

**Study of Federal  
Spending on Diabetes:  
An Opportunity for  
Change**

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## **EXECUTIVE SUMMARY**

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Diabetes is a serious and growing threat to the nation's health. Since 1980, the percentage of Americans diagnosed with diabetes has more than doubled (CDC 2005). Today, over 20.8 million Americans have diabetes, 1.5 million of them newly diagnosed in 2005 (CDC 2005). Controlling glucose, blood pressure and blood lipids and adopting healthy behaviors can help prevent diabetes and reduce its wide-ranging, expensive and debilitating complications. Yet a third of those with diabetes are not even medically diagnosed (NCHS 2006) and others fail to receive the kind of care and support that research shows to be effective.

### **STUDY FOCUS AND INTENT**

This study, commissioned by Novo Nordisk's National *Changing Diabetes* Program under contract to Mathematica Policy Research, Inc., seeks to identify the range and kinds of federal programs, authority and funding that may influence the incidence, prevalence, treatment and progression of diabetes. In contrast to many prior efforts, this study goes beyond the traditional public health and health program focus to consider the totality of federal efforts that may have intended or unintended effects on risk factors for, and the prevalence and complications of, diabetes. Through this approach, the study seeks to encourage a dialogue and debate among all stakeholders about how to maximize the use of federal dollars to prevent diabetes and its costly complications.

### **STUDY METHODS**

For this study, we develop a logic model that identifies the key points in the progression of diabetes—prevention, detection, treatment and management of complications—and the impact at each point of individual behavior, the health care system and the environment, such as families, communities and the broader physical environment, including social incentives and norms. With this model, we review the missions, programs and budgets of each department of the federal government to identify activity that may influence risk factors for diabetes, diabetes itself and the complications that result from it.

From this review, we estimate federal diabetes spending (excluding tax effects) using two methods. First, we use traditional cost-of-illness methods to estimate the additional amount that the federal government spends to treat those with diabetes compared to those without. Second, we use budget analysis techniques to estimate the total amount of federal spending for other diabetes-related purposes, including prevention and research. The latter estimates include both spending directly related to diabetes and other spending that is linked because of its influence on general risk factors for diabetes and many other chronic diseases, such as nutrition (diet), obesity and physical activity. The estimates are for fiscal year

(FY) 2005, the latest with detailed data at the time the study was completed. Given the complexity of the federal budget, the estimates are intended to offer an overall picture of federal spending rather than an exact account of every dollar spent and how it is employed.

## **THE FINDINGS**

### **Range of Federal Activity**

Our review of federal activity finds that virtually every department in the federal government with the probable exception of three—the Department of State, the Department of Energy and the General Services Administration—has some form of policy or program responsibility that could contribute to achieving federal diabetes goals. The extent of responsibility varies by department—ranging from significant leadership authority and programmatic activity in the Department of Health and Human Services (HHS) and the U.S. Department of Agriculture (USDA) to programs with more narrow implications for diabetes in many other departments. We also find a division in responsibilities between the government and private sector that leaves federal resources most heavily focused on people near the beginning and end of their lifespan, and on certain high-priority groups in between. Functionally, federal activity is focused in a number of areas including prevention, treatment, policy and regulation, research and monitoring. In addition, the federal government provides food assistance, which may influence diet in ways that contribute to obesity, a risk factor for diabetes.

### **Additional Costs to Treat People with Diabetes**

The federal government spent \$79.7 billion more to treat those with diabetes and care for its complications than it spent for those without diabetes in FY 2005 (Summary Table). This spending amounts to roughly one of every eight dollars in federal health spending. The amount is also roughly equivalent to the total annual budget of the Department of Education.

Of the \$79.7 billion, \$77.2 billion reflects the amount of additional spending by Medicare, Medicaid/SCHIP, the Federal Employees Health Benefits Program, the Department of Veterans Affairs (VA), TRICARE and a few other small medical care programs for those with diabetes compared to those without. Federal spending accounted for about 61 percent of all diabetes-related medical spending—by government, the private sector and individuals—in the United States in 2005. Nearly 80 percent of it is in the Medicare program.

About \$2.5 billion of the \$79.7 billion is spent in disability payments through Social Security Disability Income (SSDI) and Supplemental Security Income (SSI) for those whose primary reason for disability was diabetes, and for a share of those disabled by visual impairments or renal failure, which are common complications of the disease. The estimates do not account for lost productivity in the federal workforce or the impact on federal tax revenue of diabetes-related illnesses or disabilities.

