

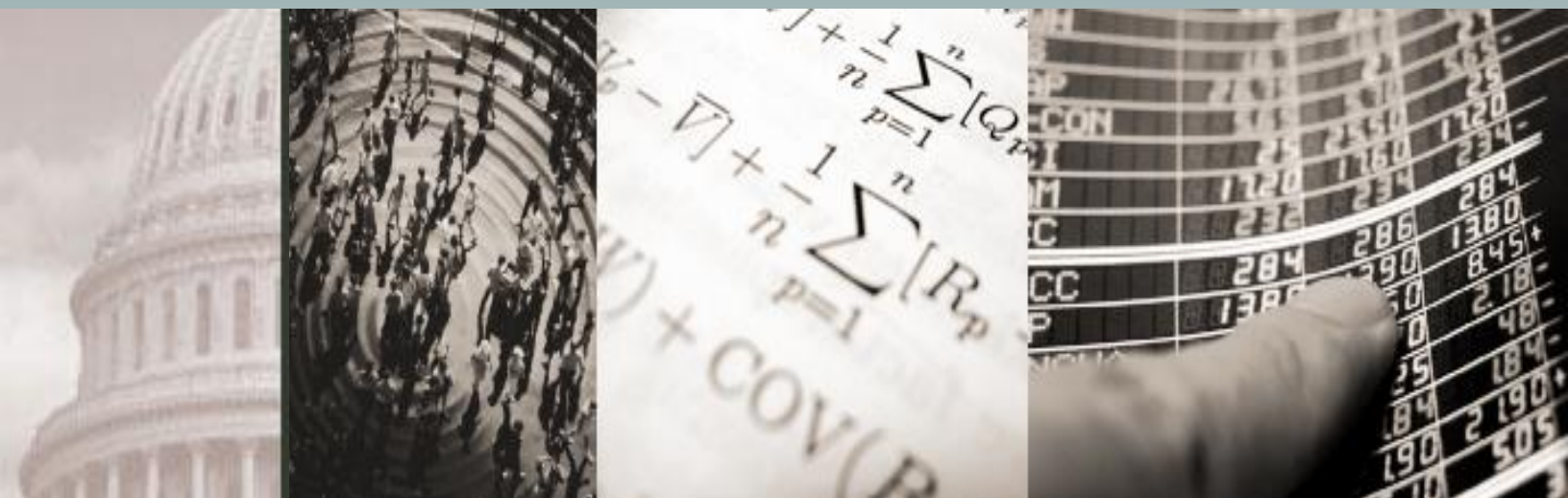
# National Changing Diabetes Program, Federal Scoring Project: Phase I Report

## Federal Health Care Cost Estimating: A Look at Current Practice and the Implications for Assessing Chronic Disease Prevention Proposals - *June 13, 2008*

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## I. Introduction<sup>1</sup>

Americans continue to rank health care as one of their top public policy concerns. They have a strong and understandable desire to see increased access to effective health services, particularly those that can prevent and treat the most dreaded and disabling conditions.

While public officials also want to improve the health care system, they know they must balance this desire against budgetary concerns. Congress and the president are responsible for fiscal and economic policy, including setting levels of taxation. Many public officials view rising government commitments for health care as one of the most, if not *the* most, pressing budgetary issue at the federal level.

There is good reason to view health spending through this kind of budgetary lens. Spending for the two main health entitlement programs -- Medicare and Medicaid -- has increased rapidly nearly every year since these programs were created in 1965. Together, they now account for one out of every four dollars spent by the federal government. As the baby boom generation heads into retirement, enrollment in Medicare and Medicaid will increase dramatically, pushing up spending even more rapidly in the coming decade than in the recent past.

Now, and for the foreseeable future, health care policy and federal budgetary policy are inextricably linked. Major health policy proposals necessarily entail significant decisions about future spending commitments, and budgetary decisions have important implications for the shape and direction of health care policy.

In the context of constrained public resources, efforts to prevent costly chronic conditions would seem to offer potential “win-win” propositions for policymakers: better health for the public and less governmental spending in the future on services for those who otherwise would develop preventable illnesses.

But, even if in theory such investments could be made today, current methods for estimating the cost savings of these investments sometimes impede policymakers’ ability to capture their true value. As a result, policymakers may fail to discern and embrace certain important cost-effective prevention strategies.

We have examined two areas in which current scoring practices may not fully capture the true value of important prevention efforts. First, the conventional time

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<sup>1</sup> The authors would like to thank the National Changing Diabetes Program and Novo Nordisk, Inc. for their financial support of this work. While they provided significant support and assistance, they did not interfere or impose in any way on the scientific or analytic aspects of this work.

frame used to assess budgetary changes is ten years. Therefore, if the benefits of treating preventable chronic conditions occur beyond this time frame, officials would fail to see the full financial returns of an investment in near-term prevention efforts.

Secondly, the primary agencies responsible for making budgetary estimates of health programs typically do not use disease-specific modeling to produce their cost projections. This too may underestimate the full cost reductions associated with effective prevention efforts.

This paper examines current and alternative budget estimating methodologies for health programs with a focus on policies to improve the prevention and treatment of diabetes. First, we describe and assess the current federal budget process and its relationship to the major health care programs. Next, we review the projection methodologies used by the primary agencies responsible for health care budget estimates, with a focus on how these methodologies relate to the incidence and costs of chronic illnesses, especially diabetes. Finally, we provide a disease-specific projection approach in the context of diabetes to demonstrate how alternative modeling might more fully capture the true costs and savings associated with innovative prevention and treatment techniques.

## **II. The Budget Process Context for Cost Estimating**

The Constitution of the United States requires the executive branch and the legislative branch to cooperate and compromise on fiscal issues. It prohibits funds from being spent without an appropriation by Congress, thus providing a key check on excessive executive power.<sup>2</sup> At the same time, it charges the president with executing the law. This effectively puts the president in charge of spending whatever resources Congress appropriates. Moreover, the president is uniquely positioned to propose and establish priorities for the government, as well as to attend to long-term considerations.

As a result of this constitutional framework, federal budget decisions -- particularly large and important ones -- tend to be joint presidential-legislative decisions, with both branches exercising their appropriate roles under the Constitution.

The process for making federal budget decisions and the relationship of the president and Congress in that process have evolved throughout our nation's history, with the most significant changes occurring in the last few decades. Prior to 1969, the president and Congress did not examine the federal budget as a whole. Instead, they examined decisions regarding annual appropriations in a process essentially divorced from discussions regarding taxes and spending on programs that did not require an annual appropriation, such as Social Security.

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<sup>2</sup> The Constitution of the United States (Section 9), Senate Document 109-17, July 2006, p. 8.

In 1965, President Lyndon Johnson's Great Society programs, including Medicare and Medicaid, were added to the Social Security Act, which already was paying benefits for retirement, disability, and spells of unemployment. All of these programs were given permanent spending authority to provide assurance to the public that the benefits would be there for them without the need for annual action by Congress.

As spending on these programs grew, it became clear that the budget process needed to be updated to address the trend towards spending outside of the appropriations process.

President Johnson agreed and established a Commission on Budget Concepts to examine the process and make recommendations to the president and Congress. The Commission's report was influential and formed the basis for today's "unified budget" as a key principle in federal budgeting.

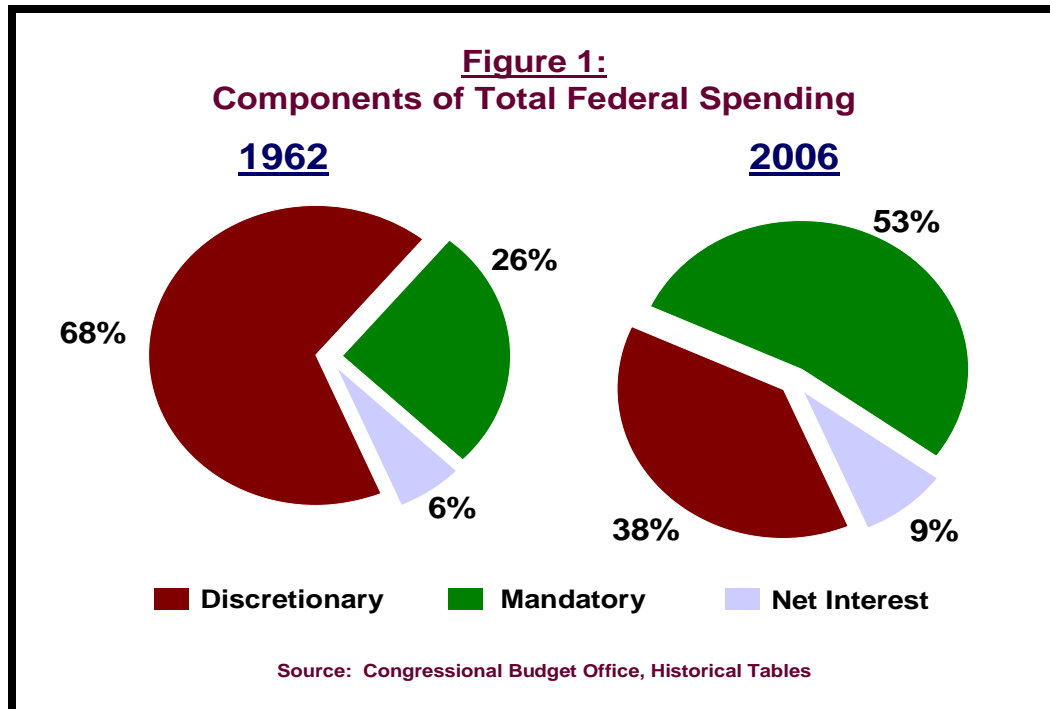
Economists long have argued that the most important measure of the federal government's impact on the national economy is the size of the annual budget deficit or surplus. The Budget Commission strongly agreed and urged a presentation of federal finances that emphasized this perspective. The unified budget allows policymakers to easily ascertain the size of the annual deficit or surplus because all governmental spending and receipts are included within its totals.<sup>3</sup>

The trend towards so-called "mandatory spending" programs -- meaning programs such as Social Security that do not require annual approval by Congress -- began in the 1960's and accelerated dramatically in the years following. As shown in **Figure 1**, in 1962, 26 percent of all federal spending went to these mandatory, or entitlement, programs. By 2006, mandatory spending had jumped to more than one-half of the total federal budget.<sup>4</sup>

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<sup>3</sup> President's Commission on Budget Concepts, *Report of the President's Commission on Budget Concepts* (October 1967).

<sup>4</sup> The Budget and Economic Outlook: Fiscal Years 2008 to 2018, Congressional Budget Office, January 2008, table F-6.



Shortly after the establishment of the unified budget process, a new congressional decision-making process was created, prompted by President Richard Nixon's efforts to withhold funds -- known as "impoundments" -- which Congress already had appropriated and wanted spent. To place limits on what was viewed by many as a power play by President Nixon, Congress passed the Congressional Budget and Impoundment Control Act of 1974. However, the new law went well beyond defining the limits of impoundment authority; it effectively erected a new budget structure for Congress. The law created the Congressional Budget Office (CBO), the House and Senate Budget Committees, and new legislative procedures for passing and enforcing congressional budgetary decisions.

### **Congressional Budgeting: The Budget Resolution and Budget Reconciliation**

Although not well understood at the time, a key feature of the new budget process is the so-called "budget reconciliation," which has played an important role in health legislation over the years.

The Congressional Budget Act set in motion procedures by which Congress would pass a budget resolution, which is the budget blueprint for legislative activity. This blueprint is not a law, but rather an internal congressional resolution that sets in motion procedural requirements intended to force committees in both chambers to meet certain budgetary targets.

In the budget resolution, Congress can choose to provide expedited procedures for certain legislation needed to meet its budgetary goals. Measures considered under these expedited procedures are called "budget reconciliation" bills. While Congress first used these expedited procedures to pass legislation during the

Carter Administration, it was only when the Reagan Administration used it to pass large portions of the president's agenda in 1981 that official Washington awoke to the important implications of the new process. Under normal circumstances, controversial legislation must garner 60 votes to overcome a filibuster in the United States Senate. By contrast, with budget reconciliation, a budgetary law can pass with a simple majority (normally 51 votes).

Since 1981, the budget reconciliation process has been used to pass most (but not all) of the important changes in the Medicare and Medicaid programs. As budget deficits have become a chronic part of government, the budget process has been used repeatedly to reduce Medicare and Medicaid spending.

