Medicare's cost-sharing obligations. In addition, certain enrollees could be exempted or "grandfathered" by applying changes only to new enrollees instead of all enrollees.

To estimate the budgetary effects of changes to cost sharing in FFS Medicare and restrictions to medigap plans, CBO uses the model to carry out the following four main steps for each year of the budget window (see [Figure 1](#)):

- First, given the levels of utilization and total spending corresponding to each person in a sample of Medicare FFS enrollees, along with each person's supplemental coverage (if any), CBO uses the model to calculate cost-sharing responsibilities as well as spending by Medicare, third-party payers (federal and nonfederal payers), and beneficiaries under current law.<sup>19</sup> Aggregate Medicare FFS enrollment and spending are calibrated to match CBO's baseline. This represents the "base case."
- Second, assuming no changes in utilization, total spending, or supplemental coverage corresponding to each enrollee, CBO uses the model to recalculate spending paid by Medicare, third-party payers, and the enrollee under a proposed policy.
- Third, based on the differences in beneficiaries' out-of-pocket spending in the base case (first step) and under a proposed policy (second step), the agency uses the model to calculate each enrollee's behavioral response. That response captures changes in total spending resulting from beneficiaries' changes in out-of-pocket responsibilities.
- Fourth, incorporating the estimates of total spending calculated in the third step, CBO again uses the model to recalculate spending by Medicare, third-party payers, and the enrollee under a proposed policy. The agency then uses the model to calculate the budgetary effects of a proposed policy on Medicare FFS spending on Part A and Part B services by comparing spending under the base case and spending under a proposed policy. In addition, CBO uses the model to estimate other changes in federal spending resulting from changes in Medicare FFS spending on Part A and Part B services.

Having a model with detailed information on Medicare and beneficiary spending under current law and proposed policies also allows for more in-depth analysis of how potential policies affect various groups of beneficiaries. For instance, the agency can examine changes in spending by

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<sup>19</sup> "Total spending" refers to the sum of Medicare FFS spending and beneficiaries' cost-sharing responsibility. That amount represents the dollar value of all health care covered by FFS Medicare. It does not include Medicare Advantage, Medicare Part D spending, or spending on medical services not covered by FFS Medicare.

beneficiaries according to their supplemental coverage or to their spending levels under current law.

## **Construction of the Base Case**

The base case consists of CBO's current-law estimate of Medicare FFS enrollment and total spending for each year of the 10-year budget window as well as beneficiary-level estimates of spending by source of payment (Medicare, supplemental payers, and beneficiaries). It is used as the standard against which proposed policy changes are measured. The base case is constructed by first creating a core file containing administrative data on enrollment, utilization, and spending. The core data set includes information on Medicaid enrollment, but information on other sources of supplemental coverage is then imputed from other data sources. Finally, enrollment and spending are calibrated to align with CBO's most current baseline.

### **The Core Data**

The core data in the current version of CBO's model are derived from the 2013 Master Beneficiary Summary File (MBSF) and supplemented with claims data from the 2013 Standard Analytic Files (SAF). The MBSF, compiled by CMS, summarizes administrative records containing detailed information about enrollment, utilization, and spending for beneficiaries enrolled in Medicare at any point in the year. CBO uses a 5 percent sample of beneficiaries from the MBSF. Because the number of people age 90 or older in the MBSF is larger than the Census Bureau's population estimates, CBO excludes beneficiaries in that age group appearing in the MBSF without spending or utilization of Medicare-covered services for three consecutive years.<sup>20</sup>

The MBSF comprises multiple parts, of which the model relies on two: the base file and the cost-and-utilization file. The base file contains several variables of importance for CBO's model. The variables of interest identify if a Medicare beneficiary is enrolled in FFS Medicare for all or part of a year and if a beneficiary is also enrolled in Medicaid. In addition, the base file indicates if a beneficiary is enrolled in an MA plan. The cost-and-utilization file contains information on utilization and spending. It is the spending information that is of particular importance for the model, as more detailed service utilization is obtained directly from the Medicare claims in the SAF.

CBO constructs variables that summarize each enrollee's spending on four categories of services covered under Part A, as well as three categories of Part B services. The Part A service

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<sup>20</sup> See Xiaotong Niu, Melinda Buntin, and Joyce Manchester, *Changes in Medicare Spending per Beneficiary by Age*, Working Paper 2015-08 (Congressional Budget Office, November 2015), [www.cbo.gov/publication/51027](http://www.cbo.gov/publication/51027).

categories consist of hospital inpatient services, care provided by skilled nursing facilities, hospice services, and certain home health services. The three Part B service categories used in the model are hospital outpatient services, some home health services, and all other Part B services.<sup>21</sup> That final category includes a broad range of services, such as visits to physicians, diagnostic procedures, surgical procedures, anesthesia, physician-administered drugs, ambulance services, and durable medical equipment. It includes services delivered by physicians and other professionals as well as those billed by certain freestanding facilities, such as independent clinical laboratories and ambulatory surgery centers. CBO derives spending for those seven categories of services by grouping 17 service categories for which spending data are available in the MBSF.<sup>22</sup>

The MBSF includes Medicare payments and beneficiary cost-sharing obligations for each service category. The MBSF also reports spending by entities other than Medicare that have the primary responsibility for paying a claim for an enrollee—specifically, primary payers. That spending, however, is not included in the current version of the model because CBO gained access to the primary payer data only recently and has identified some limitations in those data that would have to be addressed before they could be used for the model.

For hospital inpatient and SNF services, cost-sharing responsibility under current law is calculated on the basis of utilization rather than total spending.<sup>23</sup> For those two services, CBO relies on utilization from the MBSF and, in the case of inpatient services, more detailed inpatient utilization information from the SAF (the number of inpatient days, the number of inpatient coinsurance days, and the number of inpatient lifetime reserve days). In addition, CBO also uses the SAF to identify the share of spending for home health services that was covered under Part A and Part B of Medicare.

### **Supplemental Insurance**

The core data are further augmented with information on supplemental coverage to establish whether cost-sharing obligations are paid by the enrollee, by supplemental insurance, or through some combination of the two. CBO assigns all individuals in the model to one of six mutually

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<sup>21</sup> The third category of Part B services consists of services that are included in the carrier file. For a description of the contents of that file, see ResDAC, [www.resdac.org/cms-data/files/carrier-ffs](http://www.resdac.org/cms-data/files/carrier-ffs).

<sup>22</sup> CBO aggregated the 17 categories of Medicare FFS services in the MBSF to those specific seven categories because those were similar to the categories used in the Beneficiary Annual Summary File (BASf), a predecessor data set to the MBSF that was used in the model before the introduction of the MBSF. One of the service categories in the MBSF, home health services, may be covered under both Part A and Part B of Medicare and therefore appears on the list of Part A and Part B services.

<sup>23</sup> As discussed earlier, for other types of claims, cost-sharing amounts are equal to a percentage of spending (for example, for visits to physicians) or zero (for example, for laboratory tests and hospice care).

exclusive supplemental insurance coverage categories. Medicaid enrollment is included in the MBSF, and other sources of supplemental coverage are imputed from the 2013 MCBS and the 2014 CPS Annual Social and Economic (ASEC) Supplement. CBO uses data from the MCBS to impute medigap and nonfederal retiree coverage.<sup>24</sup> Because CBO cannot identify coverage through the FEHB program in the MCBS, the agency uses information from the ASEC to impute that source of coverage.<sup>25</sup> TRICARE coverage is imputed from the ASEC in a similar manner.

Identifying supplemental coverage is important because behavioral responses to proposed changes to Medicare cost sharing or to policies affecting medigap coverage depend on the extent to which beneficiaries are responsible for those costs under current law. The amount of cost-sharing obligations that is borne by the enrollee is known as true out-of-pocket (TrOOP) spending. For enrollees without supplemental insurance, TrOOP spending is equal to their cost sharing under Medicare's rules.

Some Medicare beneficiaries may in fact have multiple sources of supplemental insurance (for example, TRICARE and Medicaid); however, for the purposes of the model, each beneficiary in the sample is assigned to one of six mutually exclusive categories of supplemental insurance for the entire year (see [Table 1](#) and [Table 2](#)). The model uses the following hierarchy to ensure each observation is assigned to one supplemental coverage category: Medicaid (for dual-eligible beneficiaries whose cost sharing is paid by Medicaid), the FEHB program, TRICARE, medigap coverage, nonfederal retiree coverage, and no supplemental insurance.<sup>26</sup>

**Medicaid.** The MBSF identifies dual-eligible beneficiaries and whether or not they receive cost-sharing support from Medicaid on a monthly basis. Because each individual is associated with

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<sup>24</sup> The MCBS, sponsored by CMS, is a longitudinal survey administered to a nationally representative sample of Medicare beneficiaries (approximately 11,000 in 2013). For more information about the survey, see Centers for Medicare & Medicaid Services, "Medicare Current Beneficiary Survey (MCBS)" (accessed on June 4, 2018), [www.cms.gov/Research-Statistics-Data-and-Systems/Research/MCBS/](http://www.cms.gov/Research-Statistics-Data-and-Systems/Research/MCBS/).

<sup>25</sup> The CPS, sponsored by the Census Bureau and the Bureau of Labor Statistics (BLS), is the primary source of labor force statistics for the population of the United States. The 2014 ASEC Supplement to the CPS was administered to approximately 68,000 households that were representative of the total civilian noninstitutionalized population. The reference period for the relevant survey questions in the 2014 ASEC Supplement is 2013. For more information about the 2014 survey, see Census Bureau, "Current Population Survey, 2014 Annual Social and Economic (ASEC) Supplement" (accessed on December 6, 2018), [www2.census.gov/programs-surveys/cps/techdocs/cpsmar14.pdf](http://www2.census.gov/programs-surveys/cps/techdocs/cpsmar14.pdf) (1.7 MB).

<sup>26</sup> For example, if the imputations result in an enrollee's having both TRICARE and medigap coverage, that enrollee would be considered to have TRICARE in the model. If the imputations find that an enrollee has both Medicaid full dual-eligible status and TRICARE, that enrollee would be considered to be a Medicaid full-dual beneficiary. This method has the potential to introduce some bias by, for example, always classifying beneficiaries who are full dual-eligible beneficiaries with TRICARE as full dual-eligible beneficiaries. Such bias would be expected to have small budgetary effects.

one type of supplemental coverage for the entire year, CBO’s model assigns dual status to individuals if the ratio of months enrolled in Medicaid to months enrolled in Medicare was greater than 0.5. For instance, a person enrolled in Medicare for 12 months in a year who is enrolled in Medicaid for 7 months (a ratio of 7/12, greater than 0.5) is considered a dual-eligible beneficiary, whereas one who is enrolled in Medicare for 12 months but enrolled in Medicaid for 5 months (a ratio of 5/12, smaller than 0.5) is not considered a dual-eligible beneficiary. In cases in which the ratio equaled 0.5—that is, a beneficiary was enrolled in Medicaid for the same number of months that he or she was not enrolled—whether a person is considered a dual-eligible beneficiary depends on whether or not the last month of Medicare eligibility included Medicaid coverage. If in the last month of enrollment the person had Medicaid coverage, that person is considered a dual-eligible beneficiary and vice versa. The model further distinguishes dual-eligible beneficiaries according to the different levels of Medicare assistance they receive. As discussed above, for one group of dual-eligible beneficiaries, Medicaid pays all Medicare cost sharing and premiums, and for others, Medicaid pays only the Medicare premiums.<sup>27</sup> For modeling purposes, it is important to distinguish between those two groups because only those dual-eligible beneficiaries whose cost sharing is not paid by Medicaid would be expected to change their pattern of health care consumption if Medicare cost-sharing rules changed (assuming no simultaneous change in Medicaid rules for dual-eligible enrollees).

**Other Sources of Supplemental Insurance.** The model imputes other sources of supplemental insurance using data available in the MCBS and the CPS. Medigap and nonfederal retiree coverage are imputed from the MCBS in two steps. First, self-reported income from the MCBS is imputed onto the core MBSF data set using a cold-decking procedure that is based on the beneficiary’s age, sex, race, and dual-eligibility status. (Cold-decking imputation involves assigning values of missing variables—in this case, income—from the values for individuals who have similar characteristics in an external data source.) Second, medigap and nonfederal retiree coverage are imputed from the MCBS by cold-decking, using deciles of income and

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<sup>27</sup> For more information on dual-eligible beneficiaries, see MedPAC and MACPAC, “Data Book: Beneficiaries Dually Eligible for Medicare and Medicaid,” January 2017, [www.macpac.gov/wp-content/uploads/2017/01/Jan17\\_MedPAC\\_MACPAC\\_DualsDataBook.pdf](http://www.macpac.gov/wp-content/uploads/2017/01/Jan17_MedPAC_MACPAC_DualsDataBook.pdf) (4.5 MB); and Congressional Budget Office, *Dual-Eligible Beneficiaries of Medicare and Medicaid: Characteristics, Health Care Spending, and Evolving Policies* (June 2013), [www.cbo.gov/publication/44308](http://www.cbo.gov/publication/44308).