In addition to these costs, the federal government spends another \$1.1 billion (not included in the \$79.7 billion figure) for administrative costs associated with enhancing quality of diabetes care and treatment. Examples of such work include efforts to expand awareness of clinical guidelines, produce reports on quality measures or encourage demonstrations of ways of effectively managing care for people with specific conditions. While treatment is typically paid for through the entitlement (mandatory) part of the federal budget, administrative costs come from discretionary funds which tend to be more limited and increase more slowly over time.

### **Spending for Other Purposes**

- **Prevention and Health Promotion.** The federal government spent about \$3.9 billion in FY 2005 for disease prevention or health promotion activities likely to have some affect on diabetes. Very little of it (about \$0.2 billion) was exclusively focused on diabetes. For the most part, funds were spent for general disease prevention and health promotion around healthy behaviors and risk factors common to many chronic diseases—namely nutrition (diet), physical activity and obesity—but which are likely to have some affect on diabetes. Such spending was distributed across a wide range of federal programs and agencies. This spending may or may not target the subgroups and risk factors most relevant to preventing diabetes and its complications.

This \$3.9 billion is spent on activities that have some bearing on improving health in ways relevant to diabetes. Whether this is an appropriate amount is a question that can be debated. The findings are clear, however, that funding is highly fragmented and most efforts are not focused specifically on preventing diabetes and its complications.

- **Research and Monitoring.** The federal government spent about \$3.1 billion in FY 2005 on diabetes-related monitoring, research and oversight of the food and drug supply. About two-thirds of this was in the National Institutes of Health (NIH), but only \$1.0 billion is in what NIH directly counts as diabetes-related, of which half is in the National Institute of Diabetes and Digestive and Kidney Diseases. The rest goes for other NIH research, research elsewhere (mostly outside HHS) and limited other purposes. These include funding for data systems to support monitoring and for regulatory efforts that bear on diabetes prevention and treatment, such as those in the Food and Drug Administration (FDA).
- **Domestic Food Assistance Programs.** The federal government spent at least \$48.9 billion on food assistance programs over and above that in nutrition education. Such funding is relevant to diabetes because it affects the diet of millions of Americans, many of them with diabetes or at risk for it.

## Missed Opportunities

Our findings show that the federal government plays a large role in treating the complications of diabetes because of its responsibility for Medicare, Medicaid, VA and other programs that disproportionately serve individuals later in life or when they are ill. In contrast, the wide dispersion in spending for prevention suggests that the federal government is not effectively leveraging its other programmatic and policy responsibilities to limit the burden of diabetes on individuals, and decrease the need for spending to treat preventable complications.

We believe, given what our study shows, that there are missed opportunities to enhance the federal impact on diabetes at virtually every point in the process through which diabetes progresses. Opportunities exist: within federal medical care delivery, and financing programs themselves, to better prevent, detect and treat diabetes and its debilitating complications; in the way in which federal actions draw upon the strength of families, communities, schools and the workplace to encourage prevention, detection and early treatment; in the use of federal funds to influence and support physical activity; and in the potential for leveraging of the large amount spent in food assistance to better promote healthy diets and nutritional awareness that can prevent diabetes and its complications.

## CONCLUSIONS

Our study highlights the enormous and growing toll of diabetes on this country and the importance of a broad range of federal programs to prevent diabetes and its complications. Our research finds that the federal government spent \$79.7 billion in FY 2005 in additional treatment costs for those with diabetes compared to those without diabetes—an amount that is about 61 percent of the total United States medical spending across all payers for additional treatment costs associated with diabetes. For context, the amount the federal government pays to treat those with diabetes, compared to those without, is more than the entire budget of the Department of Education in FY 2005. It is 12 percent of the *total federal health care spending* nationwide—roughly one of every eight dollars.

A significant share of this spending is potentially avoidable, to the extent that diabetes and its complications can be prevented. Research shows that savings can result from efforts focused on prevention, early treatment and greater use of evidence-based practices that reduce risk factors for diabetes, control blood sugar and decrease complications and resulting disability. In FY 2005, the federal government spent \$3.9 billion on disease prevention or health promotion activities likely to have some affect on diabetes. These dollars are spread across numerous departments and are mostly focused on healthy behaviors generally, not specifically the populations at highest risk for diabetes. In addition, studies suggest that the nutrition education, content and coordination in food programs could be better configured to more aggressively and unambiguously promote the nation's dietary guidelines and reduce obesity rates, a major risk factor for diabetes.