Congressional budget decisions normally are enforced with procedural points of order that allow individual members of the House or Senate to object to legislation that violates a previously adopted budget decision by Congress. In the House, these points of order typically can be waived through subsequent adoption of overriding rules (with a majority vote); in the Senate, a supermajority of 60 is needed, thus making it more difficult to waive points of order raised on budgetary grounds in that chamber.

Since the budget resolution is not signed into law by the president, he or she may or may not agree with its parameters. Consequently, Congress and the president often are forced into a year-end negotiation over budgetary matters to reconcile their differences. The resulting compromise may in fact violate the budgetary blueprint Congress adopted for itself earlier in the year.

This process of compromise between the Congress and the president is further complicated by the fact that Congress relies on estimates from the Congressional Budget Office (CBO) whereas the president relies on estimates from the Office of Management and Budget (OMB) and the Centers for Medicare and Medicaid Services (CMS).

In 1990, concerns about deficit spending forced Congress and President George H.W. Bush to agree on a bipartisan series of tax increases and spending cuts. To enforce the deal, they also agreed on a new process for enforcing budgetary decisions. "Caps" were placed on annual appropriations spending, and new entitlement spending and tax cuts had to be offset year by year with entitlement spending cuts or tax increases (so-called "pay-as-you-go" or "paygo"). Any spending or tax cutting that violated the paygo procedure would trigger across-the-board spending cuts to enforce the agreement. The OMB administered the automatic spending cut procedures, which the courts ruled were an executive branch function.

In 2002, these automatic enforcement procedures expired. Today, "paygo" is in force, but only as an internal congressional procedure.

## **The Crucial Role of the Estimators in the Legislative Budget Process**

The federal budget process depends heavily on objective assessments of both federal spending and tax receipts under alternative scenarios.

Typically, policymakers want to know two things: what will happen under current law (sometimes called “the baseline”), and what will happen if there were a change in the law.

For many federal programs, cost estimating is a straightforward exercise that requires little substantial programmatic expertise. For instance, an increase in a state block grant from \$2 billion per year to \$2.1 billion is not difficult to estimate.

But for many programs, and in particular health care, cost estimating is anything but straightforward. Medicare and Medicaid have evolved into extremely complex programs, with detailed rules governing benefit entitlement and provider payment systems. Understanding the interaction of policy changes with current practice and altered incentives requires substantial training and expertise. Congressional committee staff or members’ personal staffs generally lack the time or expertise to estimate the effects of legislative proposals; further, they are not seen as unbiased sources.

The importance of nonpartisan cost-estimating cannot be overstated. Members of Congress can raise points of order against “excessive spending” that they believe violates the budget, but they need an outside source to verify such a claim. This is where CBO’s role is both crucial and powerful. As official scorekeeper to the Congress, CBO’s cost estimates frequently can be the difference between speedy passage of a low-cost idea and the shelving of a proposal found to be too expensive to accommodate within budget constraints.

### **III. The Congressional Budget Office**

The Congressional Budget Office is charged by Congress with providing non-partisan research on the costs of proposed and enacted legislation. CBO advises Congress on the implications of different policy approaches for the budget and other important economic indicators. The agency’s role is not to be a policy advisor per se. Indeed, it is standard operating procedure for CBO to state in the preface to its reports that, “In accordance with CBO’s mandate to provide objective, impartial analysis, the study makes no recommendation.”<sup>5</sup>

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<sup>5</sup> See, for example, the preface to Designing a Premium Support System for Medicare, Congressional Budget Office, December 2006.

Both the House and the Senate have standing rules requiring bills reported to the respective chambers to be analyzed for cost implications by CBO.<sup>6</sup> Bills that come to the floor without a cost estimate carry the risk that they can be blocked from passing by individual members of the chambers who raise a point of order in this regard.

Currently, Congress requires cost estimates for bills affecting taxes or mandatory spending to cover a ten-year period.<sup>7</sup> As a result, estimates for legislative changes in Medicare and Medicaid policy are analyzed in the same fashion as farm program amendments, tax policy changes, and changes in unemployment benefits.

In addition to cost estimating, CBO has a staff devoted to providing in-depth and rigorous studies to Congress on a range of subject matters, from the implications of future defense weapons systems to changes in effective marginal tax rates over time. These studies can be highly influential in helping to inform an on-going policy debate. On occasion, these special studies signal how CBO plans to assess the cost implications of potential legislative proposals.

### **Short-Term Health Care Estimating and the Medicare Drug Benefit**

CBO's staff has broad flexibility to use its professional judgment to make assumptions and to structure an analytical approach to estimate health care programs over the ten-year budget window. In general, the staff attempts to assign costs based both on the expected direct implication of a change in policy and on the possible changes in behavior associated with each proposal. For instance, CBO assumes that a legislative proposal to cut Medicare's reimbursement rates for physicians would reduce spending but that reduction would be offset somewhat by a physician-induced increase in the volume of services used by Medicare enrollees. In effect, based on an examination of historical data, CBO assumes that some physicians would see more patients and order more tests if their fees per service were cut. In general, this sort of "volume offset" would reduce the direct savings from such a proposal by an estimated 28 percent.<sup>8</sup>

CBO published two relevant reports on how it planned to, and did, estimate the costs of the new Medicare drug benefit: The first report was released in October 2002, more than a year prior to passage of the drug bill. This study focused heavily on the altered financial incentives for using prescription drugs that would accompany different drug benefit designs.

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<sup>6</sup> *CBO's Role in the Budget Process*. Congressional Budget Office, available online at <http://www.cbo.gov/aboutcbo/budgetprocess.shtml>.

<sup>7</sup> 2 U.S.C. § 602 (Congressional Budget and Impoundment Control Act of 1974), sets the budgetary window at 5 years. 2 U.S.C. § 658 limits the window for which CBO can produce budgetary estimates of the effect of new appropriations at 10 years. U.S. Code available online at <http://uscode.house.gov/search/criteria.shtml>.

<sup>8</sup> "Factors Underlying the Growth in Medicare's Spending for Physician Services," Congressional Budget Office Background Paper, July 2007, p. 4.



As CBO explained:

“To estimate the costs of a proposed Medicare drug benefit, CBO uses a model that simulates how a given proposal would affect the spending of a representative sample of Medicare beneficiaries. The model contains detailed information about beneficiaries’ spending for prescription drugs and Medicare-covered services, their supplemental insurance coverage (both public and private), their health status, and their income.”<sup>9</sup>

CBO argued that the beneficiary participation rate in a voluntary program would depend directly on the portion of the total premium paid for by the federal government. Further, CBO assumed that prices would increase as more patients demanded drugs and that such increases would depend on the fraction of drug spending covered by the benefit. Finally, CBO discounted the drug prices by what it calls a cost management factor. This factor incorporates the savings produced by “price discounts and rebates, utilization controls, and other tools that a pharmacy benefit manager (PBM) might use to hold down spending.” The size of the discount factor, in turn, depends somewhat on the intensity of the competition for enrollees and the amount of insurance risk assumed by drug plans as opposed to the government.<sup>10</sup>

CBO combined this cost-management factor with the price effect and any increased demand<sup>11</sup> in order to determine the total cost of drugs covered by the benefit. It then took into account any marketing costs, which vary year to year; the level of oversight by CMS; and the risk premium factors that exist if private plans assume at least a portion of the cost risk for their enrollees. The risk premium factor can be thought of as the additional resources a plan needs to sustain adequate reserves for unanticipated costs or, similarly, the costs of securing reinsurance from another carrier for unexpected claims.<sup>12</sup>

CBO made it clear to Congress that its cost estimates for a drug benefit would not attempt to model the possible impact such a benefit would have on the overall health of the Medicare population. As explained by CBO:

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<sup>9</sup> Issues in Designing a Prescription Drug Benefit for Medicare, Congressional Budget Office, October 2002, p. 35.

<sup>10</sup> In the current private insurance marketplace, PBMs generally do not take on insurance risk. Rather, they secure discounts from manufacturers and administer the insurance coverage on behalf of a payor, such as an employer or a large insurance company. In the Medicare drug benefit context, the relationship between insurers and PBMs is similar, but CBO’s analysis suggests that the more risk assumed by insurers offering drug coverage, the more pressure there will be on their associated PBMs to secure discounts from product manufacturers.

<sup>11</sup> Induced demand is estimated as a 3 percent increase in demand for drugs for every 10 percent decrease in the amount enrollees must pay out-of-pocket.

<sup>12</sup> See Congressional Budget Office, October 2002, op. cit., pages 35-36, for further discussion of the assumptions underlying CBO’s model.

“The evidence that is available to gauge how access to drug coverage affects health care costs is difficult to interpret. Few research studies address the question directly; rather, they examine the effects of a specific drug or class of drugs on health costs. Only a handful of studies have looked at the impact of drug coverage on health costs, and they have focused only on the most vulnerable and chronically ill subgroups of the population. Taken as a whole, the evidence from those studies is inconclusive. Some recent research suggests that using more and newer drugs may reduce the use of other health care services; but other studies suggest that modest increases in financial access to drugs for elderly patients may not produce such a reduction.”<sup>13</sup>

The second CBO report was released just after enactment of the Medicare Modernization Act of 2003 (MMA) in July 2004.<sup>14</sup> In this study, CBO provided an in-depth review of the estimates used for the MMA. This study was consistent with the methodology described in the 2002 report. Once again, while many of the estimates’ crucial variables were related to altered financial incentives for beneficiaries, insurers, and drug manufacturers, CBO did not incorporate into the estimate any change in health status associated with the benefit.

CBO’s decision to set-aside, for purposes of scoring legislation, any possible clinical interactions between expanded drug coverage and the demand for other Medicare services over time is perhaps best understood as consistent with CBO’s widely-respected culture of caution in the absence of clear empirical evidence. CBO acknowledges in the October 2002 report that some studies do show cost reductions associated with higher prescription drug use. In particular, in the October 2002 publication, CBO reviewed a study by Frank R. Lichtenberg that showed substantial net savings in hospital costs from access to newer medications.<sup>15</sup> But CBO also noted possible problems with the Lichtenberg methodology (it did not account for the costs of adverse drug reactions) and balanced the Lichtenberg findings with less conclusive findings from other researchers.

### **CBO’s Growing Focus on Chronic Conditions and Cost Control Efforts**

CBO produces a large number of academic-style studies looking more deeply into important and complex public policy issues. In these studies, CBO is able to provide additional context for its analytical findings and to explore emerging issues without necessarily offering definitive conclusions or “scoring” guidance to Congress. These studies, therefore, tend to reflect the agency’s early thinking on a subject, in advance of Congress actually considering legislation. Once legislation starts to move in Congress, however, CBO tends to shift gears and

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<sup>13</sup> *Ibid*, 33.

<sup>14</sup> A Detailed Description of CBO’s Cost Estimate for the Medicare Prescription Drug Benefit, Congressional Budget Office, July 2004.

<sup>15</sup> “The Benefits and Costs of Newer Drugs: Evidence from the 1996 Medicare Expenditure Panel Survey, Frank R. Lichtenberg, National Bureau of Economic Research Working Paper No. 8147, 2001.

produce more definitive cost estimates, which, by necessity, are less speculative and more tied to previous agency pronouncements and precedent.

In recent years, CBO's research staff has produced important analytical studies on the emerging issue of chronic disease costs, particularly within the Medicare program. Two studies prepared by CBO on this issue are noteworthy: *High-Cost Medicare Beneficiaries* (May 2005)<sup>16</sup> and *Disease Management in Medicare: Data Analysis and Benefit Design Issues* (September 2002).<sup>17</sup>

In both studies, CBO's goals were to assess which individuals account for the bulk of Medicare spending, to attempt to determine whether these individuals could be identified before they accumulate high costs, and to discuss whether preventive interventions could lower their costs. For these studies, CBO relied on a longitudinal database of claims data maintained by CMS.

CBO used three approaches to identify high-cost beneficiaries: those who were high-cost in the previous year, those who were hospitalized in the previous year, and those who had been diagnosed by their physicians as having two or more chronic diseases for at least one month in the previous year. Each method includes between 17 percent and 22 percent of all beneficiaries, and previous hospitalization was the best predictor of high costs in the current year.