Medicare spending.<sup>28</sup> In addition, CBO imputes federal retiree coverage through the FEHB program and through TRICARE by cold-decking from the CPS on the basis of age, income, and dual-eligibility status.<sup>29</sup> By construction, the distribution of income by sex, race, age, and dual-eligibility status in the core data set mirrors its distribution in the MCBS; the distributions of medigap and nonfederal retiree coverage by (imputed) income and Medicare spending in the core data set mirror their respective distributions in the MCBS; and the distributions of FEHB and TRICARE coverage in the core data set by age, income, and dual-eligibility status mirror their distributions among Medicare beneficiaries in the CPS.

**Enrollee True Out-of-Pocket Spending.** The source and particular characteristics of the supplemental coverage affect TrOOP spending (see [Table 2](#)). In the model, TrOOP spending is set to zero for people with supplemental coverage from Medicaid, FEHB, or TRICARE. For beneficiaries without supplemental coverage, TrOOP spending equals their full cost-sharing responsibility.

Because the coverage characteristics of medigap and nonfederal retiree plans are not reported in the data, CBO identified key plan characteristics for use in the model. In the case of medigap plans, an important characteristic is whether they offer first-dollar coverage. Beginning in 2020, plans offered to new medigap enrollees will not be permitted to cover the Part B deductible and therefore will not offer first-dollar coverage. Individuals who have selected medigap plans with first-dollar coverage prior to 2020 may keep their first-dollar coverage plan. Enrollment data from America’s Health Insurance Plans in 2014 showed that about 70 percent of medigap enrollment was in plans with first-dollar coverage. Based on that finding, among enrollees with medigap coverage who are initially enrolled before 2020, two-thirds are randomly selected to be

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<sup>28</sup> Respondents in the MCBS were identified as having nonfederal retiree coverage if they reported that they had employment-based health insurance and were not employed. Respondents who were employed and had employment-based health insurance were not considered to have retiree coverage because their employment-based coverage would be primary rather than supplemental to Medicare. The model probably overestimates the share of the population with nonfederal retiree coverage in two ways. First, because the MCBS does not have information on whether retired interviewees were previously employed by the federal government, the imputation does not distinguish between nonfederal and federal sources of retiree coverage. Second, the imputation does not consider the employment status of a respondent’s spouse. Therefore, the model includes respondents who did not work but had health insurance through the employer of a working spouse in the calculation of the share of the population with nonfederal retiree coverage. CBO will incorporate the employment status of the respondent’s spouse in the future because that information was added to the MCBS beginning in 2015.

<sup>29</sup> Because the CPS sample is not limited to retired individuals, the imputation of FEHB and TRICARE coverage may overestimate the number of Medicare FFS beneficiaries in those coverage categories. For example, the imputation may include working spouses of federal retirees in the calculation of the share of the population with federal retiree coverage.

treated as though their medigap plans have first-dollar coverage.<sup>30</sup> The remaining one-third of pre-2020 initial enrollees, and all enrollees who enroll in 2020 and beyond, are treated as though their medigap plans do not cover the Part B deductible.

Among beneficiaries assigned through the imputation procedure to a nonfederal retiree coverage plan, CBO specifies that all such plans have the same structure, featuring a specific annual deductible, a catastrophic cap, and a 20 percent coinsurance for spending between the deductible and the catastrophic cap. The levels of the deductible and cap are taken from a 2006 survey on retiree health benefits, which found that for retiree plans for those age 65 and older the most common deductible was \$300 and the most common catastrophic cap was \$2,000.<sup>31</sup> (To CBO's knowledge, that is the most recent information available on the characteristics of such plans.) CBO inflates those levels using its forecast of inflation as measured by the consumer price index for all urban consumers (CPI-U).

CBO calculates each enrollee's cost-sharing responsibility under Medicare's FFS cost-sharing rules on the basis of his or her spending (calibrated) and utilization taken from administrative data. Given the assigned supplemental coverage status, CBO then calculates each enrollee's TrOOP spending. The estimate of TrOOP spending for each beneficiary is used later to model beneficiaries' behavioral response to changes in the cost-sharing rules and changes in rules related to supplemental insurance such as medigap policies.

### **Calibration**

For the core data to reflect CBO's 10-year projections of Medicare FFS enrollment and spending under current law, the sample is calibrated by constructing weights and scaling spending for each beneficiary in the sample. In particular, a sample weight is assigned to each beneficiary so that the sample totals match CBO's baseline projections of Medicare enrollment as well as the total number of dual-eligible beneficiaries in each year of the 10-year budget window. Then, each beneficiary's spending on the seven service categories is scaled so that average spending by

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<sup>30</sup> That fraction is based on the combined market share of the C, F, and J standardized medigap plans, which together accounted for a combined 71 percent of medigap policies in force at the end of 2014. That figure includes an unknown but probably small number of "high-deductible Plan F" plans that do not offer first-dollar coverage. See Table 5 in America's Health Insurance Plans Center for Policy and Research, *Trends in Medigap Enrollment and Coverage Options, 2014*, [www.ahip.org/wp-content/uploads/2016/04/MedigapEnrollmentReport\\_Linked.pdf](http://www.ahip.org/wp-content/uploads/2016/04/MedigapEnrollmentReport_Linked.pdf) (1.0 MB).

<sup>31</sup> The \$300 deductible and \$2,000 catastrophic cap were the most commonly reported sizes of each according to the findings of the Kaiser/Hewitt 2006 Survey on Retiree Health Benefits. The survey included 302 businesses with at least 1,000 employees that offered retiree health coverage. See Kaiser Family Foundation and Hewitt Associates, *Retiree Health Benefits Examined: Findings From the Kaiser/Hewitt 2006 Survey on Retiree Health Benefits* (December 2006), [www.kff.org/wp-content/uploads/2013/01/7587.pdf](http://www.kff.org/wp-content/uploads/2013/01/7587.pdf) (718 KB).

service category in the enrollment-weighted sample matches CBO’s baseline projections of service-level average spending in each year of the budget window.

**Enrollment.** The construction of the sample weight consists of two steps: an FFS adjustment and a baseline enrollment adjustment. First, the beneficiary-level FFS adjustment factor is calculated as the raw sample weight, which is equal to 20 because the data represent a 5 percent sample, multiplied by the number of months a beneficiary is enrolled in FFS divided by 12 (the number of months in a year).<sup>32</sup> The factor is designed to down-weight partial-year FFS enrollees because CBO’s baseline represents an average monthly enrollment. The FFS adjustment for beneficiary  $i$ ,  $FFS_i$ , is represented by the equation:

$$FFS_i = 20 \times \frac{\text{Number of FFS Months}_i}{12}$$

Second, the baseline enrollment adjustment for each beneficiary  $i$  based on his or her dual status  $d$  is calculated as the CBO FFS enrollment baseline for that dual status divided by the sum of the FFS adjustment factors among enrollees with that dual status. For this calculation, the four dual-status categories are non-dual-eligible beneficiaries, full dual-eligible beneficiaries, beneficiaries designated as SLMB only and QIs, and other partial dual-eligible beneficiaries. The baseline enrollment adjustment is represented by the equation:

$$BaseEnr_{i,d} = \frac{CBO\ Enrollment_d}{\sum_{\{i:D=d\}} FFS_{iD}}$$

Those two factors are then combined to yield a sample weight,  $Sample\ weight_i$ , which equals the product of a beneficiary’s FFS adjustment factor and the enrollment baseline adjustment corresponding with his or her status as a dual-eligible beneficiary as represented in the equation:

$$Sample\ weight_i = FFS_i \times BaseEnr_{i,d} = 20 \times \frac{\text{Number of FFS Months}_i}{12} \times \frac{CBO\ Enrollment_d}{\sum_{\{i:D=d\}} FFS_{iD}}$$

By construction, this method results in a sample weight of zero for any beneficiaries with only MA enrollment during the year. As a consequence, such beneficiaries are excluded from the model.

**Spending.** To ensure that the sum of spending in the model aligns with CBO’s baseline projections, the model applies a service-level adjustment factor to each observation’s spending

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<sup>32</sup> People with fewer than 12 months of FFS enrollment during a year include new Medicare enrollees, people who switch between FFS and MA during the year, and people whose enrollment ends during the year (typically upon death).

on each service category.<sup>33</sup> The model’s service-level baseline spending adjustments are calculated by dividing CBO’s baseline projection for per capita spending by service category by the enrollment weighted average per capita spending for that service category. The baseline spending adjustment for service category  $s$  is represented in the equation below:

$$SpendAdj_s = CBO\ Per\ Capita\ Spend_s \div \frac{\sum_i (Sample\ weight_i \times MBSF\ Spend_{is})}{\sum_i Sample\ Weight_i}$$

**Limitations.** Two limitations of the current calibration methodology pertain to partial-year enrollees and hospice spending. First, by construction, beneficiaries enrolled in FFS for only part of the year receive a lower sample weight than those enrolled for the full year. Because the sample weights are also applied to spending, when individual-level changes in spending are aggregated, spending for partial-year enrollees in the sample is given less weight than spending by full-year FFS enrollees, even though spending reported in the MBSF for both groups represents all FFS spending while they are enrolled. Second, Medicare pays for hospice services on a fee-for-service basis, including for beneficiaries enrolled in MA. Therefore, CBO’s baseline for Part A hospice spending includes some spending for MA beneficiaries. However, the model’s spending adjustment treats the CBO baseline for hospice spending as if it represents spending for FFS enrollees. That discrepancy causes the model to overstate hospice spending on FFS beneficiaries. As discussed below, CBO plans to adjust the model to address those limitations.

### Characteristics of the Sample in the Base Case

In 2013, total spending among Medicare FFS beneficiaries averaged \$11,600 (see [Table 1](#)). Average total spending ranged from about \$9,600 among beneficiaries without supplemental coverage to about \$18,500 among dual-eligible beneficiaries with cost sharing paid by Medicaid. Those differences reflect, at least in part, demographic characteristics (such as age) and health status. They also reflect that, all else being equal, people with more extensive supplemental coverage tend to use more care. TrOOP spending also varied by supplemental insurance coverage. Dual-eligible beneficiaries with cost sharing paid by Medicaid, and beneficiaries enrolled in the FEHB program or TRICARE have no TrOOP spending (that is, with few exceptions, all cost-sharing responsibilities are paid for by third parties). On average, beneficiaries with medigap plans have very low out-of-pocket spending because most beneficiaries are enrolled in plans with generous coverage (see the description above). According to CBO’s specification about the generosity of retiree coverage, those plans cover about 45 percent of cost sharing (\$700 out of \$1,600 on average). Finally, beneficiaries without supplemental coverage—including dual-eligible beneficiaries who do not qualify for Medicaid

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<sup>33</sup> The MBSF also includes spending for certain MA enrollees enrolled in cost-based MCOs that choose to have CMS process and pay for services. Because our sample is based on FFS enrollment, CBO excludes that spending.

coverage of Medicare cost sharing—have TrOOP spending that equals their full cost-sharing responsibility.

## **Modeling Beneficiaries’ Behavior**

To analyze proposals that would change Medicare’s cost-sharing requirements or limit supplemental coverage, CBO uses its model to estimate how beneficiaries would respond to the change in cost sharing. CBO expects that beneficiaries would change their total spending on Medicare-covered services when their out-of-pocket costs for those services changed.

Accordingly, behavioral responses are modeled as changes in each beneficiary’s total spending on Part A and Part B services resulting from the change in his or her TrOOP spending under the policy proposal relative to current law. To do this, having already estimated each beneficiary’s current-law TrOOP spending in the base case, CBO next estimates TrOOP spending under the policy proposal in the same way, but this time using cost-sharing parameters corresponding to the policy proposal rather than to Medicare’s current cost-sharing rules. For this calculation, CBO uses the same values for each beneficiary’s total spending and utilization by service category, as well as each beneficiary’s supplemental coverage status, as in the base case. In CBO’s model, beneficiaries can respond to changes in cost sharing by changing their total spending, but the model does not permit beneficiaries to change their supplemental insurance coverage or to enroll in an MA plan.

In modeling behavioral responses, CBO relies on the extensive literature in health economics that estimates the effects of changes in cost sharing on individuals’ utilization of and spending on medical services.<sup>34</sup> Findings from the RAND HIE, augmented with CGM’s more recent quasi-experimental findings, provide the key evidence for the model.<sup>35</sup> How those findings are applied in CBO’s model, as well as other modeling specifications relating to beneficiaries’ responses to changes in cost sharing, is discussed below.

### **Construction of Cubic Behavioral Response Functions**

To inform CBO’s modeling of how medical spending changes in response to changes in cost sharing, CBO relies primarily on the findings of the RAND HIE, which followed approximately 2,000 nonelderly families between the mid-1970s and early 1980s. Families were randomly assigned to different health insurance plans with no deductibles, one of three different annual

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<sup>34</sup> This literature was summarized most recently in Liran Einav and Amy Finkelstein, “Moral Hazard in Health Insurance: What We Know and How We Know It,” *Journal of the European Economic Association*, vol. 16, no. 4 (August 2018), pp. 957–982, <http://dx.doi.org/10.1093/jeea/jvy017>.