Compared to spending on treatment, the federal government spends very little (\$1.1 billion) to enhance the quality and effectiveness of the care it pays for. Furthermore, while the federal government invests \$3.1 billion in research and monitoring related to diabetes and general risk factors, there are important gaps in emphasis. For example, while much is spent on clinical research, relatively less attention is devoted to identifying effective ways to modify human behavior, or encourage providers and delivery systems to implement practices that research has shown to be effective.

## RECOMMENDATIONS

Without strong federal leadership, the human and economic costs of diabetes and its complications—at least some of which are avoidable or controllable—will continue to mount. This increase in cost will only escalate as the prevalence of diabetes within our society grows. Furthermore, the nation will not reach the *Healthy People 2010* goal of using prevention to reduce the prevalence and economic burden of diabetes and improve the quality of life for people with or at risk of diabetes. This is not the first study to identify the challenge. In 2004, HHS released a report titled *Diabetes: A National Call to Action* (HHS 2004), calling for diabetes prevention, detection and treatment to be the focus of a national action plan with a comprehensive action-oriented approach involving all stakeholders. To reduce the burden of diabetes on the government and the nation, we recommend, based on our study, the following actions for consideration by the federal government and the diabetes community.

### **1. The federal government should take steps to get the most out of current spending in medical care programs.**

- The government should make appropriate screening and early detection of diabetes and its antecedent risk factors a priority in all federal health programs, particularly Medicare and Medicaid. It must be willing to increase appropriate spending in this area, encouraged by the knowledge that doing so is likely to reduce the costs of treating the complications of diabetes.
- The Centers for Medicare and Medicaid Services (CMS) should analyze why use of the new Medicare diabetes screening and the ten-year-old self-management benefits have apparently been low and what actions are needed to enhance effective screening and other preventive modalities, especially in high-risk populations. CMS should use its authority to take steps to increase use of these benefits, so diabetes is detected and self-management is used effectively to control blood glucose and thereby reduce the risk of complications.

- The Centers for Disease Control and Prevention (CDC) should work with CMS, the Office of Personnel Management (OPM), VA and other relevant departments to use national data on diabetes prevalence and health behaviors to inform major health care financing programs in areas, such as benefit design and reimbursement policy, that will support effective approaches to diabetes prevention and treatment. The government should also make it easier for major federal financing programs like Medicare, Medicaid, the Federal Employees Health Benefits Program and others to monitor diabetes at the program level—including the effectiveness of innovations such as those being recommended—by better capturing data on diabetes risk and outcomes among those served by these programs.
- HHS should identify, disseminate, educate and encourage uptake of knowledge about the strategies that yield the highest pay-off in self-management and care management of diabetes. Research clearly shows that glycemic control can greatly reduce the complications of diabetes and that active patient involvement is essential to this outcome. Yet there are significant and costly gaps between what research shows to be effective and the way care is currently provided. Because the federal government plays an extensive role in financing care for people with diabetes, federal leadership in education and the improvement of care for diabetes is essential.
- The Secretary of HHS should strengthen research and develop effective strategies for: (1) educating and promoting behavior change that can lead to risk reduction for diabetes and its complications, and (2) motivating and rewarding health providers for adopting evidence-based interventions for diabetes prevention and control.

## **2. The federal government should lead by example and effectively promote the health of its workforce.**

- The Office of Personnel Management (OPM) should strengthen the activities of the *Healthier Feds* initiative by building into their negotiations with health plans appropriate standards and activities to reduce risk factors for diabetes and encourage education, prevention and early treatment to reduce costly complications. They should publicly report on a periodic basis what has been achieved.
- Congress should ask the Institute of Medicine (IOM) to analyze and report on the number and characteristics of people at high risk for diabetes and its complications that are reached by the major federal programs that address diabetes. This should include an assessment of the differences in reach and intensity of effort based on socio-demographics (because many programs have maximum income requirements), as well as the identification of any gaps or shortcomings that impede the reach and effectiveness of these programs.