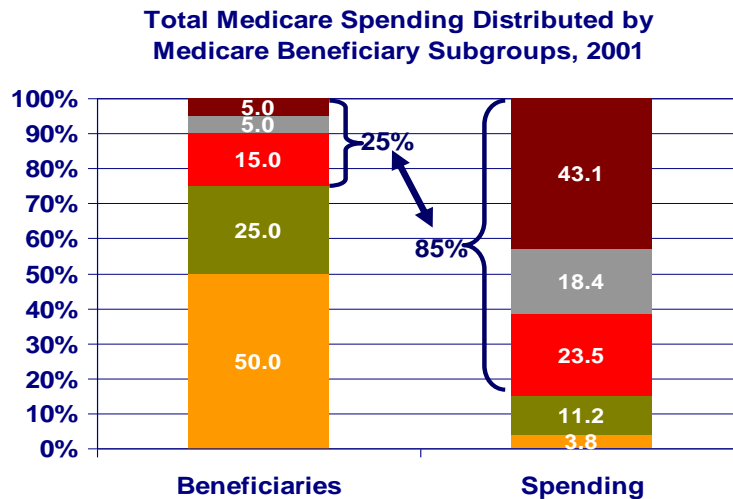
CBO also found that 5 percent of Medicare beneficiaries with the highest cost health care account for 43 percent of Medicare spending (see **Figure 2**). For these beneficiaries, health care spending averaged \$63,000 a year. The bottom 50 percent of beneficiaries accounted for only 4 percent of spending, with an average cost of \$550 per year.

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<sup>16</sup> High-Cost Medicare Beneficiaries, Congressional Budget Office, May 2005.

<sup>17</sup> Disease Management in Medicare: Data Analysis and Benefit Design Issues, Congressional Budget Office, September 2002.

**Figure 2:  
Spending Concentrated on High Cost Enrollees**



Source: High Cost Medicare Beneficiaries, Congressional Budget Office, May 2005, table 1.

CBO also found that high-cost Medicare beneficiaries tend to be older (average age of 74), and that three-quarters of these beneficiaries have a major chronic condition (asthma, chronic obstructive pulmonary disease, chronic renal failure, congestive heart failure, coronary artery disease, diabetes, or senility).

Although high-cost beneficiaries are more likely to have a chronic disease or condition, not all beneficiaries with a chronic condition are high cost. For instance, a number of chronic conditions were found to be highly prevalent among high-cost beneficiaries, and considerably less prevalent among low-cost beneficiaries. However, because the number of low-cost beneficiaries is three times as large as the number of high-cost beneficiaries, large numbers of low-cost beneficiaries have less severe symptoms from several chronic conditions. So, while diabetes is nearly twice as prevalent among high-cost beneficiaries as it is among low-cost ones, the actual number of low-cost beneficiaries with diabetes greatly exceeds the number of high-cost beneficiaries with that condition. This finding will have implications for how CBO assesses the targeting of prevention services on beneficiaries with diabetes.

In its look at disease management in 2002, CBO suggested that because these programs aim to control beneficiaries' diseases in order to prevent events requiring major medical intervention, they have the potential to lower overall costs. According to its study, it is not clear whether the savings are enough to pay for the program itself. (Of course, CBO's assessment in this regard is exclusively from the perspective of the federal budget. The gains from disease management are measured entirely as reduced health care spending by the government on

benefit of beneficiaries. In the private sector, employers looking at investing in disease management can include other factors, such as reduced absenteeism, higher productivity on the job, and improved quality of life for workers.)

Additionally, CBO found that it is difficult to define the cost-savings potential of disease management because the available data is focused more on process and quality measures, not costs. For instance, disease management organizations tend to assess their performance based on the number of patients who receive tests and screenings, visit their doctors, or take medicine regularly. While these are important measures of quality care, they do not capture how much is spent caring for the patients. CBO also noted that assigning cost savings to disease management is difficult 1) because of the long time lag between prevention steps and any potential reduction in health service use, and 2) the difficulty of establishing an appropriate control group against which spending trends can be measured over such time frames. CBO's bottom line in the study was thus to echo an Employee Benefits Research Institute (EBRI) report: the evidence on disease management is inconclusive.

### **CBO's Long-Term Health Projections**

In addition to scoring legislation over a ten-year period, CBO has developed the capacity to make long-term budgetary projections, which have been featured in a series of reports in recent years, including *The Long-Term Outlook for Health Care Spending*, published in November 2007, and *The Long-Term Budget Outlook*, published in December 2007.

These long-term cost projections are not used directly in the congressional budget development or enforcement process; however, they have been cited extensively in CBO testimony and elsewhere in order to better inform policymakers and the public about the dramatic growth in entitlement costs expected in the coming decades, particularly for the Social Security, Medicare, and Medicaid programs.

To make these projections, CBO has developed separate, long-term models for Social Security and health care costs (the Social Security cost model is discussed later in this report).

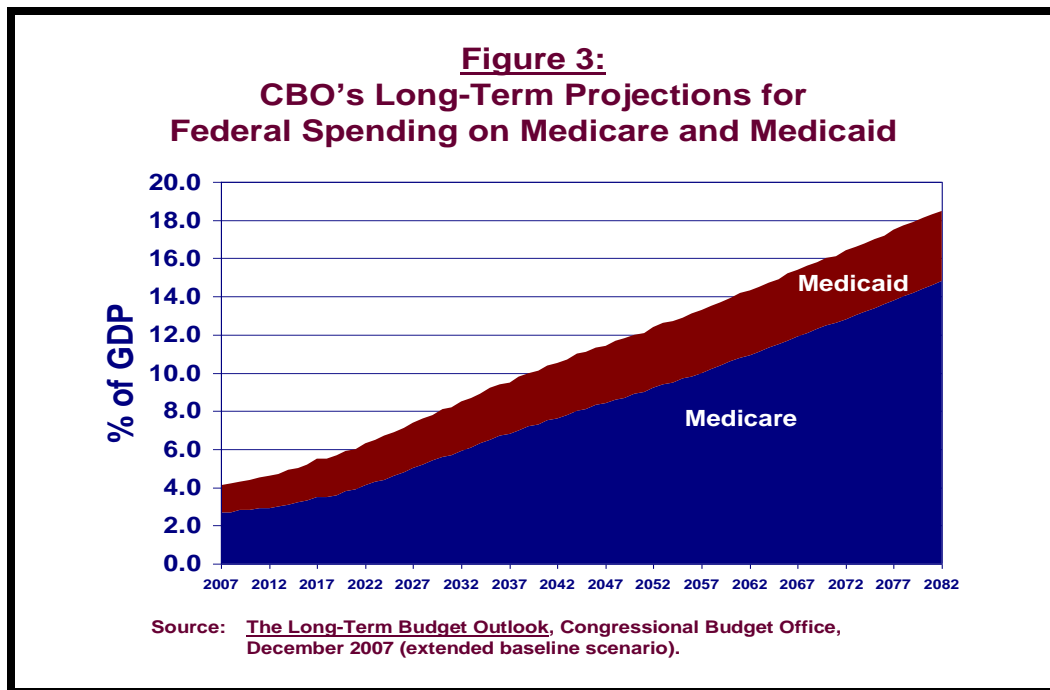
To project health care spending, CBO uses the historical rates of growth observed over the past three decades as the basis for establishing what it expects to see in the future. And, in the past, spending growth for health care has been rapid indeed. Total U.S. health care spending tripled from 1965 to 1985, and again from 1985 to 2005, and real per capita spending on health increased from about \$1,000 to over \$6,000.<sup>18</sup>

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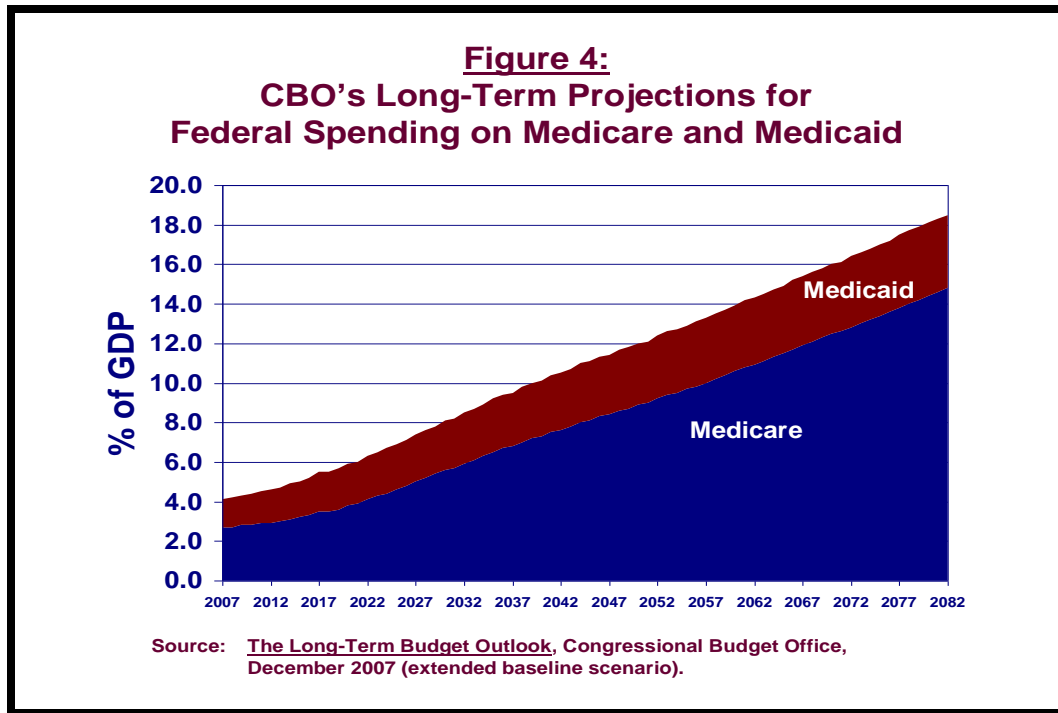
<sup>18</sup> Technological Change and the Growth of Health Care Spending, Congressional Budget Office. January 2008, p. 2-3.

CBO believes that approximately half of this rapid spending growth was due to technological innovation. It attributes the rest to price increases, the aging of the population, expanded insurance arrangements, growth in personal income, and higher administrative costs.

CBO estimates that if health care spending were to continue to grow at the rate it has been growing the past three decades, nationwide spending would exceed the entire GDP for the country in 80 years, which is, of course, not possible. Consequently, CBO assumes instead that private and public participants in health care will have to pursue cost-cutting to slow spending growth below the rates seen in the past. Even so, CBO still foresees dramatic increases in health costs in the future, with total public and private spending on health increasing from 16 percent of GDP today to 25 percent in 2025, 37 percent in 2050, and 49 percent in 2082 (see **Figure 3**).



Federal spending on Medicare and Medicaid, which currently accounts for 4 percent of GDP, is predicted to grow to 7 percent of GDP by 2025, and 19 percent of GDP by 2082 (see **Figure 4**).



### Connecting Long-Term Cost Projections to the Growing Burden of Chronic Diseases

CBO is one of the federal government's most respected analytical institutions, and for good reason. The agency employs a highly professional staff with substantial expertise in health care policy. Its recent health care publications have included many useful insights into the strengths and weaknesses of the current health care system, which have helped inform policymakers of the challenges ahead. CBO's efforts to provide long-term projections of health care costs have been particularly useful -- and eye-opening. CBO Director Peter Orszag and many others have argued persuasively that rising health care costs is the dominant economic challenge facing the country, and they are providing a steady stream of reports to help policymakers understand the challenge.

Moreover, current CBO cost estimating practices with regard to health care are in many respects, the most defensible and understandable, given the history of how Medicare and Medicaid have evolved and the state-of-the-art of modeling and data collection. The health entitlements give beneficiaries a right to a range of services, and Congress must consider what levels of payments will ensure ready access to the care patients have been promised. Consequently, CBO's cost estimating has been built primarily around assessment of the implications of various changes in provider payment structures.

But CBO itself has made it clear that it is open to new thinking and approaches to health care policy analysis. CBO Director Orszag established a health care panel of advisors in 2007 to provide the agency with independent advice on matters

related to health policy and analysis. The panel's membership has a large number of highly respected health economists and experienced modelers.