<sup>35</sup> For a complete description of the RAND HIE, see Joseph P. Newhouse and the Insurance Experiment Group, *Free for All? Lessons From the RAND Health Insurance Experiment* (RAND Corporation, 1993), [www.rand.org/pubs/commercial\\_books/CB199](http://www.rand.org/pubs/commercial_books/CB199).

caps on beneficiaries' out-of-pocket spending, and one of six different coinsurance structures—four of which were different singular coinsurance rates that applied to all covered services.<sup>36</sup> Although the population studied in the RAND HIE differs from the Medicare population, CBO relies on its results because they provide the most comprehensive experimental evidence to date of how cost sharing in health insurance affects medical spending. Importantly, the experiment's finding of a behavioral response to cost sharing has been corroborated among the Medicare population by CGM's study. For CBO's modeling purposes, the key result from the experiment is the reported average spending by coinsurance level and service category (see Table 3). Because families were randomized to different coinsurance levels, those differences in average spending should not result from differences in the characteristics of people enrolled in the different plans and can be interpreted as the effect of changes in cost sharing on total spending.<sup>37</sup>

Findings from the RAND HIE concerning the relationship between medical spending and cost sharing are most often expressed using elasticities. However, CBO applies the RAND HIE's findings—along with the findings of CGM's study—by estimating cubic functions to relate TrOOP spending and total spending. In so doing, CBO follows the recommendation of a 2006 Congressional Research Service report by Peterson, which described a number of properties of arc elasticities from the RAND HIE that are problematic for modeling purposes.<sup>38</sup> Additionally, a widely cited result of the experiment is that the elasticity of medical spending with respect to out-of-pocket price is -0.2—that is to say, if an individual's net out-of-pocket price increased by

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<sup>36</sup> To construct the cubic behavioral response functions, CBO relies on the four plans that applied a singular coinsurance rate (either 0, 25 percent, 50 percent, or 95 percent) to all services below the out-of-pocket cap. The other two plans in the RAND HIE applied different coinsurance rates to different services below the out-of-pocket cap: one with 50 percent coinsurance for dental and outpatient mental health services and 25 percent coinsurance for other services; and one with 95 percent coinsurance for outpatient services and no coinsurance for inpatient services.

<sup>37</sup> Although subsequent research has identified potential bias in the RAND HIE resulting from differences across groups in both study participation and reporting of expenditures, Aron-Dine and coauthors performed an analysis in 2013 that suggested the consequences of such bias are limited. See Aviva Aron-Dine, Liran Einav, and Amy Finkelstein, "The RAND Health Insurance Experiment, Three Decades Later," *Journal of Economic Perspectives*, vol. 27, no. 1 (Winter 2013), pp. 197–222, <http://dx.doi.org/10.1257/jep.27.1.197>.

<sup>38</sup> See Chris L. Peterson, *Alternatives for Modeling Results From the RAND Health Insurance Experiment*, Report for Congress RL33296 (Congressional Research Service, March 6, 2006). An arc elasticity is the ratio of a percentage change in one quantity (in this case, total medical spending) to the percentage change in another quantity (here, out-of-pocket price) defined over a specific *range* of values, rather than at a specific point. Their first challenging property is that multiple arc elasticities can be calculated from the results, including the elasticity over the 25 percent to 50 percent interval, the one over the 50 percent to 95 percent interval, and a different one over the 25 percent to 95 percent interval. These different arc elasticities would yield different estimates of the effect of a change in cost sharing on medical spending. Second and more problematic, when the coinsurance under either current or a proposed policy equals zero, the coinsurance rate cancels out of the arc-elasticity formula and the resulting calculated elasticity is therefore independent of the change in coinsurance. This is problematic in part because so many individuals in fact face zero effective coinsurance owing to the presence of secondary insurance coverage.

10 percent, his or her medical spending would decrease by 2 percent. However, as Aron-Dine and coauthors discuss, this finding results from several particular modeling choices made by the RAND HIE investigators, and to apply the finding in a different setting is a challenging task.<sup>39</sup>

In developing behavioral response functions, CBO adapts the results of the RAND HIE into the model in three ways. First, CBO uses the model to calculate each beneficiary’s “effective coinsurance” separately for combined Part A services and combined Part B services, taking into account supplemental coverage. Specifically, effective coinsurance is given by TrOOP spending divided by total spending. Because effective coinsurance is calculated on the basis of TrOOP spending, the policies that drive changes in TrOOP spending are the same ones that change effective coinsurance—namely, alterations to Medicare FFS cost-sharing parameters (such as deductibles and coinsurance) as well as rules concerning supplemental insurance (such as medigap policies). Second, rather than using actual levels of spending, CBO measures people’s total spending at different cost-sharing levels relative to what their total spending would have been if they had a plan with no coinsurance (a “free plan”). As a result, spending in the model does not need to be adjusted for inflation. Third, the model applies the RAND HIE’s results for inpatient services to all Medicare Part A services and the RAND HIE’s results for outpatient services to all Medicare Part B services. The two cubic functions developed by CBO and used in the model are:

$$\text{Part A: } \hat{s} = 1.000 - 0.516c + 0.787c^2 - 0.525c^3$$

$$\text{Part B: } \hat{s} = 0.991 - 1.193c + 1.761c^2 - 0.921c^3.$$

In the functions,  $c$  denotes effective coinsurance (parameterized between zero and one), and  $\hat{s}$  denotes the beneficiary’s total expected spending relative to spending under a free plan. The derivation of these functions is described in detail throughout the remainder of this section.<sup>40</sup>

Before discussing the derivation of the cubic behavioral response functions, the following example illustrates their use in the model. Consider a hypothetical beneficiary with total annual spending on Part B services of \$2,000 whose TrOOP spending on those services would be \$548. The beneficiary’s effective coinsurance rate on those services under current law would be 27.4 percent. Next, consider a change in policy that would increase the beneficiary’s cost sharing

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<sup>39</sup> See Aviva Aron-Dine, Liran Einav, and Amy Finkelstein, “The RAND Health Insurance Experiment, Three Decades Later,” *Journal of Economic Perspectives*, vol. 27, no. 1 (Winter 2013), pp. 197–222, <http://dx.doi.org/10.1257/jep.27.1.197>.

<sup>40</sup> According to the cubic function, when effective coinsurance, or  $c$ , equals zero, the level of Part B spending relative to the free plan is 0.991. It is not equal to 1, as expected, because the least squares regression line does not pass exactly through that point.

for Part B services. To estimate the beneficiary's behavioral response, CBO applies the proposed cost-sharing schedule to his or her actual spending under current law and calculates his or her TrOOP spending under the proposed policy *assuming no change in the beneficiary's total spending*. Supposing that the beneficiary's TrOOP spending is calculated to equal \$696, then the effective coinsurance rate would be 34.8 percent.<sup>41</sup> Applying the cubic function for Part B services reveals that,

- Under current law,  $\hat{s} = 0.991 - 1.193(0.274) + 1.761(0.274)^2 - 0.921(0.274)^3 = 0.777$ , meaning that the beneficiary who faced an effective coinsurance rate of 27.4 percent for Part B services would be expected to spend 77.7 percent of what he or she would have spent under a free plan.
- Under the proposed policy that would result in an effective coinsurance rate of 34.8 percent,  $\hat{s} = 0.991 - 1.193(0.348) + 1.761(0.348)^2 - 0.921(0.348)^3 = 0.750$ , meaning that the beneficiary would spend 75.0 percent of what he or she would have spent under a free plan.

Changes in Part B spending can be computed using a scalar equal to the ratio of spending relative to the free plan under the proposed policy relative to current law. In this example, the scalar calculated by the model is equal to  $0.750 \div 0.777 = 0.965$ , and the beneficiary would then incur  $\$2,000 \times 0.965 = \$1,930$  in total Part B spending under the proposed policy. When analyzing changes in cost sharing for Part A services, the model uses the Part A formula shown above in a similar way.

CBO estimates the two cubic functions by ordinary least squares regression in which the outcome variable is spending as a fraction of free-plan spending at each coinsurance level in the RAND HIE, and the explanatory variables are the coinsurance level, the coinsurance level squared, and the coinsurance level cubed. For the estimation, both the outcome and coinsurance are expressed as numbers between zero and one, and the coinsurance for each plan is the share of medical spending that RAND HIE participants were responsible for paying before they reached the cap on out-of-pocket spending. Spending relative to the free plan is derived from the RAND HIE results shown in [Table 3](#) but, before the equations are estimated, the spending levels relative to the free plan are adjusted in order to (1) address a data limitation at the 50 percent coinsurance level, and (2) incorporate the findings of CGM. Those adjustments are discussed below, and the effect of each adjustment is shown in [Table 4](#). The cubic functions for Part A and Part B services

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<sup>41</sup> Those levels of TrOOP spending and associated effective coinsurance rates correspond to a policy change that doubles the Part B deductible from its 2019 level of \$185 to \$370 for a beneficiary without supplemental coverage.

are estimated using the coinsurance levels and associated “Final Values” shown in the last column of [Table 4](#).<sup>42</sup>

**Adjustments at the 50 Percent Coinsurance Level.** According to results from the RAND HIE, participants at the 50 percent coinsurance level spent more on inpatient care than those with either no or 25 percent coinsurance. However, as reflected in the large standard error for mean inpatient spending at the 50 percent coinsurance level, that statistic is imprecisely estimated. Study participants were only enrolled in the 50 percent plan for about half of the length of the study’s plan assignment period, many fewer people were enrolled in the 50 percent plan, and the plan was not available in all study sites. In addition, one participant in that plan had a very expensive hospitalization resulting in a much higher mean of inpatient spending. Furthermore, subsequent work by the RAND HIE investigators attempting to isolate the effect of the coinsurance level from the plans’ out-of-pocket maximums found that spending on the 50 percent coinsurance plan fell between the spending on the 25 percent and 95 percent plans.<sup>43</sup> Because those later findings conform to economic intuition (that higher prices do not induce greater demand over a certain middling range of prices) and because the original counterintuitive finding is estimated imprecisely, CBO has decided to use an alternative figure for inpatient spending at the 50 percent coinsurance level, where average spending with 50 percent effective coinsurance is 87.3 percent of free-plan spending (see [Table 4](#)). That figure is based on the subsequent work by the RAND investigators: Studying spending only by people not near their out-of-pocket maximum, they found that at the 25 percent, 50 percent, and 95 percent coinsurance levels, hospital spending averaged 71 percent, 68 percent, and 60 percent of free-plan spending, respectively. The estimate of 87.3 percent developed by CBO is an average of the (whole-sample) estimate of spending at the 25 percent coinsurance level (91.2 percent) scaled by the ratio of 50 percent to 25 percent plan spending among people near their out-of-pocket maximum, and the estimate of spending at 95 percent coinsurance (77.0 percent) scaled by the ratio of 50 percent to 95 percent spending among people near the out-of-pocket maximum.

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<sup>42</sup> As shown in [Table 4](#), the Part A cubic function is estimated from four data points (corresponding to coinsurance levels 0, 25 percent, 50 percent, and 95 percent), and the Part B function is estimated from five data points. Because least-squares estimation of a cubic function entails estimating four unknown coefficients, the Part A function fits the data exactly, meaning the estimated Part A function passes through each of the four data points used to estimate it. The Part B function, estimated from five points, does not fit exactly. Still, the fit is very close ( $R^2 = 0.993$ ). Although a fourth-order polynomial function would pass through all the Part B data points, the improvement to the fit would be minimal and the function would not be downward sloping for all levels of effective coinsurance along the interval between zero and one.

<sup>43</sup> See [Table 4.17](#) on page 120 of Joseph P. Newhouse and the Insurance Experiment Group, *Free for All? Lessons From the RAND Health Insurance Experiment* (RAND Corporation, 1993), [www.rand.org/pubs/commercial\\_books/CB199](http://www.rand.org/pubs/commercial_books/CB199). The authors restricted the sample to patients who were not close to meeting their out-of-pocket maximums, under the assumption that they would be more responsive to the plan’s coinsurance.

Precisely,

$$\frac{1}{2} \left[ 91.2\% \times \left( \frac{68\%}{71\%} \right) + 77.0\% \times \left( \frac{68\%}{60\%} \right) \right] = 87.3\%.$$

For consistency, the analogous replacement was made for Part B spending. This has a small effect, with spending for outpatient services among people with 50 percent coinsurance changing from 65.9 percent of free-plan spending to 66.6 percent (see the second column of [Table 4](#)).

**Incorporating Results of the Chandra, Gruber, and McKnight (CGM) Article.** The spending by coinsurance results are further modified to account for two contributions from CGM's paper. The two modifications are, first, the addition of a data point for outpatient care at coinsurance of 8 percent, and second, an adjustment to account for increased spending on inpatient care resulting from greater outpatient cost sharing. For that paper, the authors studied the effects of the introduction of a \$10 copayment for office visits alongside increased cost sharing for prescription drugs among Medicare beneficiaries in a particular supplemental retiree insurance plan.