And, as CBO itself is likely to acknowledge, current estimating practices provide little information on health status or health outcomes, as they stand today or what we might expect in the future under current law. Moreover, with the baby boom generation heading into retirement, experts are expecting a rapid rise in expensive chronic illnesses. Under current practice, information about what options are available to policymakers for dealing with this challenge is not readily available from the usual sources of official government information.

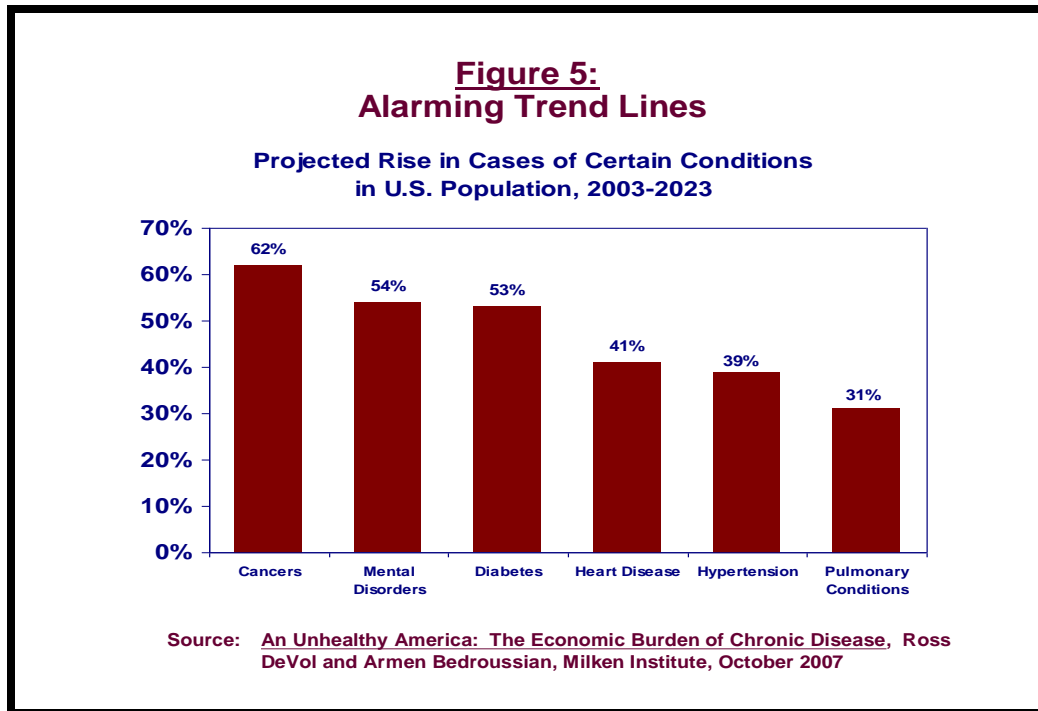
With chronic illnesses on the rise, now is an appropriate time to take stock of current practice and see if it might be augmented with new information. For instance, how many people with diabetes do we expect in 2020? Outside researchers already have begun to ask such questions. One study by researchers affiliated with the Milken Institute found that the number of Americans with diabetes is expected to increase by more than 50 percent between 2003 and 2023. Similarly, estimates show that incidence of cancer is rising by more than 60 percent during this same period (see **Figure 5**).<sup>19</sup> Overall, the prevalence of diagnosed disease is increasing with many more individuals living with multiple chronic conditions. In 1987, patients with 5 or more conditions accounted for 31% of the Medicare beneficiary population; by 2002, they were 50% of the population.<sup>20</sup>

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<sup>19</sup> An Unhealthy America: The Economic Burden of Chronic Disease, Ross DeVol and Armen Bedroussian, Milken Institute, October 2007, pp. 93-126.

<sup>20</sup> Thorpe, K.E. and D.H. Howard. The rise in spending among Medicare beneficiaries: the role of chronic disease prevalence and changes in treatment intensity. *Health Affairs*, 2006. 25 (5): p. 378-388.

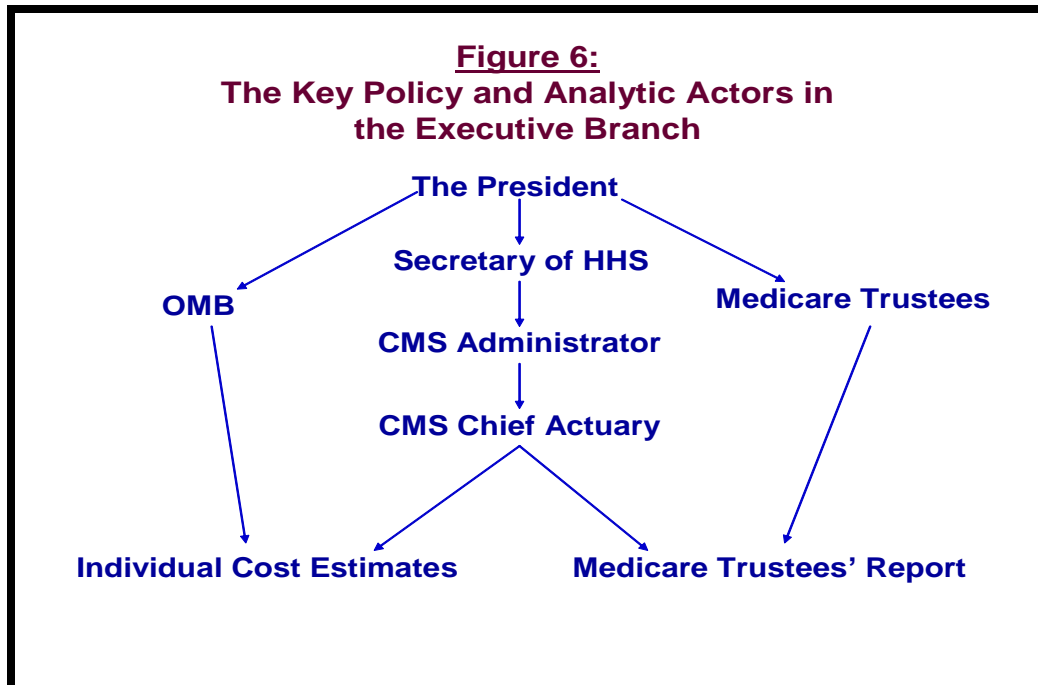




An effort by CBO to provide such estimates of expected disease burden would begin the process of augmenting current budget information with more health-outcome related data. Even if such information is presented initially in a qualified manner, it almost certainly would generate useful debate and follow-on research aimed at refining the estimates with better data and developing policy options aimed at improving the outlook.

#### **IV. The Executive Branch: CMS and OMB**

The picture is somewhat different in the executive branch. While no single organization has total responsibility for scoring changes in health care and health spending, a number of different agencies provide input into the system (see **Figure 6**).



### **Cost-Estimating in Non-Legislative Contexts**

The Centers for Medicare and Medicaid Services (CMS) administers the Medicare and Medicaid programs, a task that entails issuance of a constant stream of administrative decisions. Some of these decisions heavily influence the direction of health care policy for the entire nation because of the size and reach of the public insurance programs. Among other things, CMS has the authority to set payment rates for hospitals and doctors under Medicare, approve or disapprove state applications for innovative Medicaid reforms, and launch experiments to test the efficacy of alternative models for taking care of patients within these programs.

Of course, as with legislative changes, these administrative decisions can have important budgetary implications. As recognition of the cost consequences of these decisions has grown, officials within the executive branch -- particularly those working in the Office of Management and Budget -- have tried to ensure that they are made consistent with the president's budgetary policies. Consequently, most major Medicare or Medicaid regulations, research initiatives, and state waiver applications are now considered only after CMS' Office of the Actuary (OACT) has produced cost estimates for the proposals.

### **CMS's Role**

The Office of the Actuary at CMS has two key responsibilities:

- To estimate the future spending in the long run, e.g., the Medicare Trustees' Reports and

- To estimate the current and future spending of more immediate policy changes proposed by either the president or the Congress, e.g., the Medicare Drug Benefit.

It also has a more limited role in estimating current and future Medicaid and SCHIP spending.<sup>21,22</sup> This work primarily focuses on demonstrations and waiver programs that states wish to explore, but not on the fundamental financing of these programs.

Overall, the budgetary process for making administrative decisions is very different from the legislative budgetary process. For administrative actions, there is far less structure and far more room for policy officials to use discretion and judgment to reach compromises facilitating consensus and smooth program operations.

For instance, CMS frequently is presented with proposals to test new payment approaches for Medicare’s providers. Many of these suggestions are rejected on budgetary grounds, with CMS using cost estimates produced by OACT to show they would not be budget neutral to the federal government. But, from time to time, CMS itself wants to initiate a project to help advance a policy the Administration supports, such as “pay for performance” for physician fees. In these cases, CMS invariably is able to find ways to move forward with the effort, even as budget neutrality is met only after working with the cost estimators to find a satisfactory formula.

Cost estimating for the Medicaid program is made more difficult by the state-by-state nature of the program. Over the years, many states have sought to adopt Medicaid provisions that are outside of the normal programmatic boundaries. In these cases, states are required to submit to CMS applications for “waivers” under section 1115 of the Social Security Act. These waiver applications are supposed to be approved by CMS only if they are “budget neutral,” which means total federal spending is not expected to increase as a result of the alternative program design. But the crucial question, as always, is: what is the baseline against which neutrality is measured?

It is not at all uncommon for CMS to engage in direct discussions with the states on this very question. Typically, the states argue that in the absence of the waiver request, spending would increase at a rate in excess of what CMS officials would like to assume. This higher “baseline” would accommodate more Medicaid spending under the “waiver” than CMS’ assumed baseline would. At some point, usually as a deadline nears, CMS and the states engage in negotiations over the

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<sup>21</sup> State Children’s Health Insurance Program (SCHIP).

<sup>22</sup> The amount of resources within OACT focused on Medicaid and SCHIP is minor compared to the resources devoted to Medicare. This is due, in part, to the major role of the states in the administration of Medicaid and SCHIP, as well as the states’ significant partnership with the federal government in sharing the costs of these two programs.

baseline they will use to assess the waiver request. In most cases, they reach a compromise, especially if both the state and the Administration believe the policy being pursued by the state is worthwhile from a health policy perspective.

### **Annual Trustees' Reports**

Both the Boards of Trustees of the Medicare and of Social Security programs are required to report annually on the current and projected financial status of these programs to the Congress and the American people.<sup>23,24</sup> These reports allow policymakers and the public to judge the future impact of these programs on taxpayers. Unfortunately, no equivalent Medicaid or SCHIP Trustees report is required.

In theory, OACT simply advises the Trustees and carries out its wishes. However, since few of the Trustees have the technical expertise to offer alternative assumptions or estimation techniques, OACT and the Chief Actuary are far more influential throughout the process.

The Board of Trustees is comprised of three cabinet Secretaries – Health and Human Services, Treasury, and Labor. In addition, the Commissioner of the Social Security Administration is a trustee, as well as two outside experts called “Public Trustees.” The Public Trustees tend to be recognized scholars often from academia.<sup>25</sup>

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<sup>23</sup> The Medicare Boards of Trustees were established under the Social Security Act, as amended, to oversee the financial operations of the Medicare trust funds. The boards are composed of the Secretary of the Treasury, the Secretary of Labor, the Secretary of Health and Human Services, the Commissioner of Social Security, and two members of the public who are appointed by the President and confirmed by the Senate. These same Trustees serve on the Board of Trustees for the Social Security trust funds. Many of the demographic and economic assumptions that determine Medicare costs and income are common to the Social Security trust funds.

<sup>24</sup> 42 U.S.C. 1395i requires the Medicare Trustees to submit an annual report on the HI Trust Fund; 42 U.S.C. 1395t requires the Trustees to submit an annual report on the SMI Trust Fund.

<sup>25</sup> Few of the Trustees have the technical expertise to offer alternative assumptions or estimation techniques to those suggested by OACT. The Commissioner of the Social Security Administration and his/her staff typically are focused on the Social Security Trustees report. The two “public trustees” have significant expertise, but limited staff (none provided by the government) and are not actuaries themselves, but often economists. In recent years the Secretary of Labor and her staff have not weighed in heavily on the cost estimating process.