The \$10 office visit copayment is analogous to an effective coinsurance of 8 percent because the authors report that average per-member, per-month spending on physicians' visits prior to the introduction of the copayment was \$93.25, but that includes members who do not visit a physician. On average, beneficiaries had 0.753 monthly physicians' visits before the introduction of the copayment. Therefore, the mean cost of a physician's visit in the sample was  $\$93.25 \div 0.753 = \$123.84$ , and the \$10 copayment represented an effective coinsurance level of  $\$10 \div 123.84 = 8\%$ . The authors measured the change in office visits resulting from the copayment, and found that the arc elasticity of office visit utilization with respect to out-of-pocket price was -0.07. To incorporate that finding into the cubic function for outpatient behavioral response, the arc elasticity must be converted into a level of spending relative to the free plan at the 8 percent coinsurance level. The amount of spending that yields an arc elasticity of -0.07 between zero and 8 percent coinsurance is 86.9 percent of spending in the free plan.<sup>44</sup> The 8 percent coinsurance level and corresponding 86.9 percent spending level are therefore added to the schedule of coinsurance and spending levels for Part B services (see [Table 4](#)).

As described earlier, the headline finding of the paper by CGM was that, for every one-dollar reduction in spending on outpatient care or prescription drugs resulting from higher cost sharing, spending on hospital inpatient services increases by 20 cents. That estimate was generated based on simultaneous increases in copayments for office visits and prescription drugs, which were

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<sup>44</sup> This is calculated using the formula for an arc elasticity of medical spending by coinsurance level, plugging in -0.07 for the elasticity, 0 and 0.08 for the two coinsurance levels, and 100 percent for the level of spending (relative to the free plan) corresponding to zero coinsurance. Solving for the level of spending at the 8 percent coinsurance yields 86.9 percent.

found to cause reductions in spending on those services and an increase in hospital spending. The study design did not allow the authors to identify what fraction of the increased hospital spending is attributable to lower spending on office visits versus lower spending on prescription drugs. CBO supposes, however, that simultaneously increasing copayments for both office visits and prescriptions is likely to have a positive interaction effect, meaning that the reduction in drug spending increases the responsiveness of hospital inpatient spending to cost sharing for office visits. If true, then hypothetical increases in outpatient cost sharing not accompanied by increases in prescription drug cost sharing would produce a smaller effect on hospital spending than the 20 percent found in that study. Absent more precise estimates in the empirical literature, CBO expects that 15 percent of the reduction in Part B costs resulting from an increase in cost sharing is offset by increases in hospital inpatient spending.

CGM's findings imply that a change in Part B cost sharing, in fact, has two effects on beneficiary spending: one for Part B services, and the other for Part A services. Rather than modeling each of those effects explicitly, CBO's model incorporates both effects in the cubic response function for Part B services. Specifically, CBO adjusts the levels of Part B spending at each level of coinsurance (8 percent, 25 percent, 50 percent, and 95 percent) relative to the free plan. To reflect CGM's findings, any reduction in Part B spending induced by increased Part B cost sharing is reduced by 15 percent because of increased hospital inpatient spending. For example, the first column of [Table 4](#) shows that Part B spending by a beneficiary at the 25 percent coinsurance level is expected to equal 76.5 percent of what an individual would spend with zero coinsurance. That difference of  $(100\% - 76.5\%) = 23.5\%$  is scaled down by 15 percent, so the new estimated value of spending at the 25 percent coinsurance level relative to the free plan is equal to  $100\% - (100\% - 15\%) \times 23.5\% = 80.0\%$ . That adjustment is also made for each other level of coinsurance (8 percent, 50 percent, and 95 percent). Such an approach to modeling the offset identified by CGM means that Part A spending and Part B spending would not individually change in response to changes in Part B cost sharing as predicted by the RAND HIE and the CGM paper. However, total Medicare FFS spending (the sum of Part A and Part B spending) would change as predicted. CBO chose this approach in order to simplify the model in a way that still produces estimates of combined Part A and Part B spending that are consistent with the findings of the RAND HIE and CGM.<sup>45</sup>

### **Implications of Behavioral Modeling Choices and Effects Not Modeled**

The advantages of modeling beneficiaries' responses to changes in cost sharing as presented in this section are its simplicity and its empirical foundation. Simplicity in microsimulation

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<sup>45</sup> This approach simplifies the model because it is not clear, based on CGM's findings, how a change in Part A spending in response to Part B cost sharing would be distributed among beneficiaries. It cannot be applied simply to each beneficiary in response to his or her own change in Part B cost sharing because many beneficiaries with Part B spending have zero Part A spending, and a decrease in Part B cost sharing for those beneficiaries would result in a negative number for Part A spending.

modeling increases transparency and computational efficiency. In the model, a Medicare beneficiary's behavioral response to changes in Medicare cost sharing is modeled by multiplying his or her current-law Part A and Part B spending each by a scalar value. Each scalar is derived from one of the cubic functions described above and represents the change in a beneficiary's expected spending given his or her effective coinsurance under current law and under a proposed policy. That approach makes the initial design and any subsequent modification of the model considerably less cumbersome, and means the model can quickly produce multiple estimates that are comparable to one another since they are produced using the same data and reflect the same modeling choices. The second advantage is that the treatment of beneficiaries' behavioral response is grounded in empirical evidence since the cubic functions are constructed to reflect the findings of the RAND HIE and CGM.

However, modeling beneficiaries' behavior this way imposes some limitations. First, because the behavioral response in the model is implemented simply by scaling each beneficiary's current-law spending by a multiplier, any beneficiary with zero spending under current law cannot respond to a change in cost sharing. (In 2013, about 15 percent of FFS beneficiaries had zero spending.) To the extent that a reduction in cost sharing would in fact induce some beneficiaries to begin utilizing medical services who otherwise would consume zero, that response will not be captured by the model.<sup>46</sup> Second, the behavioral response in the model allows total spending for medical care to change, but it does not explicitly allow for changes in measures of service utilization, such as the number of days of hospital inpatient or SNF services. In the case of services for which cost-sharing rules under a proposed policy would depend on utilization (as hospital inpatient and SNF services do under current law), the model would calculate cost sharing under the proposed policy using current-law utilization but total spending under the proposed policy, potentially resulting in a biased estimate of the change in Medicare spending. Third, CBO applies the behavioral responses at the level of total Part A spending and total Part B spending, rather than to more disaggregated groups of services. In CBO's view, that approach is appropriate given the current state of the empirical literature because it provides less evidence on people's behavioral responses to changes in cost sharing for specific services than for many services at once.<sup>47</sup> For that reason, the model is best suited to the analysis of policies that would

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<sup>46</sup> The model should, however, capture the aggregate effect on total spending because the spending figures taken from the RAND HIE reflect, in part, the effects of people choosing positive utilization with low cost sharing who otherwise would have chosen zero utilization under higher cost sharing. Consequently, the analysis of aggregate effects is more precise than that of distributional effects.

<sup>47</sup> For example, the behavioral responses to cost sharing observed in the RAND HIE—with plans generally applying the same coinsurance to all covered services—likely reflected a combination of “own-price effects” (changes in spending on a particular service in response to cost sharing for that same service) and “cross-price effects” (changes in spending on a particular service in response to cost sharing for other services). Accordingly, both the RAND HIE and CBO's behavioral modeling can be thought of as reflecting both own-price and cross-price effects.

apply the same cost sharing to broad categories of services, rather than policies that would change cost sharing for more specific services or groups of services. Fourth, the model does not incorporate any change in the beneficiary's plan choice—FFS Medicare or MA—or medigap coverage in response to a proposed policy. That is a limitation of the model because changes in the generosity of medigap insurance, or of FFS Medicare relative to an MA plan, could affect some beneficiaries' enrollment choices. However, some evidence suggests that the decision to enroll in MA is not substantially affected by differences in premiums charged for medigap insurance.<sup>48</sup> Although further study is needed, that finding suggests that enrollment decisions might be less responsive to financial incentives than would otherwise be expected.

A further limitation of the model is the fact that it does not include a Medicare Part D interaction. If, for example, increased beneficiary cost sharing for Part B services reduced physicians' visits, which in turn reduced prescription drug utilization under Medicare Part D, that effect on Part D spending (and any feedback effects on Parts A and B spending) would not be captured by the model.

Estimating beneficiaries' behavioral responses is challenging, and CBO's approach to mapping the "effective coinsurance" calculated in the model to the coinsurance rates in the RAND HIE may have disadvantages. Effective coinsurance rates in the model are essentially calculated as averages, and they are conceptually different from the four nominal coinsurance rates from the RAND HIE, which applied to spending below the catastrophic caps. In fact, the presence of catastrophic caps in the RAND HIE meant that average coinsurance rates were considerably lower than nominal rates. For example, the average coinsurance for enrollees in the 95 percent plan was 31 percent. (That is, aggregate cost sharing for families in that plan was equal to 31 percent of their total medical spending.) In addition to being different from one another, both the effective coinsurance rates calculated in the model and the coinsurance rates in the RAND HIE can be quite different from the marginal out-of-pocket price that people pay for each medical service. For example, an FFS beneficiary without supplemental coverage in mid-2019 who has already incurred \$200 in spending on Part B services faces a 20 percent marginal coinsurance rate because he or she has already met the \$185 Part B deductible. However, according to CBO's model, his or her effective coinsurance would be 94 percent.<sup>49</sup> Similarly, the RAND HIE participants in the 25 percent, 50 percent, and 95 percent plans who reached their catastrophic cap thereafter faced a marginal out-of-pocket price of zero. Because the insurance plans in the RAND HIE included catastrophic caps but not deductibles, whereas FFS Medicare

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<sup>48</sup> See Marika Cabral and Neale Mahoney, "Externalities and Taxation of Supplemental Insurance: A Study of Medicare and Medigap," *American Economic Journal: Applied Economics*, vol. 11, no. 2 (April 2019), pp. 37–73, <http://dx.doi.org/10.1257/app.20160350>.

<sup>49</sup> This is calculated as the beneficiary's TrOOP spending divided by total spending, or  $(\$185 + 20\% \times [\$200 - \$185]) \div \$200 = 94\%$ .

under current law includes a deductible but no caps, the same level of average coinsurance in the two contexts might correspond to very different marginal coinsurance rates.

By estimating the cubic functions differently, CBO could potentially mitigate those problems. More broadly, the model could possibly yield more accurate estimates of beneficiaries' behavioral responses to changes in cost sharing by explicitly incorporating the cost structure facing beneficiaries instead of relying on their total out-of-pocket share of spending. However, it is not clear which alternative approach would yield the "correct" outcome, and alternative specifications are likely to introduce different problems. Because of their coinsurance and copayments, as well as deductibles and out-of-pocket maximums that reset each calendar year, consumers face multiple prices for a given service throughout the year, depending on how much health care they have used or expect to use. As Einav and Finkelstein discuss in their 2018 article, the evidence suggests individuals respond to both the "spot price" of care (that is, the marginal price of the next health care service) and the expected end-of-year price.<sup>50</sup> As a result, they argue, no single measure of price or effective coinsurance fully represents the financial incentives that influence the beneficiary's behavior.

Similarly, the model might yield more precise estimates if CGM's finding of an inpatient spending response to outpatient cost sharing were incorporated directly as a change in Part A spending, rather than indirectly as an attenuated change in Part B spending. As discussed earlier, CBO's approach means that the model can more reliably estimate changes in the sum of Part A and Part B spending than changes in either component individually. Although this simplification may cause the model to over- or underestimate total changes in Medicare spending, depending on cost sharing for Part A versus Part B services under the policy being evaluated, such errors are expected to be small in magnitude. Perhaps a more important implication of this approach relates to the calculation of the model's Part B premium interaction. That interaction reflects the fact that Part B premiums are set to recover approximately one-quarter of total Part B spending, which means that changes in Part B spending caused by changes in cost sharing would also affect the level of offsetting Part B premium receipts. Because this interaction depends on changes in Part B spending only, rather than combined Part A and Part B spending, CBO's approach to modeling CGM's findings most likely results in an understatement of the Part B premium interaction.

The distributional analysis is also subject to additional limitations beyond those that apply to budgetary analysis. One such limitation is that all beneficiaries are presumed to change their

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<sup>50</sup> See Liran Einav and Amy Finkelstein, "Moral Hazard in Health Insurance: What We Know and How We Know It," *Journal of the European Economic Association*, vol. 16, no. 4 (August 2018), pp. 957–982, <http://dx.doi.org/10.1093/jeea/jvy017>.

spending in the same way given the same levels of effective coinsurance under current law and proposed law (in other words, the same Part A and Part B cubic functions are used for all beneficiaries in the model). In fact, the extent to which a person's total medical spending depends on cost sharing might depend on his or her age, resources, access to different kinds of providers, type of supplemental coverage, or health status, among other potentially observable (or imputable) characteristics.<sup>51</sup> The decision not to model heterogeneity in behavioral responses reflects the sample size limitations of the RAND HIE and the fact that CBO's model was designed primarily for budgetary analysis.

## **Budgetary Effects of Proposed Policy Changes**

Having estimated each beneficiary's spending, accounting for behavioral responses, CBO once again estimates total Medicare spending and the beneficiary's cost sharing under a proposed policy. As before, that calculation is done using the cost-sharing rules of the proposed policy, but unlike before, the model applies those rules to the new total spending estimates. The model then calculates the difference between the resulting estimate of Medicare spending under the proposal and the initial estimate of current-law Medicare spending from the base case for each beneficiary and each year of the budget window. The estimate of the change in Medicare FFS spending is calculated as the weighted sum of the difference in Medicare spending for each beneficiary.

In addition to analyzing how policy proposals change Medicare FFS spending, CBO uses its cost-sharing model to estimate their effects on other parts of Medicare and on other federal health care programs. In particular, CBO estimates interactions with MA and Medicare Part B premiums.<sup>52</sup> Changes in FFS spending would affect the MA program because federal payments to MA plans are determined in part by county-level benchmarks, which are based on per capita FFS spending. CBO uses the model output to estimate how the resulting changes in FFS spending would affect spending on the MA program, assuming no change in MA enrollment. In addition, if spending on Medicare Part B services increased or decreased as a result of a policy

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<sup>51</sup> The evidence to date strongly suggests that the effects of cost sharing on people's behavior and outcomes varies by income. As Swartz details in her review, both the RAND HIE and subsequent research have found that low-income people reduce their medical spending more than higher-income people in response to cost sharing, and that such a pattern even holds among people with relatively high income. See Michael Chernew and others, "Effects of Increased Patient Cost Sharing on Socioeconomic Disparities in Health Care," *Journal of General Internal Medicine*, vol. 23, no. 8 (August 2008), pp. 1131–1136, <http://dx.doi.org/10.1007/s11606-008-0614-0>; and Carol Friedman and others, "Association Between Health Insurance Coverage of Office Visit and Cancer Screening Among Women," *Medical Care*, vol. 40, no. 11 (November 2002), pp. 1060–1067, [www.jstor.org/stable/3767820](http://www.jstor.org/stable/3767820).

<sup>52</sup> Changes in Part A spending would also result in changes in Part A premiums. However, because very few people are subject to those premiums, that effect is not included in the model.

change, Part B premiums collected for the program (set to cover about 25 percent of total Part B costs) would, in turn, increase or decrease.

Aside from the interactions between FFS and other parts of Medicare, the model also estimates interactions between FFS Medicare and federal programs that provide supplemental coverage to Medicare beneficiaries. First, the model includes two Medicaid interactions that account for changes in federal Medicaid spending resulting from the fact that Medicaid pays Medicare cost sharing and Part B premiums for certain groups of dual-eligible beneficiaries.<sup>53</sup> To account for the Medicaid cost-sharing interaction, CBO uses the model to calculate the change in total Medicaid program spending resulting from changes in cost sharing (accounting for whether or not the beneficiary's state has a "lesser-of" policy) and then multiplies that quantity by the percentage of Medicaid costs borne by the federal government in each beneficiary's state (known as the Federal Matching Assistance Percentage, or FMAP).<sup>54</sup> Similarly, a policy that results in, for example, higher Medicare Part B spending, and thus higher Part B premiums, would cause Medicaid spending on those premiums to increase. For partial dual-eligible beneficiaries who participate in the Qualified Individuals (QI) program, the entire cost of their Medicare Part B premium is paid by the federal government. For other dual-eligible beneficiaries for whom Medicaid pays the Part B premium, its cost is shared between the federal and state governments according to the FMAP.

Second, interaction effects from enrollees' supplemental FEHB and TRICARE coverage are established separately but in the same manner as the Medicaid cost-sharing interaction. For both of those groups of enrollees, TrOOP spending is zero which means that there is no behavioral response, or change in total spending, when cost sharing changes. If a proposed increase in beneficiary cost sharing shifts costs to supplemental FEHB plans, CBO expects that premiums for FEHB plans would adjust accordingly. Consequently, federal spending on the FEHB program would increase because the federal government pays for most of the cost of FEHB premiums for retired federal employees and their spouses.<sup>55</sup> For enrollees with supplemental TRICARE coverage, all Medicare FFS cost sharing is funded by TRICARE. Accordingly, among

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<sup>53</sup> CBO does not estimate changes in Medicaid spending borne by state governments.

<sup>54</sup> In states with "lesser-of" policies, Medicaid agencies have the option of either covering all of a beneficiary's Medicare cost sharing for each service or paying up to the point at which combined Medicare and Medicaid payments to the provider equal what the provider would receive under Medicaid payment rates.

<sup>55</sup> Federal annuitants enrolled in the FEHB program include people who are enrolled in Medicare and people who are not. CBO anticipates that any changes in costs borne by FEHB plans would be captured in the FEHB premium (distributed across both active and retired workers) as a result of competition between private insurers in the FEHB program. In addition, CBO estimates that about 70 percent of premiums for supplemental FEHB plans are paid by the federal government. The model does not capture the budgetary effect of changes in premiums among active workers and their dependents because that effect is subject to the appropriation process.

beneficiaries with TRICARE, any reductions in FFS Medicare spending would be exactly offset by increases in TRICARE spending, resulting in no changes in federal spending.

Changes to Medicare’s cost-sharing structure also could affect the amount of “allowable bad debt”—debt that remains after a reasonable collection effort and resulting from unpaid deductible and coinsurance amounts for services covered by Medicare. Medicare reimburses hospitals and certain other service providers for 65 percent of their allowable bad debt; however, that effect is not captured in the model. In the case of dual-eligible beneficiaries, allowable bad debt includes any cost-sharing responsibilities that remain unpaid by Medicaid.<sup>56</sup> CBO estimates that Medicare spending on bad debt will be less than 1 percent of total Medicare spending over the 2019–2029 period.

Altogether, the budgetary effect of a policy is equal to its impact on Medicare FFS spending (including the behavioral response) and interactions with MA, Medicare Part B premiums, and other federal health programs. CBO reports that total effect as one number for each year of the budget window and as sums over both 5 and 10 years.

## **Applications of the Model**

CBO’s beneficiary cost-sharing model is designed to analyze the federal budgetary effects of proposals that would alter the cost-sharing structure of FFS Medicare or restrict the generosity of medigap plans. The range of policies that can be examined efficiently using the model is broad, and CBO has used the model on numerous occasions to analyze such policies.<sup>57</sup> In addition, CBO can use the model to gain insight into how those proposals would affect beneficiaries differentially, increasing Medicare spending or cost-sharing responsibilities for some enrollees, decreasing them for others, and resulting in relatively little change for others. As an example, a policy option to establish uniform cost sharing for FFS Medicare is described below.

CBO’s estimates of the budgetary effects of legislative proposals are generally reported by fiscal year.<sup>58</sup> However, the model is organized on a calendar year basis because the MBSF and SAF are available for calendar years and the Part B deductible is based on a calendar year. In addition, Medicare enrollees may choose supplemental insurance coverage for a given calendar year, so

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<sup>56</sup> The Balanced Budget Act of 1997 (Public Law 105–33) provided states the option to pay the lesser of (1) the full Medicare cost-sharing amount or (2) the difference between the Medicaid rate for the service and the Medicare payment. As a result, some state Medicaid programs do not fully cover the cost-sharing obligations of Medicare’s beneficiaries, resulting in bad debt.

<sup>57</sup> For example, see Congressional Budget Office, letter to the Honorable John A. Boehner providing a cost estimate and supplemental analyses for H.R. 2, the Medicare Access and CHIP Reauthorization Act of 2015 (March 25, 2015), [www.cbo.gov/publication/50053](http://www.cbo.gov/publication/50053).

<sup>58</sup> The federal government’s fiscal year begins on October 1 and ends on September 30. A fiscal year is designated by the calendar year in which it ends.

the reporting of distributional effects across enrollees and by source of supplemental coverage lends itself to analysis by calendar year. Unless noted otherwise, all of the estimates reported in this section are on a calendar year basis. For its formal cost estimates, CBO converts its estimates to a fiscal year basis using an approach described below.

### **Specification of Parameters in the Model**

To simulate a variety of policy changes with minimal edits to the model’s underlying computer code, the key policy variables governing beneficiary cost sharing in FFS Medicare—under current law and a proposed policy—are parameterized. Their values are read into the model from a spreadsheet. The simplified setup, which avoids extensive modifications to the underlying code every time the model is run, means that the analysis of policies requires considerably less time and is less susceptible to errors. Although the use of the parameter spreadsheet to model proposed policy changes has clear advantages, the parameter spreadsheet is limited in its ability to model every policy that could be proposed. For example, the spreadsheet allows CBO to model different cost-sharing rules for up to two categories of Part B services, but if the Congress were interested in applying different cost-sharing rules for three or more different types of Part B service simultaneously, that could not be analyzed with the model as written. To perform that analysis, CBO would require the time necessary to modify the parameter spreadsheet and the underlying code. Alternatively, in certain circumstances, CBO can make adjustments outside of the model to account for changes that cannot be analyzed using the model alone.

### **An Illustrative Option: Establish Uniform Cost Sharing for FFS Medicare**

To demonstrate the use of the beneficiary cost-sharing model in CBO’s analyses for the Congress, this section presents the changes in federal spending and distributional effects analyzed in Option 17 in the agency’s 2018 report titled *Options for Reducing the Deficit: 2019 to 2028*.<sup>59</sup> (That report and the analyses below measure changes in federal spending relative to CBO’s April 2018 baseline. Estimates based on updated baseline budget projections could differ.) This paper focuses on one of the alternatives specified in that option, which would replace the separate cost-sharing structures of Medicare Part A and Part B with a unified structure starting in January 2022. Under that unified structure, all spending on Part A and Part B services would be subject to a shared deductible, uniform coinsurance of 20 percent for spending exceeding the deductible each calendar year, and a catastrophic cap. The deductible would be \$750 and the cap would be \$7,500 in 2022, and those amounts would be indexed in subsequent years by the rate of growth of average Medicare FFS spending per enrollee.

Without the model, that change to Medicare’s cost-sharing structure and its impact on Medicare spending would be much more difficult to estimate. The introduction of a combined annual

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<sup>59</sup> See Mandatory Spending—Option 17 in Congressional Budget Office, *Options for Reducing the Deficit: 2019 to 2028* (December 2018), pp. 61–64, [www.cbo.gov/budget-options/2018/54731](http://www.cbo.gov/budget-options/2018/54731).

deductible that would be greater than the Part B deductible and less than the initial Part A copayment for hospital inpatient services would tend to increase cost sharing for the roughly 65 percent of enrollees who have only Part B spending in a given year and decrease cost sharing for the roughly 20 percent of enrollees who have some Part A spending. (About 15 percent of enrollees use no Part A or Part B services in a given year.) The introduction of coinsurance would have little impact on Part B Medicare spending because cost sharing would not change for most services. The impact of the introduction of 20 percent coinsurance on spending for Medicare Part A would depend on how current copayments compare with the proposed coinsurance and whether enrollees would respond by changing their use of Part A services. Overall, a catastrophic cap would increase Medicare spending for both Part A and Part B services by requiring the program to pay the entire cost of care above a cap and possibly by increasing the amount of care enrollees sought that exceeded the cap because they would no longer face costs for additional care.<sup>60</sup> The model allows CBO to analyze methodically the total change in Medicare spending given the multiple spending effects moving in different directions.

**Effects on Federal Spending.** Between January 2022 and December 2028, the option would reduce federal spending by \$46.9 billion (see [Table 5](#)).<sup>61</sup> Spending on FFS Medicare would decrease over that period by \$24.1 billion—spending on Part B would increase under this option but that effect would be more than offset by a decrease in spending on Part A services. The introduction of the combined deductible and coinsurance would decrease Medicare FFS spending for most enrollees but increase it for others, and the introduction of the catastrophic cap would increase Medicare FFS spending for enrollees whose total spending is high enough to exceed the cap. Aggregate Medicare FFS spending would decrease for enrollees who have supplemental coverage through the FEHB program, TRICARE, a nonfederal retiree plan, or a medigap policy (see [Table 6](#)). Those beneficiaries have low average spending, so the effect of higher cost sharing applied to relatively low levels of spending would outweigh the effect of the cap, which relatively few people would meet (see [Table 1](#)). Medicare FFS spending would increase for dual-eligible beneficiaries with cost sharing paid by Medicaid because their total spending is comparatively high, so the effect of the cap would outweigh the increase in cost sharing resulting from the deductible and coinsurance. Medicare FFS spending would also increase for beneficiaries without supplemental coverage, despite their comparatively low

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<sup>60</sup> For enrollees in FFS Medicare who have supplemental coverage, adding a catastrophic cap to Medicare would reduce the costs paid by their supplemental policies, resulting in lower premiums for those policies but little change in enrollees' financial risk. For enrollees without supplemental coverage, establishing a cap would reduce financial risk and decrease out-of-pocket costs once their spending exceeded the cap.