The remaining Secretary of Health and Human Services and the Secretary of the Treasury both tend to delegate their Medicare Trustees' responsibilities to Assistant Secretaries with relevant expertise and staff. At HHS, this often is the Assistant Secretary for Planning and Evaluation (ASPE). This serves two purposes. By delegating to the ASPE, the Administrator of CMS is removed from direct authority. The ASPE has the status of a neutral third party within HHS, but is outside of CMS. In addition, ASPE has the largest technical staff appropriate for the task outside of CMS.

At Treasury, the Secretary typically delegates Medicare Trustees' Report responsibilities to the Assistant Secretary for Economic Policy (ASEP). This parallels the HHS logic given the expertise both of the Assistant Secretary for Economic Policy and his/her staff. The ASEP has to evenly split time and resources between Social Security and Medicare. Social Security often has more assumptions and estimates

### *Modeling in support of the Trustees' Reports*

The modeling done by the Office of the Actuary to support the annual Medicare Trustees' report has a parallel methodology to the modeling done at CBO. No particular diseases or conditions are focused on as primary drivers of Medicare spending now or in the future. The idea of "cost centers" is used to parse Medicare spending into its component parts. Specific estimates of growth rates and other key factors affect those cost centers, for example, inpatient hospital services, physician services, and durable medical equipment.

These component parts of Medicare spending can be thought of as sub-accounts of the Medicare Trust Funds. Like CBO, they are organized by the provider group or covered Medicare benefit responsible for the spending rather than the disease or condition triggering the need for health care services.

Medicare has two Trust Funds, the Hospital Insurance (HI) Trust Fund and the Supplemental Medical Insurance Trust Fund (SMI). The HI Trust Fund finances Part A of Medicare, which covers mostly hospitals but also skilled nursing facilities, hospice care, and some home health. Funding is provided by current payroll taxes using an intergenerational subsidy mechanism that has the current generation of workers pay for the care of their parents' generation, with the promise that their children's generation will pay for them.

Given HI payroll taxes as the dedicated funding source, CMS's modeling is structured around spending on these benefits and on the adequacy of that funding source for the future. In 2007, Medicare had a total of 44.1 million beneficiaries, of which 43.8 million, or 99.3 percent had their services paid out of the HI Trust Fund.<sup>26</sup>

The second Medicare Trust Fund, the SMI Trust Fund, finances all of Parts B and D and some of Part C of Medicare. Part B covers mostly physicians, but also outpatient hospital, medical equipment, and some home health. Seventy-five percent of Part B spending is financed through a direct taxpayer subsidy (general revenues). The remaining 25 percent is financed by premiums paid by Medicare

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pertaining to issues like future economic growth, wage rates, taxes, etc. that are more germane to the Treasury Department's portfolio and expertise.

One factor that limits the input of either the Secretary of HHS or Treasury is the tenure of the actors involved. While the chief actuaries for either Medicare or Social Security tend to hold office for decades, the assistant secretaries at both HHS and Treasury with primary responsibility within their respective departments tend to have tenures closer to 18 months or two years. As a result, the typical assistant secretary has one cycle to learn the process and at most one cycle to question or challenge the status quo in assumptions or estimation techniques.

<sup>26</sup> 2008 Annual Report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds, p. 5. <http://www.cms.hhs.gov/ReportsTrustFunds/downloads/tr2008.pdf>,

beneficiaries. The Part B portion of the SMI Trust Fund covers services for 40.9 million, or 92.7 percent of Medicare beneficiaries.<sup>27</sup>

Part D covers prescription drugs. Although not as fixed in statute as under Part B, roughly 75 percent of Part D spending is financed through a direct taxpayer subsidy (general revenues). The other roughly 25 percent is financed by premiums paid by Medicare beneficiaries.<sup>28</sup> The Part D portion of the SMI Trust Fund covers services for 30.9 million, or 70.1 percent of Medicare beneficiaries.<sup>29</sup>

Part C of Medicare is the Medicare Advantage program, which allows private health insurance plans to compete for Medicare beneficiaries. Because these plans offer benefits from Parts A, B, and D, their government payments are drawn from both the HI and SMI Trust Funds. The government payment is determined in proportion to the relative share of total Medicare spending represented by the two Trust funds.

**Figure 7** shows the latest results of the Trustees' modeling efforts. It shows the 75-year projection and the impacts of a series of events and trends affecting the Medicare program. These would include:

- ◆ The impact of a large increase in enrollees that will begin within the next few years, i.e., the baby boomers. The relatively large number of persons born during the period between the end of World War II and the mid-1960s will reach eligibility age and begin to receive benefits.
- ◆ The average age of Medicare beneficiaries will increase, with these individuals experiencing greater health care utilization and costs, thereby adding further to growth in program expenditures.
- ◆ The upward pressure on spending of new technologies and the Medicare populations' desire to have the latest technology available.

While the Trustees do not provide a breakdown of how much they believe each of these factors adds to the upward pressure on spending, it is clear that these and other factors complicate the accurate modeling of Medicare's financial future.

*Modeling the HI Trust Fund* – Every year the Medicare actuaries follow a series of steps to model the future of the HI Trust Fund (Part A).<sup>30</sup> The major emphasis is directed toward expenditures for fee-for-service inpatient hospital services, which accounted for approximately 35 percent of total Medicare spending in 2007 (see **Figure 8**).<sup>31</sup>

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<sup>27</sup> Ibid, p. 5.

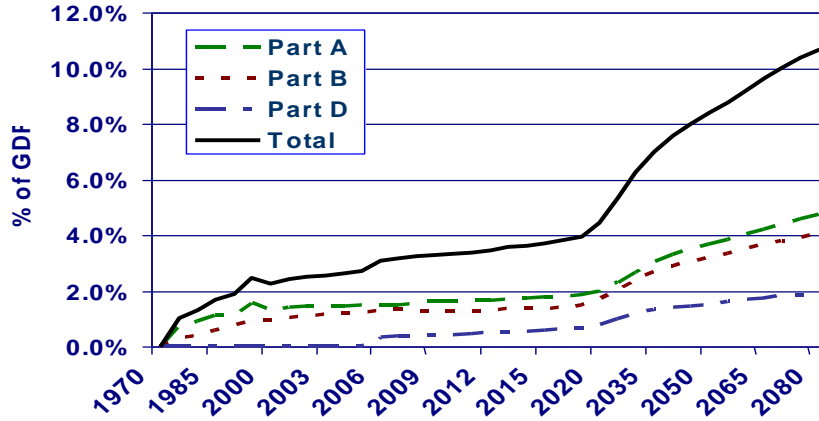
<sup>28</sup> The statute specifies that the base beneficiary premium is equal to 25.5 percent of the sum of the national average monthly bid amount. In 2006, the national average bid was calculated as an unweighted average. Ultimately, it will be a weighted average, using plan enrollments as weights. Ibid, p. 158.

<sup>29</sup> Ibid, p. 5.

<sup>30</sup> Ibid, page 127.

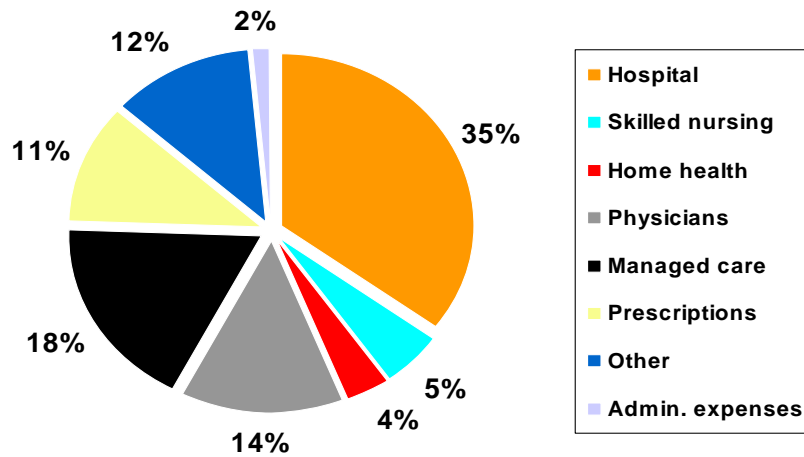
<sup>31</sup> Ibid, p. 5.

**Figure 7:  
Long Term Growth in Medicare Spending  
as a Percent of GDP**



Source: 2008 Annual Report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds, p. 35

**Figure 8:  
Components of Total Medicare Spending -- 2007**



Source: 2008 Annual Trustees' Report, p. 5. <http://www.cms.hhs.gov/ReportsTrustFunds/downloads/tr2008.pdf>

Increases in aggregate payments for inpatient hospital care covered under HI are analyzed in five broad categories: labor factors, non-labor factors, unit input intensity allowance, volume of services, and other sources.<sup>32</sup>

A similar methodology is used to model fee-for-service spending on skilled nursing facilities, home health agencies, and hospice services, with a few modifications.<sup>33</sup>

*Modeling the SMI Trust Fund (Part B)* – The Medicare actuaries follow a series of steps to model the future of the SMI Trust Fund (Parts B&D).<sup>34</sup> The major emphasis is directed toward expenditures for fee-for-service physician spending, the third largest component of total Medicare spending after inpatient hospital services and managed care. Physician spending accounted for approximately 14 percent of total Medicare spending in 2007 (**Figure 8**).<sup>35</sup>

To project Medicare Part B spending, CMS organizes its modeling efforts in line with the payment mechanisms used in the day-to-day operations of the Medicare program. These mechanisms take two forms: services more likely to be provided outside the hospital setting and services more likely to be institutionally-based.

The data are tabulated on an incurred basis. As a check on the validity of the projection base, incurred reimbursement amounts are compared with cash expenditures reported through an independent reporting system.<sup>36</sup>

Physician services are possibly the hardest area of Medicare spending to model reliably. Physician services are the largest payment area in Part B. Medicare payments for physician services are based on a fee schedule, which reflects the relative level of resources required for each service.

While the fee schedule amount has a number of inputs and adjustments, at its foundation, it is based on a calculation of time and intensity of the service being provided. Increases in physician fees are based on growth in the Medicare Economic Index (MEI).<sup>37</sup> In addition, an update adjustment reflecting past growth in the volume and intensity of services is used. Under Medicare law,

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<sup>32</sup> Ibid, p. 128.

<sup>33</sup> Ibid, page 133-136.

<sup>34</sup> The principal steps involved in projecting the future SMI costs related to Part B are: Establishing the present cost of services provided to beneficiaries, by type of service, to serve as a projection base; Projecting increases in SMI payments for physician services; Projecting increases in SMI payments for durable medical equipment; Projecting increases in SMI payments for laboratory services; Projecting increases in SMI payments for outpatient hospital services; Projecting increases in payments to managed care plans; and Projecting increases in administrative costs.

<sup>35</sup> Op. Cit., “2008 Annual Trustees” Report, p. 5. <http://www.cms.hhs.gov/ReportsTrustFunds/downloads/tr2008.pdf>.

<sup>36</sup> Op. Cit., 2008 Annual Report of the Boards of Trustees..., page 142.

<sup>37</sup> The MEI is a measure of inflation in physician practice costs and general wage levels.



growth in physician services must meet specified targets under the sustainable growth rate mechanism.<sup>38</sup>

As with physician services, fee schedules and other reimbursement mechanisms have been established over time for virtually all non-physician services. These include durable medical equipment (DME) and laboratory services. The fee schedules for each of these expenditure categories are updated by increases in the CPI, together with any applicable legislated limits on payment updates.

Per capita charges for these expenditure categories have grown as a result of a number of other factors, including the increased number of services provided, the aging of the Medicare population, more expensive services, and certain administrative actions. This growth is projected based on recent past trends in growth per enrollee.<sup>39</sup>

#### *Modeling the SMI Trust Fund (Part D) --*

Part D first was implemented in 2006 and therefore lacks the decade of spending trend data available to model the other parts of Medicare. For both 2006 and 2007, CMS modeled Medicare Part D differently than the other parts of Medicare. The 2008 Trustees Report is the first time that actual Part D spending information is available for analysis. Part D spending accounted for approximately 11 percent of total Medicare spending in 2007 (**Figure 8**).<sup>40</sup>

Rather than developing sub-estimates based on the provider or service covered, the modeling of Medicare Part D is based on estimates of the subpopulations of enrolled beneficiaries. This was done for two reasons. First, since all of Part D benefits are offered by private insurers, the government payments are based on a statutorily defined government contribution formula rather than on services used. The spending mechanism in Part D is closer to the spending mechanism for Part C, the Medicare Advantage program. Second, the different sub-populations are

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<sup>38</sup> The sustainable growth rate (SGR) system links total spending for physician services to the growth of the U.S. economy. The growth of the economy, measured as Gross Domestic Product (GDP), is used as a proxy for the growth in tax revenues to the federal government. The policy logic was that spending for physician services would grow no faster than the government's ability to pay for those services. This is done by setting the annual update (change in unit payment for the year) for physician services. The SGR is based on changes in: the number of beneficiaries in the Medicare fee-for-service program, input prices, law, regulation and the GDP. The basic SGR mechanism is to compare actual spending to target spending and adjust the update when there is a mismatch. In recent years, Congress has overridden the SGR when the SGR mechanism indicated that physician payments should be cut to slow to the same rate as GDP. This congressional action has made CMS modeling on physician payments very difficult and unrealistic. Congress never comes up with new money to offset the blocked cuts. It just moves the payment cuts farther back in time, which results in the later year cuts being much larger and much less realistic.

<sup>39</sup> Op. Cit., 2008 Annual Report of the Boards of Trustees..., page 145.

<sup>40</sup> Ibid, p. 5.

subsidized at different levels thereby making total government spending fairly dependent on the distribution between the different sub-populations.<sup>41</sup>

In addition, after two years of actual spending data CMS's Part D modeling is willing to assume that private prescription drug plans can negotiate significant retail price discounts and manufacturer rebates as well as manage drug utilization. It also assumes that given the amount of negotiation, utilization review, etc., these plans incur administrative costs for plan operation and earn profits. However, since drug expenses are expected to grow faster than administrative costs, the administrative expenses as a percentage of benefit and costs slowly decrease over time.

#### *Modeling Medicare Part C –*

Part C of Medicare has been discussed only briefly up to this point. CMS places less effort into modeling Part C spending than on other parts of Medicare because Part C spending is a function of the other three parts of the program. Modeling Part C involves estimating the mix of Medicare services/benefits that will be used over time and parsing out the percentage of beneficiaries likely to enroll in Part C.

The CMS actuaries have been much more pessimistic than the CBO economists about the likelihood that competition between plans will result in lower spending. They tend not to make significant modifications in their assumptions about how the public versus private sides of Medicare will behave. This difference in assumptions about the effect of market competition in holding down spending was one of the key differences between the Part D estimates for CMS and those from CBO.

CMS's professional pessimism can serve it well in when the supporters of change are unrealistically optimistic about the impact of the provision. But caution can be taken too far as well. Medicare's cost for Part D are now estimated at \$243.7 billion over the ten-year period (2004-2013), about half the original CMS estimate over the same time period.<sup>42</sup>

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<sup>41</sup> Part D beneficiaries have five key subpopulations: 1) Beneficiaries with an employer subsidy; 2) Medicaid beneficiaries fully eligible for both Medicare and Medicaid; 3) Low-income beneficiaries (non-Medicaid) receiving a full subsidy; 4) Low-income beneficiaries (non-Medicaid) receiving a partial subsidy; and 5) All other Part D beneficiaries.

<sup>42</sup> "Medicare Prescription Drug Benefit's Projected Costs Continue To Drop Part D Attracts New Beneficiaries and Achieves High Rates Of Satisfaction," Thursday, January 31, 2008. CMS Office of Public Affairs. 202-690-6145. Statement of Rick Foster, Chief Actuary, Centers for Medicare and Medicaid Services, Testimony Before the House Committee on Ways and Means, March 24, 2004.

### *Modeling Medicare's End-Stage Renal Disease (ESRD) Program –*

Given the unique nature of both the population and the required services, the modeling of future spending for ESRD is handled differently than for the other parts of the Medicare program. More than 38 percent of the ESRD sub-population has diabetes and diabetic ESRD patients are 25.1 percent more expensive to treat than non-diabetic ESRD patients.<sup>43</sup> While in other parts of Medicare the actuaries tend to break-out aged beneficiaries from disabled beneficiaries and model them separately, this is not the case with ESRD. Whether disabled or aged, ESRD beneficiaries have much more in common with one another than with the rest of the Medicare population. ESRD per enrollee costs are both higher and different in nature than those of most other disabled or elderly Medicare beneficiaries. Specifically, most of the Part B reimbursements for these persons are for kidney transplants and renal dialysis.

Directly relevant to the main focus of this study, CMS assumes a continued increase in ESRD enrollment. The underlying process used to develop those assumptions could be enhanced greatly by better modeling of: 1) the incidence and severity of diabetes, and 2) the effects of prevention programs and changes in treatment patterns. For example, given that people with diabetes are one of the larger and more expensive sub-populations of ESRD patients, a better understanding and modeling of the onset of the complications of diabetes -- particularly kidney disease -- would improve estimates of both the future size and spending of the ESRD population.

### *Long-Range Medicare Cost Growth Assumptions*

Thus far, the modeling and projections discussed are used typically for the first ten years of the projection period. In many ways this is similar to CBO's 10-year budget window. However, the Board of Trustees is required to make a 75-year estimate of the financial viability of the Medicare program.

The CMS actuaries first model Medicare growth between the 11<sup>th</sup> and 24<sup>th</sup> year. Making projections farther and farther into the future is plagued by the lack of certainty and reliability in both data and modeling. Much of the methodology for CMS's longer term projections is based on the goal of not overstating the accuracy of the estimates.

As the projection horizon lengthens, it becomes increasingly difficult to anticipate changes in the delivery of health care, the development of new medical technologies, and other factors that will affect future health care cost increases. To deal with this uncertainty, Medicare "mid-term" projections for years 11 through

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<sup>43</sup> "2007 Annual Data Report," United States Renal Data System. <http://www.usrds.org/adr.htm>. Page 89. Authors' calculation of the weighted average between the three ESRD categories.

24 are made in aggregate for each of HI, SMI Part B, and SMI Part D, rather than preparing for each individual category of service.<sup>44</sup>

The actuaries' modeling of Medicare growth between the 25<sup>th</sup> and 75<sup>th</sup> year, the end of the projection period, is even less specific. These "long-term" projections of Medicare expenditures are assumed to increase at the same rate. The demographic adjustments are made later, e.g., effect of the retirement of the "baby boom" generation. Again, the Board of Trustees and the actuaries preparing these estimates have judged that it would be misleading to imply a higher level of accuracy than is warranted either by the rigor of the data or the sophistication of the modeling.

Recently, CMS has been looking to improve the current modeling and introduced a new modeling methodology in the 2006 report.<sup>45</sup> The model is based on a computable general equilibrium (CGE) methodology, which uses actual economic data to estimate how an economy (or in this case the Medicare program) might react to changes in policy, technology, or other external factors. CGE models also are referred to as AGE (applied general equilibrium) models.

CMS' CGE uses a variable to represent demand for medical care at the national level. While it does not directly project Medicare spending, it provides a refinement of the long-range growth assumptions. It also provides a smoother and more realistic transition from current Medicare cost growth rates, which have been significantly above the level of GDP growth, to the ultimate assumed level of GDP plus zero percent for the indefinite future.

This final assumption is one of the more controversial assumptions in the Trustees' Report, since health care spending growing at GDP has rarely been experienced in the American health care system.

The model also has assumptions about (i) continuing improvements in medical technology, (ii) the extent to which new medical technology either increases health care costs or reduces them, and (iii) society's relative preference for improved health versus consumption of other goods and services.<sup>46</sup>

At the current time this new methodology is used to refine and "smooth" the projections. It has not replaced the traditional methodology. Still, it is encouraging that the actuaries continue to look for new and better ways to model the Medicare program.

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<sup>44</sup> Op. Cit., 2008 Annual Report of the Boards of Trustees..., page 166.

<sup>45</sup> <http://www.cms.hhs.gov/ReportsTrustFunds/downloads/tr2006.pdf>, 2006 Annual Report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds. page 160.

<sup>46</sup> Op. Cit., 2008 Annual Report of the Boards of Trustees..., page 167.

## CMS's Modeling of Specific Proposals

The second major area of CMS modeling is related to specific legislative and administrative proposals. The contrast is striking between CMS modeling for the annual Trustees' reports and its modeling of specific administrative and legislative proposals. While the methodologies are similar, the transparency of the process is not. The Trustees' reports are somewhat arcane, but well-documented with long technical appendices about assumptions and techniques.

By contrast, while discussions of the modeling of specific proposals sometimes appear in congressional testimony or as part of a regulatory decision-making notice in the Federal Register, they lack the detailed discussion of methodology that accompanies the Trustees' report. Approximately every four years, an outside technical advisory panel comprised of senior actuaries and economists reviews the methodology used for the Trustees' reports and makes recommendations (although it does not review specific administrative and legislative proposals).<sup>47</sup>

The second exception to the typical lack of transparency involved the Part D modeling and the 2004 Technical Advisory Panel. In this case, Chief Actuary of CMS Richard Foster specifically asked the panel to review the estimates. While it made some recommendations for change, e.g., a lowering of the assumed participation rates, it found overall that the methodology was sound.<sup>48</sup>

The significant transparency of the Trustees' methodology provides important information on how the modeling of specific proposals is performed. It indicates that CMS does not make significant shifts in modeling methodologies as it moves from Trustees' estimates to estimates of specific proposals. For example, CMS provided estimates of Medicare's spending on beneficiaries with diabetes over time (see **Figure 9**).

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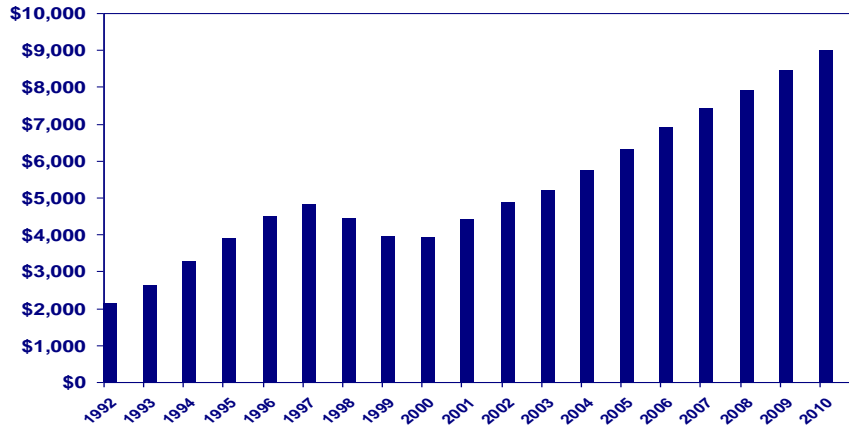
<sup>47</sup> The exception to this pattern is the modeling that CMS provided during the debate over the Part D drug benefit. Given the controversy surrounding that piece of legislation in general and the difference in estimates between CMS and CBO in particular, significantly more attention was focused on CMS estimates. Still, the public documentation of the Part D estimate(s) is far less than typical for the Trustees' reports. It originally was limited to written testimony by Chief Actuary Richard Foster in which he explained, after passage of the bill, the differences between his office's estimates and the CBO estimates. Now that Part D is part of the Medicare program and is included in the modeling for the Trustees' reports, significantly more transparency exists.

<http://waysandmeans.house.gov/hearings.asp?formmode=view&id=1303>.

<sup>48</sup> "Review of the Assumptions and Methods of the Medicare Trustees' Financial Projections," December 2004, Prepared by: 2004 Technical Review Panel on the Medicare Trustees Report.

<http://www.aspe.hhs.gov/health/medpanel/>.

**Figure 9:  
Medicare Spending for Beneficiaries with Diabetes  
(in millions)**



**Source: Office of the Actuary, CMS/HHS. February 6, 2008. Based on the FY 2009 President's Budget projections.**

*Limitations of CMS's current system –*

The very attributes that make CMS's current system effective at some tasks make it less than effective at others. CMS primarily is geared to produce annual Trustee Reports that focus on specific trust funds, i.e., HI and SMI, and on specific sub-accounts of those trust funds, e.g., private plans and ESRD. CMS views the financial dynamics of Medicare as being driven by the sources of payment into the system and the entities that must be paid by the system. Its task is to estimate the actuarial balance of Medicare.

However, in the coming decades, Medicare and other insurance programs will face certain epidemiological forces that will tax their fundamental financial viability. To anticipate, prepare for, and possibly prevent these changes, the traditional conceptual framework will need to be retooled. The current forms of modeling will need to be enhanced to account for these epidemiological trends and the way in which these trends can be affected by advancements in prevention and treatment. Diabetes is a prime example of a chronic condition that will have future costs to Medicare that will heavily influenced by epidemiological trends and population dynamics.