<sup>61</sup> Between fiscal year 2022 and fiscal year 2028, the option would reduce federal spending by \$44.2 billion (see the last row of [Table 5](#)). The total effect of this illustrative option on federal spending in each fiscal year is estimated as a weighted average of the estimated effects by calendar year. For example, fiscal year 2024 will contain the last three months (October through December) of calendar year 2023 along with the first nine months of calendar year 2024. Therefore, the estimate for fiscal year 2024 is  $(0.25) \times (-5.26) + (0.75) \times (-5.65) = -5.55$  (or -5.6 billion as reported in [Table 5](#)).

average spending, because of the modeled behavioral response. Specifically, the introduction of the cap would reduce cost sharing among enrollees with high total spending, resulting in large increases in total spending above the cap (due to the behavioral response), which would be paid entirely by FFS Medicare.

The overall reduction in Medicare FFS spending would reduce other mandatory spending over the same period because of the net effect of four factors, three of which would reduce spending and one of which would increase spending (see [Table 5](#)):

- First, the reduction in Medicare FFS spending would lower the benchmarks used to set payments to MA plans, reducing federal payments to those plans by \$10.7 billion.
- Second, receipts from Part B premiums would increase by \$14.0 billion, partially offsetting the increase in spending on Part B services.
- Third, federal spending on Medicaid for dual-eligible beneficiaries would decrease by \$0.4 billion. Federal Medicaid spending on cost sharing would decrease by \$1.7 billion, but that would be partially offset by a \$1.3 billion increase in spending from higher Part B premiums.
- Fourth, those reductions in spending would be partially offset by increases in federal spending on the FEHB program and TRICARE stemming from increases in cost sharing for Medicare beneficiaries covered by those programs. Changes in cost sharing would affect federal spending on the FEHB program and TRICARE differently than spending on Medicaid because dual-eligible beneficiaries have more spending that exceeds the catastrophic cap.

On net, the interactions between changes in outlays for FFS Medicare and lower federal payments to MA plans, higher Part B premiums, lower federal spending on Medicaid, and higher spending through the FEHB program and TRICARE would decrease other mandatory outlays by \$22.9 billion.

**Effects on Spending by Third-Party Payers and Beneficiaries.** The option would reduce spending by third-party payers on Medicare-covered services by \$14.4 billion—including federal and nonfederal spending—and increase beneficiary TrOOP spending by \$33.4 billion between calendar years 2022 and 2028 (see [Figure 2](#)). Whether the option increases or decreases cost sharing on net for any particular beneficiary depends on his or her Part A and Part B spending under current law. Despite reducing spending by third-party payers in aggregate, the option would actually increase spending by each category of third-party payer except for medigap plans and Medicaid (see [Table 6](#)). Beneficiary TrOOP spending would increase because of higher deductibles for people without first-dollar coverage. For beneficiaries with first-dollar coverage,

the introduction of the cap would represent lower spending for third-party payers but no change in TrOOP spending.

**Distributional Effects by Level of Enrollee Spending.** Those changes in cost sharing would affect enrollees differently, depending on their level of spending under current law (see [Figure 3](#)). Under the option modeled here, in calendar year 2028, FFS Medicare spending is projected to be \$6.6 billion lower under this example than under current law (see [Table 7](#)). The option would also increase total TrOOP spending by \$6.9 billion and reduce spending by third-party payers by \$2.1 billion in that year. Among enrollees in the bottom 90 percent of the distribution of total current-law spending, Medicare spending would decrease by \$30.7 billion, TrOOP spending would increase by \$10.0 billion, and spending by third-party payers would increase by \$14.7 billion. Those patterns are reversed for the enrollees in the highest 10 percent of the spending distribution. For those enrollees, Medicare spending would increase by \$24.1 billion, while TrOOP spending would decrease by \$3.1 billion and spending by third-party payers would decrease by \$16.8 billion.

The different effects of those changes in cost sharing on the bottom 90 percent and the top 10 percent of the total spending distribution reflect the two different components of the option being analyzed and their interaction with the types of supplemental insurance coverage in the two parts of the distribution. In the bottom 90 percent of the distribution, where the majority of beneficiaries have total spending below the specified catastrophic cap, the effect of the proposal is driven by a deductible that is higher than the Part B deductible under current law, which would increase cost sharing and reduce Medicare spending. About 40 percent of the increase in cost sharing would be borne by beneficiaries, and the remaining 60 percent would be borne by third-party payers. Enrollees in the top 10 percent of the spending distribution would be affected by the higher deductible and by the catastrophic cap. However, for that group, the effect of the higher deductible would be overwhelmed by the effect of the cap, which would reduce cost sharing and increase Medicare spending. Altogether, the increase in TrOOP spending among the bottom 90 percent would exceed the decrease in TrOOP spending among the top 10 percent, whereas the decrease in payments by third-party payers among the top 10 percent would exceed the increase among the bottom 90 percent.

## Next Steps

CBO's model has been developed through repeated testing and refinement. The agency plans to continue improving the model in the future. Specific future improvements will depend upon the availability of data, changes to relevant laws or regulations, as well as the details of the policy proposals the agency evaluates. CBO plans to address specific limitations of the current model. For example, CBO plans to update the model's treatment of FFS hospice spending by MA enrollees. Also, the agency plans to update its treatment of beneficiaries who are enrolled in FFS Medicare for part of the year. Lastly, CBO expects to revisit its modeling of the behavioral response to changes in cost sharing to address the limitations discussed earlier.

CBO is also considering incorporating additional data from a variety of sources to refine the model's calibration procedure and its imputation of supplemental coverage. The model's current calibration procedure aligns the base case with CBO's estimates of Medicare FFS enrollment by dual-eligibility status and CBO's estimates of aggregate spending for each of seven service categories. Future iterations of the model are expected to adjust the calibration to also target CBO's baseline projections of the age and sex mix of the Medicare FFS population. CBO will also explore possible refinements to the imputation of supplemental coverage—for example the use of additional administrative data in the MBSF to impute enrollee income, or the use of additional information in the MCBS and CPS to identify people with different types of coverage.

## **Caveats About This Model**

The budgetary estimates produced by the model are subject to uncertainty. One source of uncertainty is the extent to which future changes in enrollment in FFS Medicare and supplemental insurance and spending by category align with CBO's baseline projections. A second source of uncertainty stems from the use of a 5 percent sample of Medicare beneficiaries from 2013, with the sample adjusted to reflect differences in Medicare FFS enrollment and spending in CBO's baseline by category of medical service between 2013 and each year between 2022 and 2028. Patterns of medical spending and utilization among Medicare FFS beneficiaries could differ between 2013 and the 2022–2028 period in important ways in addition to those related to the baseline projections. Another important source of uncertainty is how beneficiaries would change their use of Medicare services in response to changes in cost sharing or limits on medigap insurance. CBO relied on published research to estimate that response, but those research findings can only approximate how Medicare FFS beneficiaries would respond in the future. Another source of uncertainty is how the types of proposals analyzed by the model might affect enrollment in medigap or MA. Although such a response is probable, there is little evidence to inform CBO's analysis. The model does not currently incorporate such responses.

As lawmakers consider the impact of proposals that alter Medicare cost sharing or further limit the generosity of medigap plans, their decisions would most likely depend on factors other than the effects on the federal budget. Those other aspects would probably include the effects of the proposed policy on the following: people's health and their expected future health care costs (for instance, higher cost sharing might deter some enrollees from obtaining necessary care, including preventive care, which could increase the need for more expensive services in the future); the cost of medigap plans; the costs for employers who provide retiree coverage (for example, higher cost sharing would tend to increase costs for employers); and the budgets of state governments (for instance, higher cost sharing would increase federal and state Medicaid spending for dual-eligible beneficiaries). In addition, such proposals would require administrative changes. For instance, administering a new cost-sharing structure could require

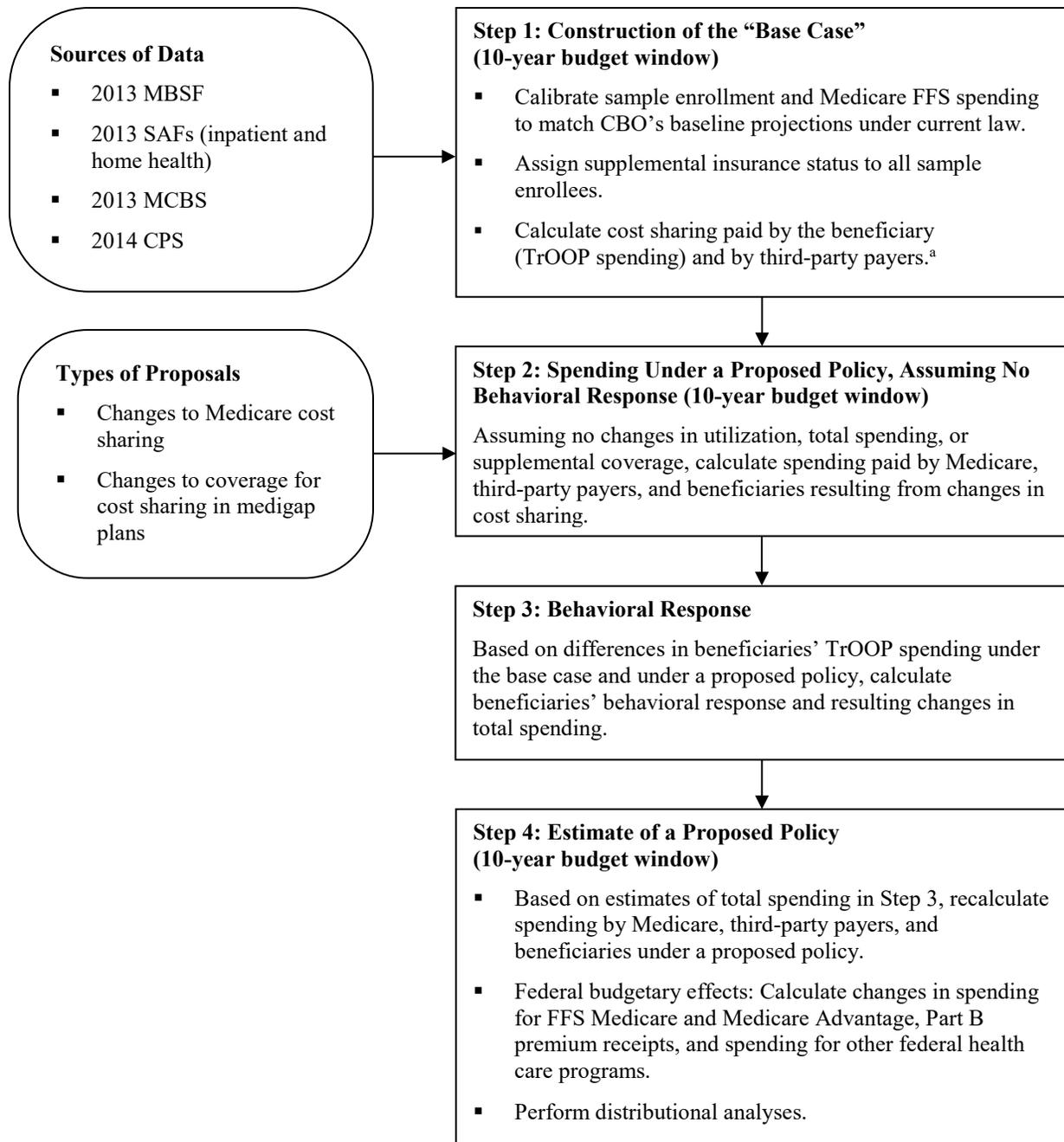
coordination that currently does not exist among the organizations that review and process Medicare claims, insurers that provide supplemental coverage, and Medicare. Such other considerations are beyond the scope of the model, which addresses only the impact of policy proposals on the federal budget.

# Figures

Figure 1.

[\[Return to Text 1, 2\]](#)

## CBO's Beneficiary Cost-Sharing Model: Process for Estimation



Source: Congressional Budget Office.

*(Notes continue)*

*(Continued)*

CPS = Current Population Survey; MBSF = Master Beneficiary Summary File; MCBS = Medicare Current Beneficiary Survey; SAF = Standard Analytic Files.

a. TrOOP spending (an abbreviation for “true out-of-pocket” spending) is the amount of the beneficiary’s responsibility that is paid by the enrollee rather than by third-party payers who provide supplemental insurance. Spending by third-party payers includes federal spending.

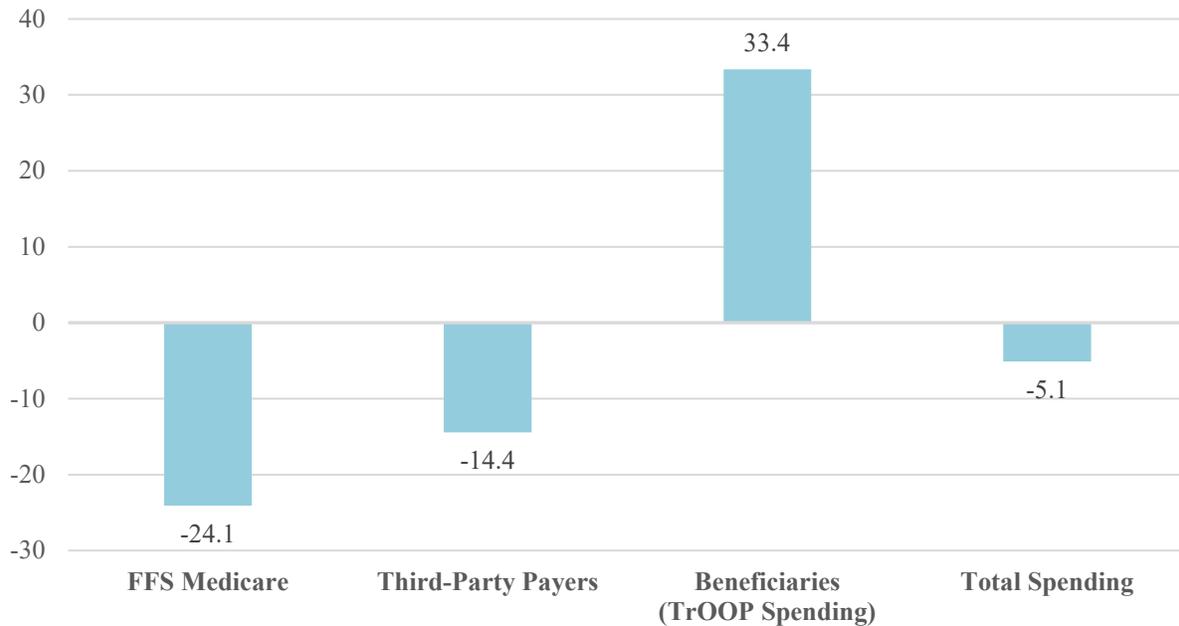
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**Figure 2.**

[\[Return to Text\]](#)

**Projected Change in Spending by Payer Under an Illustrative Option for Changing Medicare Cost Sharing, 2022 to 2028**

Billions of Dollars



Source: Congressional Budget Office.

This illustrative option would replace the separate cost-sharing structures of Medicare Part A and Part B with a unified structure starting in 2022. Under that unified structure, all spending on Part A and Part B services would be subject to a shared deductible, uniform coinsurance of 20 percent for spending exceeding the deductible each calendar year, and a catastrophic cap. The deductible would be \$750 and the cap would be \$7,500 in 2022, and those amounts would be indexed in subsequent years by the rate of growth of average Medicare FFS spending per enrollee.

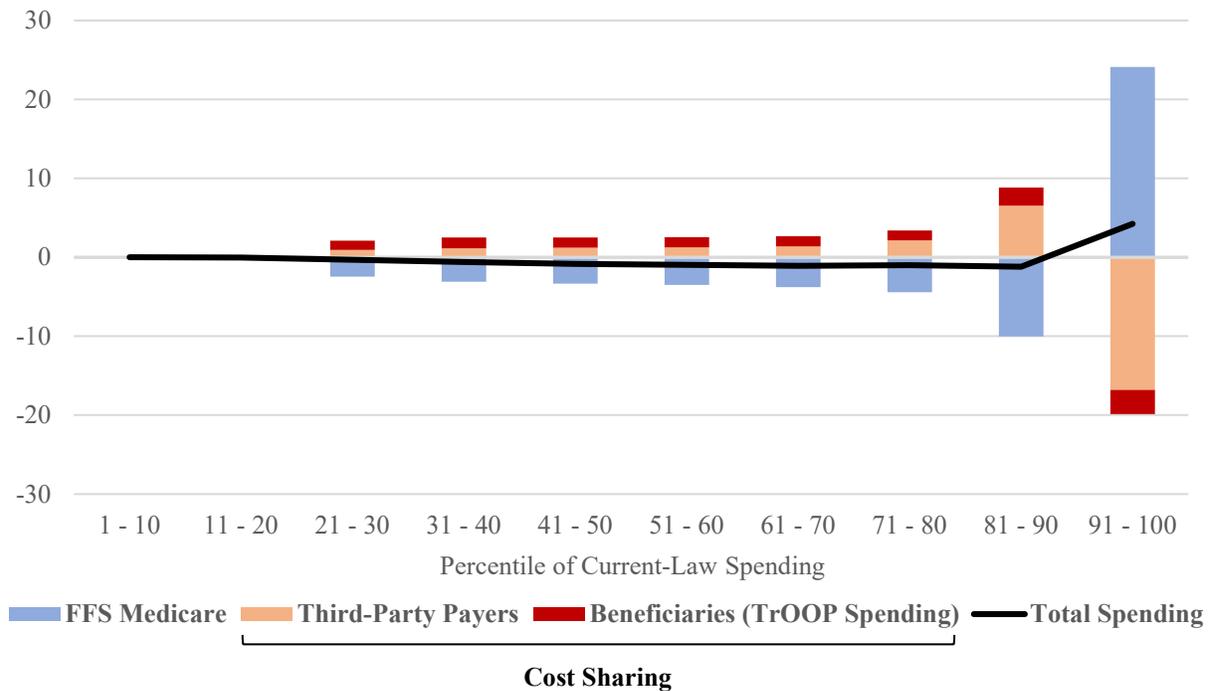
TrOOP spending (an abbreviation for “true out-of-pocket” spending) is the amount of the beneficiary’s responsibility that is paid by the enrollee rather than by third-party payers who provide supplemental insurance. Spending by third-party payers includes federal spending.

**Figure 3.**

[\[Return to Text\]](#)

**Projected Change in Spending by Payer Under an Illustrative Option to Change Medicare Cost Sharing, by Percentile of Total Spending Under Current Law, 2028**

Billions of Dollars



Source: Congressional Budget Office.

The illustrative option would replace the separate cost-sharing structures of Medicare Part A and Part B with a unified structure starting in 2022. Under that unified structure, all spending on Part A and Part B services would be subject to a shared deductible, uniform coinsurance of 20 percent for spending exceeding the deductible each calendar year, and a catastrophic cap. The deductible would be \$750 and the cap would be \$7,500 in 2022, and those amounts would be indexed in subsequent years by the rate of growth of average Medicare FFS spending per enrollee.

Each segment of the bar indicates the projected change in spending by Medicare, third-party payers, and beneficiaries in the indicated percentile range of total spending under current law. For each percentile range, the change in cost sharing equals the sum of changes in spending by third-party payers (who provide supplemental coverage) and beneficiaries. The change in total spending, represented by the black line, is equal to the sum of all three segments.

TrOOP spending (an abbreviation for “true out-of-pocket” spending) is the amount of the beneficiary’s responsibility that is paid by the enrollee rather than by third-party payers who provide supplemental insurance. Spending by third-party payers includes federal spending.

## Tables

**Table 1.**

[\[Return to Text 1, 2, 3, 4, 5\]](#)

**Enrollment and Spending Characteristics of Medicare Fee-for-Service Beneficiaries, by Source of Supplemental Insurance Coverage, 2013**

	Enrollment		Average Spending (Dollars)			
	Millions	Percent	Total	Medicare Payment	Beneficiary Responsibility	TrOOP Spending <sup>a</sup>
<b>Federally Subsidized Coverage</b>						
Medicaid <sup>b</sup>	6	16	18,500	15,900	2,600	0
FEHB Program	1	3	10,500	8,900	1,600	0
TRICARE	1	2	10,500	9,000	1,600	0
<b>Nonfederally Subsidized Coverage</b>						
Retiree	13	33	10,600	9,000	1,600	900
Medigap	9	23	10,400	8,800	1,600	*
Subtotal, Supplemental Coverage	29	78				
<b>No Coverage<sup>c</sup></b>	<b>9</b>	<b>22</b>	<b>9,600</b>	<b>8,200</b>	<b>1,400</b>	<b>1,400</b>
<b>All Beneficiaries</b>	<b>38</b>	<b>100</b>	<b>11,600</b>	<b>9,900</b>	<b>1,700</b>	<b>600</b>

Source: Congressional Budget Office, using data from the microsimulation model.

The sum of the Medicare payment and the beneficiary's responsibility equals total spending. The beneficiary's responsibility is equal to the beneficiary's TrOOP spending plus spending paid by third-party payers (not shown). Average spending is rounded to the nearest \$100.

FEHB is the Federal Employees Health Benefits program; TRICARE is the health care program for uniformed service members, military retirees, and their family members.

\*=between zero and \$50.

*(Notes continue)*

*(Continued)*

- a. TrOOP spending (an abbreviation for “true out-of-pocket” spending) is the amount of the beneficiary’s responsibility that is paid by the enrollee rather than by third-party payers who provide supplemental insurance. Spending by third-party payers includes federal spending.
  - b. Consists of dual-eligible beneficiaries whose cost sharing is paid for by Medicaid—that is, all full dual-eligible beneficiaries, along with partial dual-eligible beneficiaries who participate in the Qualified Medicare Beneficiary program (known as QMB-only beneficiaries).
  - c. This category includes approximately 700,000 dual-eligible beneficiaries whose only Medicaid coverage is through the Specified Low-income Medicare Beneficiary program (known as SLMB-only beneficiaries), the Qualified Individual (QI) program, or the Qualified Disabled and Working Individual (QDWI) program. Those three groups have Medicare premiums paid by Medicaid, but do not qualify for coverage of Medicare cost sharing or other Medicaid benefits.
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Table 2.

[\[Return to Text 1, 2\]](#)
**Model Imputations of True-Out-of-Pocket (TrOOP) Spending, by Type of Supplemental Coverage**

	Beneficiary TrOOP Spending <sup>a</sup>	Payer Responsible for Remaining Beneficiary Cost-Sharing Responsibility
<b>Federally Subsidized Coverage</b>		
Medicaid <sup>b</sup>	None	Federal and state governments
FEHB Program	None	Private FEHB plan, with premiums shared between the beneficiary and the federal government
TRICARE	None	Federal government
<b>Nonfederally Subsidized Coverage</b>		
Retiree <sup>c</sup>	Retiree plan deductible, then 20 percent coinsurance up to catastrophic cap	Private retiree plan
Medigap <sup>d</sup>	<ul style="list-style-type: none"> <li>▪ None (two-thirds of beneficiaries initially enrolled before 2020), or</li> <li>▪ Part B deductible (one-third of beneficiaries initially enrolled before 2020, and all beneficiaries enrolled thereafter)</li> </ul>	Private medigap plan
<b>No Coverage<sup>e</sup></b>	Full beneficiary cost sharing	None

Source: Congressional Budget Office, using data from the microsimulation model.

FEHB is the Federal Employees Health Benefits program; TRICARE is the health care program for uniformed service members, military retirees, and their family members.

a. TrOOP spending (an abbreviation for “true out-of-pocket” spending) is the amount of the beneficiary’s responsibility that is paid by the enrollee rather than by third-party payers who provide supplemental insurance. Spending by third-party payers includes federal spending.

b. Consists of dual-eligible beneficiaries with cost sharing paid for by Medicaid—that is, all full dual-eligible beneficiaries, along with partial dual-eligible beneficiaries who participate in the Qualified Medicare Beneficiary program (known as QMB-only beneficiaries).

c. The levels of the deductible and cap are taken from a 2006 survey of retiree health benefits, which found that the most common deductible was \$300 and the most common catastrophic cap was \$2,000. CBO inflates those levels using its forecast of the consumer price index for all urban consumers. *(Notes continue)*

*(Continued)*

d. In the model, two-thirds of the beneficiaries imputed to have medigap coverage only are randomly assigned a plan with no TrOOP spending. The remaining one-third are assigned to a plan with maximum TrOOP spending set at the Part B deductible.

e. This category includes approximately 700,000 dual-eligible beneficiaries whose only Medicaid coverage is through the Specified Low-income Medicare Beneficiary program (known as SLMB-only beneficiaries), the Qualified Individual (QI) program, or the Qualified Disabled and Working Individual (QDWI) program. Those three groups have Medicare premiums paid by Medicaid but do not qualify for coverage of Medicare cost sharing or other Medicaid benefits.

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**Table 3.**[\[Return to Text 1, 2, 3\]](#)**Mean Spending on Inpatient and Outpatient Services by Coinsurance Level in the RAND Health Insurance Experiment**

	Inpatient Services			Outpatient Services		
	Spending		Spending Relative to the Free Plan	Spending		Spending Relative to the Free Plan
	Mean	S. E.	Percent	Mean	S. E.	Percent
<b>0 (Free plan)</b>	\$409	32.0	100.0	\$340	10.9	100.0
<b>25 Percent</b>	\$373	43.1	91.2	\$260	14.7	76.5
<b>50 Percent</b>	\$450	139.0	110.0	\$224	16.8	65.9
<b>95 Percent</b>	\$315	36.7	77.0	\$203	12.0	59.7

Source: Sample means of spending and their standard errors are taken from Table 2 of Manning and others (1987).<sup>62</sup>

As reported by the original investigators, the sample means reflect average annual per capita spending in June 1984 dollars, and standard errors reflect intrafamily and intertemporal correlations. Outpatient spending excludes dental and outpatient mental health care. Spending relative to the free plan is the level of spending at the specified coinsurance relative to average spending in the free plan.