Also, as discussed above, CMS would be better served and produce more accurate estimates if the professional pessimism could be curbed somewhat. The goal of any modeling organization is to produce the most accurate estimates possible.

The estimators at CBO also overestimated the cost of Part D, but not by as much as CMS did. Overall, the economists at CBO were optimistic about the effects of competition and price sensitivity on keeping spending down. CBO assumptions about competition among plans and Medicare beneficiaries' sensitivity to the drug prices generated a more accurate estimate of Part D costs. A mix of perspectives from different disciplines could improve the quality of both CMS and CBO modeling: The economists' perspective would have improved CMS' model of a new competition-based drug benefit; the actuaries' perspective can improve CBO modeling in areas such as benefit design; and the epidemiologists' perspective could help both CMS and CBO model Medicare spending better by more carefully examining the impact of a handful of major chronic illnesses and their co-morbidities.

### **Missed Opportunity: Improved Modeling of the Medicaid and SCHIP Programs**

The amount of resources within OACT focused on Medicaid and SCHIP is minor compared to the resources devoted to Medicare. This is due, in part, to the major role of the states in the administration of Medicaid and SCHIP, as well as the states' significant partnership with the federal government in sharing the costs of these two programs. However, Medicaid currently provides insurance to more people than Medicare, roughly 52 million in Medicaid and 44 million in Medicare.<sup>49</sup> Medicare still spends more \$401 billion in 2006, compared to \$309 billion for Medicaid. It's important to keep in mind that while Medicaid and SCHIP are state administered over 60 percent of the spending is federally funded.

The annual report of the Medicare Trustees provides policymakers and the public with the best estimates of the financial viability of the Medicare program. Unfortunately, no equivalent Medicaid or SCHIP report exists to provide estimates of the financial viability of Medicaid and SCHIP. This is a significant missed opportunity.

### **Missed Opportunity: Improved Modeling of the End-Stage Renal Disease Program**

Diabetes is a major cause of ESRD and by law Medicare covers 100 percent of the ESRD population. More accurate modeling of the incidence of diabetes and the disease progression from diabetes to ESRD is essential to giving policymakers the most accurate information possible on the future of the ESRD program and the costs associated with ESRD.

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<sup>49</sup> Trends and Indicators in the Changing Health Care Marketplace. Exhibit 1.14: Medicaid Enrollees and Expenditures on Benefits, by Eligibility Category, 2003. Kaiser Family Foundation. <http://www.kff.org/insurance/7031/print-sec1.cfm>. Op. Cit., 2008 Annual Report of the Boards of Trustees..., page 2.

CMS's considerable interest in accurately modeling future ESRD spending presents a potential opportunity to provide additional analysis that could be of great help to CMS efforts in this area. Nearly 40 percent of the ESRD population has diabetes. Given the current trends in Type II diabetes, this percentage is likely to increase.

Compounding the importance of diabetes to ESRD modeling, the costs for ESRD patients with diabetes are higher than other ESRD patients. In 2005, ESRD patients with diabetes were 25.1 percent more expensive than non-diabetic patients.<sup>50</sup> Better modeling of the progression of the disease and the steps that can be taken to prevent or more effectively treat the disease can only help improve CMS's efforts in this area.

To summarize, the CMS methodology used to model the various parts of the Medicare program is not directly compatible with the modeling of future changes in the prevention and treatment of diabetes or any other chronic illness. However, CMS has moved into new areas and used new modeling methodologies in recent years. Two examples are its use of survey data during the first two years of the new Part D drug benefit and its introduction of general equilibrium modeling.

As CMS continues to refine and improve its modeling capabilities, the opportunity exists to help better inform those efforts. Given its current modeling methodologies, the most likely impact will be on helping to improve the assumptions that feed into the current modeling.

### **The Office of Management and Budget (OMB)**

The Office of Management and Budget is an unusual agency, located as it is within the Executive Office of the President.

OMB frequently is positioned as the executive branch equivalent of CBO, as in "OMB scoring" versus "CBO scoring" of proposals with budgetary effects. But that juxtaposition is highly misleading. OMB is a policymaking participant, serving as the enforcer of presidential policy within the executive branch. Although largely staffed by career civil servants, the agency's mission is to use the tools at its disposal to secure the president's policies in budgetary and non-budgetary matters.

With regard to scoring, OMB is more like the consumer than the producer. Although twice the staff size of CBO, OMB's staff mainly is occupied with coordinating policy matters with the large agencies of the executive branch. While some routine models are used, these are the exceptions. Most budgetary estimates are produced by the agencies themselves and sent to OMB for compilation in a coordinated presidential submission.

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<sup>50</sup> Op. Cit., "2007 Annual Data Report," United States Renal Data System. Page 229.



With regard to health care policy, OMB's staff is in frequent communication with CMS, seeking out estimates and getting advice on the budgetary implications of alternative policy options. Although OMB can have an independent voice if it chooses to do so, this is generally not possible with regard to complex Medicare and Medicaid proposals. Much like the relationship between congressional staff and CBO, OMB's staff is heavily dependent on the expertise that the CMS staff has developed over many years. This expertise cannot be replicated easily elsewhere.

*Limitations of the OMB system –*

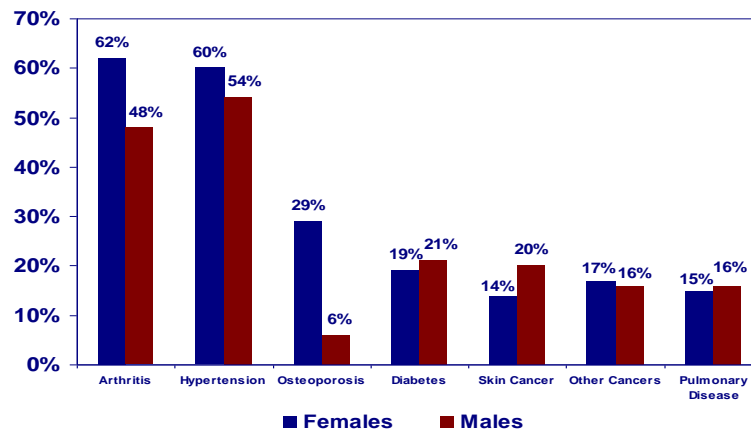
Along with the Treasury Department and the Council of Economic Advisors, OMB has an institutional role in setting the primary economic assumptions used in the budget projections, which make up the president's annual budget submission to Congress. Some of these assumptions have a direct impact on Medicare and Medicaid estimates, such as the expected increase in the wage base for Medicare's payroll tax estimates. These assumptions do not dictate the more crucial variables in health care policy, such as service utilization rates and the factors used to inflate provider payments annually. Moreover, the Medicare Trustees are in no way bound to use the economic assumptions in the president's budget when issuing the annual report on the outlook for Medicare's finances.

**V. Chronic Diseases and Health Care Costs**

The health policy community increasingly is aware that costs associated with caring for those with chronic diseases is now one of the most pressing issues in health care.

First, it is recognized that a large proportion of Medicare beneficiaries already are living with such conditions. As shown in **Figure 10**, more than half of all Medicare beneficiaries have hypertension, about one in five has diabetes, nearly as many have various forms of cancer, and heart disease also is widespread. Moreover, many beneficiaries, especially the sickest, have more than one of these common ailments.

**Figure 10:  
Percentage of Medicare Beneficiaries Reporting  
Presence of Common Diseases, 2002**



Source: [Health Care Spending and the Medicare Program: A Data Book](#), Medicare Payment Advisory Commission, June 2007, Chart 2-7.

New projections of what the country faces in the future are even more alarming. As mentioned previously, a recent analysis of the factors that drive chronic disease burden (including obesity and smoking rates) shows a dramatic increase in the years ahead. Given current trends, the number of people with diabetes is projected to increase by nearly 60 percent in two decades. Similarly large increases are projected for people with cancer and heart disease.

These projections use a modeling approach built on determining the risk factors for these conditions, which are then projected forward to predict the disease burden in the future. Neither CBO nor CMS yet has developed a similar capacity for estimating the future disease burden for people covered by publicly-financed programs.

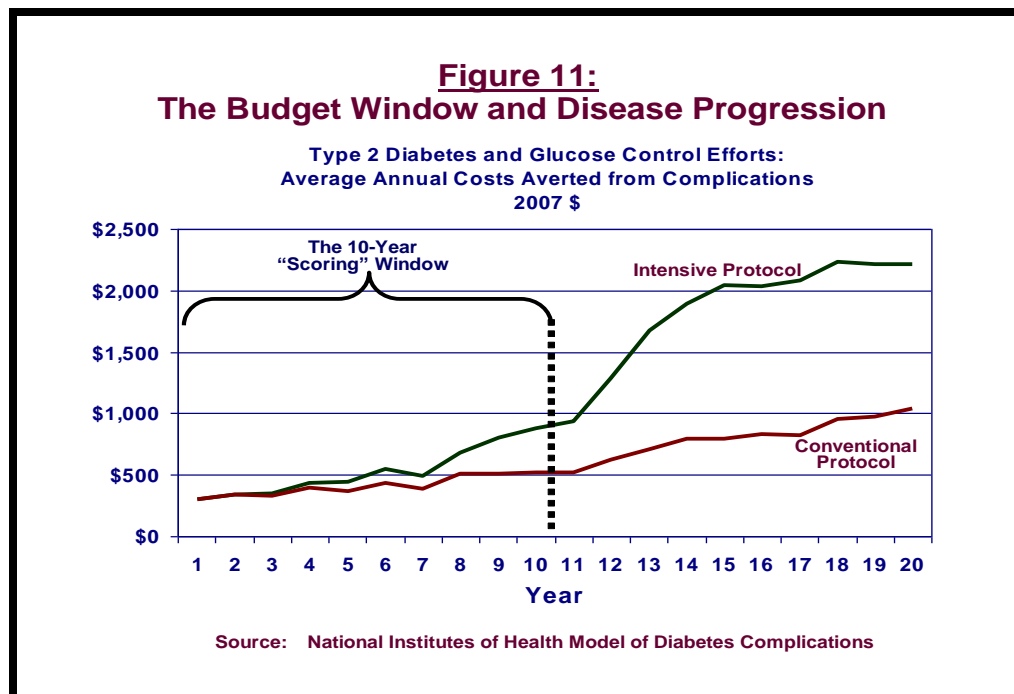
### **The Budget Time Frame and Prevention Efforts**

The economic value of many health care interventions is dependent upon the normal progress of disease in question and on the timing of the effect of the intervention. These clinical facts are particularly salient in the setting of preventive medicine and chronic disease management in which oftentimes a significant time lag exists between the delivery of a therapy and the realization of its benefit.

A chronic condition that encapsulates many of these issues is type 2 diabetes mellitus. The typical progression of diabetes is from being obese, to developing pre-diabetes (impaired fasting glucose, impaired glucose tolerance), to developing frank type 2 diabetes, and then to developing complications related to diabetes. Type 2 diabetes typically develops in middle-aged or older individuals, many of

whom may have been at risk for diabetes for many years. The actual diagnosis of diabetes is oftentimes delayed (estimated to be 5-7 years) from the time that glucose levels enter the diabetic range because of the asymptomatic nature of the early stages of the condition.

The onset of the complications of diabetes also takes many years to appear. As a result of this natural history, the positive effects of improved treatment and control of diabetes often take time to show significant effects. In clinical trials of intensive glucose control, it has been found to require up to 9 years of therapy before reductions in these complications are realized (see **Figure 11**).



In contrast to the timing of treatment effect for intensive glucose control, other components of diabetes care such as intensive blood pressure and cholesterol control have far shorter time to treatment effects. In addition, efforts to prevent the onset of diabetes through diet and exercise or medications (the Diabetes Prevention Program) have been found to have significant benefits within one to two years of onset of programs. This timing of treatment effects has important implications for studies evaluating the costs associated with efforts to prevent diabetes and/or improve the delivery of diabetes care. If an analysis uses a relatively short time frame (e.g. <10 years), almost no downstream cost offsets for improving glucose control actually will be included in such an analysis.