S. E. = standard error.

<sup>62</sup> See Willard G. Manning and others, "Health Insurance and the Demand for Medical Care: Evidence From a Randomized Experiment," *American Economic Review*, vol. 77, no. 3 (June 1987), pp. 251–277, <http://www.jstor.org/stable/1804094>.

**Table 4.** [\[Return to Text 1, 2, 3, 4, 5, 6, 7\]](#)

**Derivation of Expected Spending Relative to Free Plan, by Service Type and Coinsurance Level**

	<b>RAND HIE Values (Percent)</b>	<b>Adjustment at 50 Percent Coinsurance</b>	<b>Addition of 8 Percent Coinsurance</b>	<b>Addition of Part B Offset</b>	<b>Final Values (Percent)</b>
<b>Inpatient Services</b>					
<b>0 (Free plan)</b>	100.0				100.0
<b>25 Percent</b>	91.2				91.2
<b>50 Percent</b>	110.0	-22.7			87.3
<b>95 Percent</b>	77.0				77.0
<b>Outpatient Services</b>					
<b>0 (Free plan)</b>	100.0				100.0
<b>8 Percent</b>			+86.9	+2.0	88.9
<b>25 Percent</b>	76.5			+3.5	80.0
<b>50 Percent</b>	65.9	+0.7		+5.0	71.6
<b>95 Percent</b>	59.7			+6.0	65.7

Sources: RAND Health Insurance Experiment (HIE) values derived from Table 2 in Manning and others (1987). The remaining columns are CBO’s calculations based on Newhouse (1993) and Chandra, Gruber, and McKnight (2010).<sup>63</sup>

Values in the first column match the columns labeled “Mean Spending” in Table 3 and are reported as average spending for the specified level of coinsurance relative to average spending for the free plan. The three middle columns of the table above show the net effects of the adjustments discussed in the section titled “Modeling Beneficiaries’ Behavior.” The figures in the “Final Values” column are those used to calculate the Part A and Part B cubic behavioral response functions used in the beneficiary cost-sharing model.

<sup>63</sup> See Willard G. Manning and others, “Health Insurance and the Demand for Medical Care: Evidence From a Randomized Experiment,” *American Economic Review*, vol. 77, no. 3 (June 1987), pp. 251–277, <http://www.jstor.org/stable/1804094>; Joseph Newhouse and the Insurance Experiment Group, *Free for All? Lessons From the RAND Health Insurance Experiment* (RAND Corporation, 1993), [www.rand.org/pubs/commercial\\_books/CB199](http://www.rand.org/pubs/commercial_books/CB199); and Amitabh Chandra, Jonathan Gruber, and Robin McKnight, “Patient Cost-Sharing and Hospitalization Offsets in the Elderly,” *American Economic Review*, vol. 100, no. 1 (March 2010), pp. 193–213, <http://dx.doi.org/10.1257/aer.100.1.193>.

Table 5.

[\[Return to Text 1, 2, 3, 4\]](#)

### Estimated Effects on Federal Spending of an Illustrative Option to Change Medicare Cost Sharing, 2022 to 2028

Billions of Dollars

	2022	2023	2024	2025	2026	2027	2028	2022–2028
<b>FFS Medicare</b>	-2.3	-2.6	-2.7	-3.0	-3.2	-3.7	-6.6	-24.1
<b>Interactions</b>								
Medicare Advantage	-1.0	-1.1	-1.1	-1.3	-1.4	-1.7	-3.0	-10.7
Part B Premium <sup>a</sup>	-1.6	-1.8	-2.0	-2.1	-2.2	-2.4	-1.9	-14.0
Medicaid <sup>b</sup>								
Cost Sharing	-0.2	-0.2	-0.3	-0.3	-0.3	-0.3	-0.1	-1.7
Part B Premium	<u>0.1</u>	<u>0.2</u>	<u>0.2</u>	<u>0.2</u>	<u>0.2</u>	<u>0.2</u>	<u>0.2</u>	<u>1.3</u>
Subtotal, Medicaid	-0.1	-0.1	-0.1	-0.1	-0.1	*	*	-0.4
FEHB Program	0.1	0.1	0.2	0.2	0.2	0.2	0.2	1.2
TRICARE	<u>0.1</u>	<u>0.1</u>	<u>0.1</u>	<u>0.1</u>	<u>0.1</u>	<u>0.2</u>	<u>0.2</u>	<u>1.0</u>
Subtotal, Interactions	-2.5	-2.7	-2.9	-3.1	-3.4	-3.8	-4.5	-22.9
<b>Total</b>	<b>-4.8</b>	<b>-5.3</b>	<b>-5.6</b>	<b>-6.1</b>	<b>-6.6</b>	<b>-7.5</b>	<b>-11.0</b>	<b>-46.9</b>
<b>Total (FY)</b>	<b>-3.6</b>	<b>-5.1</b>	<b>-5.6</b>	<b>-6.0</b>	<b>-6.5</b>	<b>-7.2</b>	<b>-10.1</b>	<b>-44.2</b>

Source: Congressional Budget Office, using data from the microsimulation model.

Except where noted, the estimates are reported on a calendar year basis. CBO's estimates of budgetary effects are generally reported by fiscal year.

This illustrative option would replace the separate cost-sharing structures of Medicare Part A and Part B with a unified structure starting in 2022. Under that unified structure, all spending on Part A and Part B services would be subject to a shared deductible, uniform coinsurance of 20 percent for spending exceeding the deductible each calendar year, and a catastrophic cap. The deductible would be \$750 and the cap would be \$7,500 in 2022, and those amounts would be indexed in subsequent years by the rate of growth of average Medicare FFS spending per enrollee.

Positive numbers indicate increases in federal spending on the designated program in the specified year under the option relative to current law, whereas negative numbers indicate reductions in federal spending. Interactions refer to other changes in federal spending that would result from the change in Medicare's cost sharing.

MA is Medicare Advantage; FEHB is the Federal Employees Health Benefits program; TRICARE is the health care program for uniformed service members, military retirees, and their family members.

FY = fiscal year (federal fiscal years begin on October 1 and end on September 30, and are denoted by the calendar year in which they end).

\* = between -\$50 million and \$50 million.

(Notes continue)

*(Continued)*

a. This represents the gross change in Part B premium receipts under the illustrative option and includes Medicaid payments of Part B premiums for dual-eligible beneficiaries. The federal share of those premium payments is included as part of the Medicaid interaction.

b. The Medicaid interaction consists of changes in federal Medicaid spending on Part B premiums (for all full and nearly all partial dual-eligible beneficiaries) and cost sharing (for all full dual-eligible beneficiaries, along with partial dual-eligible beneficiaries who participate in the Qualified Medicare Beneficiary, or QMB, program).

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Table 6.

[\[Return to Text 1, 2\]](#)

**Changes in Spending Under an Illustrative Option to Change Medicare Cost Sharing Relative to Current Law, by Payer and Source of Supplemental Insurance Coverage, 2022 to 2028**

	Medicare FFS Spending		TrOOP Spending <sup>a</sup>		Third-Party-Payer Spending <sup>b</sup>	
	Billions of Dollars	Percent	Billions of Dollars	Percent	Billions of Dollars	Percent
<b>Federally Subsidized Coverage</b>						
Medicaid <sup>c</sup>	12.5	1.3	0	n.a.	-12.5	-8.2
FEHB Program	-1.8	-1.3	0	n.a.	1.8	7.5
TRICARE	-1.0	-1.4	0	n.a.	1.0	7.9
<b>Nonfederally Subsidized Coverage</b>						
Retiree <sup>d</sup>	-14.0	-1.0	8.4	6.6	5.1	4.2
Medigap <sup>e</sup>	-24.5	-2.5	19.3	257.2	-9.8	-5.9
<b>No Coverage<sup>f</sup></b>	<b>4.6</b>	<b>0.5</b>	<b>5.6</b>	<b>3.8</b>	<b>0</b>	<b>n.a.</b>
<b>Total</b>	<b>-24.1</b>	<b>-0.6</b>	<b>33.4</b>	<b>11.7</b>	<b>-14.4</b>	<b>-3.0</b>

Source: Congressional Budget Office, using data from the microsimulation model.

This illustrative option would replace the separate cost-sharing structures of Medicare Part A and Part B with a unified structure starting in 2022. Under that unified structure, all spending on Part A and Part B services would be subject to a shared deductible, uniform coinsurance of 20 percent for spending exceeding the deductible each calendar year, and a catastrophic cap. The deductible would be \$750 and the cap would be \$7,500 in 2022, and those amounts would be indexed in subsequent years by the rate of growth of average Medicare FFS spending per enrollee.

Positive numbers under “Billions of Dollars” indicate increases in spending or cost sharing under the uniform cost-sharing option relative to current law, whereas negative numbers indicate reductions in spending or cost sharing. Reported percentage changes are the corresponding changes in dollars divided by spending under current law.

n.a. = not applicable.

a. TrOOP spending (an abbreviation for “true out-of-pocket” spending) is the amount of the beneficiary’s responsibility that is paid by the enrollee rather than by third-party payers.

b. Third-party payers provide supplemental insurance, and spending by third-party payers includes federal spending.

c. Consists of dual-eligible beneficiaries with cost sharing paid for by Medicaid—that is, all full dual-eligible beneficiaries, along with partial dual-eligible beneficiaries who participate in the Qualified Medicare Beneficiary program (known as QMB-only beneficiaries).

d. The levels of the deductible and cap are taken from a 2006 survey of employer-provided retiree health plans, which found that the most common deductible was \$300 and the most common catastrophic cap was \$2,000. CBO inflates those levels using its forecast of the consumer price index for all urban consumers. *(Notes continue)*

*(Continued)*

e. In the model, two-thirds of the beneficiaries who are imputed to have medigap coverage and are eligible to purchase a plan with first-dollar coverage are randomly assigned such a plan. Those beneficiaries consequently have no TrOOP spending. The remaining beneficiaries with medigap coverage are assigned to a plan with maximum TrOOP spending set at the either the Part B deductible under current law or the combined deductible under the illustrative option.

f. This category includes approximately 700,000 dual-eligible beneficiaries whose only Medicaid coverage is through the Specified Low-income Medicare Beneficiary program (known as SLMB-only beneficiaries), the Qualified Individual (QI) program, or the Qualified Disabled and Working Individual (QDWI) program. Those three groups have Medicare premiums paid by Medicaid but do not qualify for coverage of Medicare cost sharing or other Medicaid benefits.

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**Table 7.**

[\[Return to Text\]](#)

**Estimated Change in Medicare Spending by Payer Under an Illustrative Option to Change Medicare Cost Sharing, by Percentile of Total Spending Under Current Law, 2028**

Billions of Dollars

	<b>Total Spending</b>	=	<b>Medicare FFS Spending</b>	+	<b>Cost Sharing</b>	=	<b>TrOOP Spending<sup>a</sup></b>	+	<b>Third-Party- Payer Spending<sup>b</sup></b>
<b>Bottom 90</b>	-6.0		-30.7		24.7		10.0		14.7
<b>Top 10</b>	4.2		24.1		-19.9		-3.1		-16.8
<b>All</b>	<b>-1.8</b>		<b>-6.6</b>		<b>4.8</b>		<b>6.9</b>		<b>-2.1</b>

Source: Congressional Budget Office, using data from the microsimulation model.

This illustrative option would replace the separate cost-sharing structures of Medicare Part A and Part B with a unified structure starting in 2022. Under that unified structure, all spending on Part A and Part B services would be subject to a shared deductible, uniform coinsurance of 20 percent for spending exceeding the deductible each calendar year, and a catastrophic cap. The deductible would be \$750 and the cap would be \$7,500 in 2022, and those amounts would be indexed in subsequent years by the rate of growth of average Medicare FFS spending per enrollee. Positive numbers indicate increases in spending or cost sharing under the uniform cost-sharing option relative to current law, whereas negative numbers indicate reductions in spending or cost sharing.

The table groups beneficiaries according to their total spending under current law. Beneficiaries in the “Bottom 90” have spending that falls in the bottom 90 percent of the distribution of current-law total spending, and beneficiaries in the “Top 10” have spending that falls in the top 10 percent of the distribution of current-law total spending.

a. TrOOP spending (an abbreviation for “true out-of-pocket” spending) is the amount of the beneficiary’s responsibility that is paid by the enrollee rather than by third-party payers.

b. Third-party payers provide supplemental insurance, and spending by third-party payers includes federal spending.