The natural history of disease and timing of the effect of treatments have implications for which components of CMS bear the costs of treatment or costs of complications. For the typical middle-aged working individual who develops diabetes, the initial costs of treatment are borne by the individual with the condition, private insurers, or by Medicaid. As complications develop years after

onset of the condition, complications may develop well after retirement and after the individual becomes Medicare eligible. As a result, Medicare bears the burden of the costs of complications that develop late in life. The major exception to this typical history is for younger individuals who either are disabled or develop end-stage renal disease. As a result of these specific mandates, Medicare actually provides care to adult individuals across the age spectrum.

## **VI. Exploring Possible Cost Estimating Improvements**

As awareness grows that much of the future burden in health care will be for those with chronic diseases, pressure will build for a policy response. This, in turn, will put pressure back on the cost estimators to develop more refined models for examining the existing “baseline” for chronic disease burden in the years ahead and a way to specifically address how policies might alter both the disease burden estimates as well as potential cost implications.

We present below avenues for possibly improving today’s current practices.

### **Building on CBO’s Social Security Long-Term Modeling Capacity<sup>51</sup>**

CBO has spent the better part of a decade building a sophisticated microsimulation capacity for Social Security projections and proposal estimation.

The model specifically is aimed at assessing the dynamic behavioral effects associated with altered financial incentives in the program over the long-run – namely seventy-five years.

CBO’s Social Security model “generates realistic demographic and economic outcomes for a representative sample of the population and then applies tax and benefit rules to that sample in order to draw inferences about the effects of various policy alternatives.”<sup>52</sup>

“A microsimulation model starts with individual data from a representative sample of the population and projects demographic and economic outcomes for that sample through time. In CBOLT [Congressional Budget Office Long-Term projection], the basic demographic processes include fertility, educational attainment, marital transitions, marital partner assignments, and eventual death,” CBO explains.<sup>53</sup>

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<sup>51</sup> In a phone conversation with the authors, CBO staff raised this approach as a possible starting point they are exploring for more explicit examination of long-term changes in health status. They made it clear that such an approach is in the very early stages of development, and they made no commitments to adopt such an approach.

<sup>52</sup> Projecting Labor Force Participation and Earnings in CBO’s Long-Term Microsimulation Model, Congressional Budget Office, October 2006.

<sup>53</sup> *ibid*

CBO estimates earnings, for instance, by calculating the predicted labor force participation, hours worked, unemployment status, and wages based on the age, educational level, marital status, birth cohort, number of children in school, and disability status. Incorporated into the equations are permanent and transitory shocks that affect the wages an individual would expect.

For uncertainty in its projections, CBO uses a *Monte Carlo* estimating technique.<sup>54</sup> First, CBO develops functions that relate the input variables (such as age, educational achievement, etc.) to the output (unemployment, for instance). Then, CBO determines a probability for each outcome based on each set of inputs. The final step is assigning random numbers to each input set, which are used to assign outcomes by probability. Repeating this procedure allows CBO to produce probability distributions of various outcomes for each set of inputs.<sup>55</sup>

CBO analysts explained that it has begun to add health inputs and outputs to its model, but it knows it will take some time before a workable approach to modeling long-term health outcome trends is ready for use.

### **Existing Diabetes Models**

Over the past decade, diabetes prevention and care have been evaluated routinely using cost-effectiveness analysis techniques to assess the economic value of diabetes prevention and care. Because of the long-term nature of the development of diabetes and its complications, it has been necessary in these analyses to utilize disease simulation models that combine epidemiological data and clinical trial data. Disease simulation models allow analysts to extrapolate clinical trial findings over the lifetime of patients.

Extrapolation of clinical trials results is needed for two basic reasons. First, clinical trials in diabetes care rarely are conducted over long enough periods of time to see major changes in patients' health. With notable exceptions (e.g. United Kingdom Prospective Diabetes Study), researchers are unable to undertake and sustain long-term clinical trials because of the needs of research careers and the instability of research funding. A second and highly related issue is that clinical trials have typically focused on intermediate outcomes such as change in glucose or blood pressure levels, but not on long-term outcomes such as the development of diabetes or complications or overall quality of life. As a result, the findings of trials that alter intermediate outcomes need to be extrapolated in order to understand their long-term implications.

A consistent history of findings is available from the major models of diabetes complications. The first major model of diabetes complications was a type 1 diabetes model developed by the Diabetes Control and Complications Trial

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<sup>54</sup> A statistical technique used to approximate the probability of specific outcome.

<sup>55</sup> *Quantifying Uncertainty in the Analysis of Long-Term Social Security Projections*, Congressional Budget Office, November 2005.

Research Group. The model used DCCT trial data to project the lifetime benefits and costs of intensive glucose control in type 1 diabetes. The analysts found that intensive control was highly cost-effective (\$28,661/life year gained) in this population.<sup>56</sup>

This model then was adapted for use by a team led by the head of NIDDK to evaluate the value of different therapies in type 2 diabetes.<sup>57,58</sup> It helped to illustrate the long-term cost-effectiveness of intensive glucose control applying DCCT data to the lives of patients with type 2 diabetes (\$16,000/QALY). These results were confirmed later with the arrival of United Kingdom Prospective Diabetes Study (UKPDS) data, which illustrated the benefits of intensive glucose control in type 2 diabetes. The model also was used to evaluate the value of screening for diabetes, a diabetes prevention strategy.

The CDC/RTI model of diabetes complications later was developed using the NIH model structure in combination with published UKPDS results.<sup>59</sup> This model was designed to simultaneously evaluate the economic value of intensive glucose control, intensive blood pressure control, and intensive cholesterol control if the entire population of diabetes patients actually adopted these therapies. The analysis showed that intensive glucose control and cholesterol control were cost-effective (\$41,384/QALY for glucose, \$51,889/QALY for cholesterol), while intensive blood pressure control was actually a cost-saving therapy. The model also was used to evaluate the economic value of diabetes prevention in individuals with pre-diabetes (impaired fasting glucose or impaired glucose tolerance) and found that a lifestyle intervention for preventing diabetes was highly cost-effective (\$8800/QALY).<sup>60</sup>

More recently the UKPDS group has developed a comprehensive model of diabetes complications that is based entirely on the UKPDS data.<sup>61</sup> At its core, the model predicts the risk of developing specific diabetes-related complications, diabetes-related mortality, and overall life expectancy of people living with type 2 diabetes based on risk factors such as glucose and blood pressure. The model can be used to project the long-term health benefits of altering these risk factors. This model has been used to calculate the incremental net annual cost of implementing

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<sup>56</sup> The Diabetes Control and Complications Trial Research Group. Lifetime benefits and costs of intensive therapy as practiced in the Diabetes Control and Complications Trial. *JAMA* 1996;276:1409-15.

<sup>57</sup> Eastman RC, Javitt JC, Herman WH, et al. Model of complications of NIDDM: II. Analysis of the health benefits and cost-effectiveness of treating NIDDM with the goal of normoglycemia. *Diabetes Care* 1997;20(5):735-44.

<sup>58</sup> Eastman RC, Javitt JC, Herman WH, et al. Model of complications of NIDDM: I. Model construction and assumptions. *Diabetes Care* 1997;20(5):725-34.

<sup>59</sup> The CDC Diabetes Cost-effectiveness Group. Cost-effectiveness of intensive glycemic control, intensified hypertension control, and serum cholesterol level reduction, for type 2 diabetes. *JAMA* 2002;287(19):2542-51.

<sup>60</sup> Herman WH, Hoerger TJ, Brandle M, et al. The cost-effectiveness of lifestyle modification or metformin in preventing type 2 diabetes in adults with impaired glucose tolerance. *Ann Intern Med* 2005;142:323-32.

<sup>61</sup> Gray A, Clarke P, Farmer A, et al. Implementing intensive control of blood glucose concentration and blood pressure in type 2 diabetes in England: cost analysis (UKPDS 63). *BMJ* 2002;325:860-5.

intensive control of blood glucose and blood pressure to all people with diagnosed type 2 diabetes in England (£100.5 million). The UKPDS group has made its model publicly available for use by researchers and policy analysts.

Other models of diabetes complications have been developed by other academic and industry groups.<sup>62</sup> One of the most notable models is the Archimedes model developed by David Eddy.<sup>63</sup> The model differs from the other complication models in that it sets out to account for basic cellular and organ functioning in the body as it predicts the risks of complications. Most complication models account for the risks of complications by using directly observed epidemiological or clinical trial data.

The conclusions of the various models have been consistent over the past decade despite differences in model assumptions and inputs. One of the probable reasons that model predictions are so consistent is that so few clinical trials are available to compare and evaluate. Efforts have been taken to compare the performance of complication prediction models. Recently a conference was convened to compare the performance of various diabetes models and model results for cardiovascular complications were highly similar.

While there has been significant progress in diabetes complication modeling, some limitations of current models are important to acknowledge. Many of the inputs for the previously described models rely on data that come from clinical trial populations. Individuals who enroll in clinical trials are more likely to be healthier than average patients in the general population, because of the exclusion of patients with comorbid illnesses, and are more likely to be adherent to therapies because of the exclusion of patients who are unable to complete the run-in phase of a clinical trial. All of these concerns raise questions about whether or not the forecasted disease progression and costs associated with models can be generalized to the overall population. To some extent, many of these concerns can be addressed by integrating inputs from clinical trials data with data from the populations of interest and by performing validation exercises with current models.

### **Potential Implications of Diabetes Simulation Models**

Simulation models already are being used by policymakers to guide public health decisions and public health spending in other nations. For example, the UKPDS model already is being used for health care planning in the United Kingdom at the national and regional level. In addition, the provincial government of Ontario in

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<sup>62</sup> Palmer AJ, Roze S, Valentine WJ, et al. The CORE diabetes model: projecting long-term clinical outcomes, costs and cost-effectiveness of interventions in diabetes mellitus (type 1 and 2) to support clinical and reimbursement decision-making. *Curr Med Res Opin* 2004;20(Suppl.1):S5-S26.

<sup>63</sup> Eddy DM, Schlessinger L. Validation of the Archimedes Diabetes Model. *Diabetes Care* 2003;26(11):3102-10.

Canada and the Mexican government have commissioned analyses that have used the UKPDS model.

In the context of the U.S. federal budget scoring process, the simulation models might be used as an alternative approach to estimating long-term health care costs and for estimating changes in the number of prevalent cases of diabetes over time. In terms of assessing specific health care proposals, models might play a role in projecting the overall cost-implications of diabetes prevention programs as well as diabetes management programs given the long-term impact of such programs. Quality of life estimates would most likely be ignored.

## **VII. Conclusion**

In coming decades, the types of problems the country will be facing in health care will differ from those confronted in the last century. Scientific and technological advances have made dramatic improvements in health and longevity, and many conditions that were previously deadly are no longer so. But projections indicate that these advances and other societal changes will lead to a dramatic increase in chronic disease burden in the future if no policy changes are made.

It is inevitable that policymakers will become increasingly interested in pursuing policies that can both prevent the expected rise in disease burden and head off expensive public commitments to care for the chronically ill.

Current cost estimating practices will need to be re-tooled to help policymakers carefully examine such questions. The possible avenues for improved estimating presented in this report should be explored aggressively to determine if they would add valuable information and thus improve policy.



## VIII. Selected References

A Detailed Description of CBO's Cost Estimate for the Medicare Prescription Drug Benefit, Congressional Budget Office, July 2004

Disease Management in Medicare: Data Analysis and Benefit Design Issues, Congressional Budget Office, September 2002

High Cost Medicare Beneficiaries, Congressional Budget Office, May 2005

Issues in Designing a Prescription Drug Benefit for Medicare, Congressional Budget Office, October 2002

The Long-Term Outlook for Health Care Spending, Congressional Budget Office, December 2007

The Long-Term Budget Outlook, Congressional Budget Office, December 2007

Quantifying Uncertainty in the Analysis of Long-Term Social Security Projections, Congressional Budget Office, November 2005

Projecting Labor Force Participation and Earnings in CBO's Long-Term Microsimulation Model, Congressional Budget Office, October 2006

Technological Change and the Growth of Health Care Spending, Congressional Budget Office, January 2008

An Unhealthy America: The Economic Burden of Chronic Disease, Ross DeVol and Armen Bedroussian, Milken Institute, October 2007

2008 Annual Report of the Boards of Trustees of the Federal Hospital Insurance and Federal Supplementary Medical Insurance Trust Funds