### **3. The federal government should enhance interdepartmental coordination to more effectively apply its resources to reduce the risk factors for and complications of diabetes.**

- The federal government should require that the USDA and HHS work together to examine ways to heighten the impact of federal spending on food and nutrition programs on reducing risk factors for diabetes and diabetes prevalence and complications. The goal should be to harmonize efforts so that effective diabetes prevention and a diet more consistent with federal guidelines become a central component of food and nutrition programs.
- There is a role for strong federal leadership in addressing the problems of obesity and lack of physical activity with a view toward the way they contribute to diabetes and its costly complications. While the Diabetes Mellitus Interagency Coordinating Committee is responsible for coordination around diabetes, its focus and membership does not necessarily position it to mobilize the full resources of the federal government toward this end as aggressively as it might. The White House should work with Congress to identify how best to make every federal agency responsible for understanding the ways its programs may influence diabetes and its complications, as well as broader public health goals, and be accountable for actions designed to mitigate the risk factors for and complications of diabetes.
- The federal government should enhance and protect its databases that are critical to monitoring and improving outcomes for all aspects of diabetes—such as the National Health Interview Survey, the National Health and Nutrition Examination Survey, the Medical Expenditure Panel Survey and the National Vital Statistics System. Solid national data in all areas—diabetes prevalence and its associated risk factors, the care patients with diabetes receive, the complications they experience and the outcomes and costs associated with diabetes—are vital to set health policy, plan and evaluate programs and track progress in meeting the nation’s diabetes objectives.

### **4. Further research is needed in at least two areas.**

- The Medicare Payment Advisory Commission (MedPAC) should estimate the amount by which projected federal Medicare cost increases could be reduced through efforts to address avoidable complications of diabetes and recommend steps and associated funding to achieve these savings.
- The government should develop a white paper that synthesizes what is known about the effectiveness of food assistance programs directed at people at high risk for diabetes, the kinds of nutrition education provided and the strengths and weaknesses of these efforts. Based on these findings, the government should recommend modifications to maximize the effectiveness of these programs.

**Summary Table. Federal Spending for Diabetes-Related Purposes by Spending Type, HHS Versus Other Agencies, FY 2005 (in billions)**

Type of Spending	All Departments	HHS	Other Agencies
<b>FEDERAL PROGRAM COSTS OF TREATING DIABETES AND DEALING WITH COMPLICATIONS</b>	<b>\$79.704</b>	<b>\$66.056</b>	<b>\$13.648</b>
<b>Direct Health Care Benefits/Treatment Costs</b>	<b>\$77.244</b>	<b>\$66.056</b>	<b>\$11.188</b>
Medicare	\$61.097	\$61.097	\$0.000
Medicaid (federal share)	\$ 4.669	\$ 4.669	\$0.000
Federal Employees Health Benefits (actives, annuitants and dependents)	\$ 2.432	\$ 0.000	\$2.432
DOD (TRICARE)	\$ 3.033	\$ 0.000	\$3.033
Veteran Affairs Health System	\$ 5.723	\$ 0.000	\$5.723
Other (SCHIP, Indian Health Service, PHS Corps Retirees) <sup>a</sup>	\$ 0.290	\$ 0.290	\$0.000
<b>SSDI/SSI Spending for Diabetes-Related Disabilities</b>	<b>\$2.460</b>	<b>\$ 0.000</b>	<b>\$2.460</b>
<b>ADMINISTRATIVE SPENDING BY HEALTH CARE FINANCING PROGRAMS TO PROMOTE EFFECTIVENESS AND QUALITY</b>	<b>\$1.084</b>	<b>\$0.891</b>	<b>\$0.193</b>
<b>PREVENTION AND HEALTH PROMOTION</b>	<b>\$3.925</b>	<b>\$2.241</b>	<b>\$1.684</b>
<b>Targeted Diabetes Funding – Total</b>	<b>\$0.232</b>	<b>\$0.214</b>	<b>\$0.018</b>
CDC diabetes-related chronic disease spending	\$0.064	\$0.064	\$0.000
Indian Health Service diabetes prevention	\$0.150	\$0.150	\$0.000
Other	\$0.018	\$0.000	\$0.018
<b>Prevention Targeted at Risk Factors (Physical Activity, Diet, Nutrition, Obesity and Other Relevant Concerns) – Total</b>	<b>\$3.693</b>	<b>\$2.027</b>	<b>\$1.666</b>
CDC	\$0.414	\$0.414	\$0.000
HHS-wide	\$0.021	\$0.021	\$0.000
Other HHS spending	\$1.592	\$1.592	\$0.000
USDA nutrition guidance and services	\$0.915	\$0.000	\$0.915
Other federal departments and agencies	\$0.751	\$0.000	\$0.751
<b>RESEARCH AND MONITORING</b>	<b>\$3.053</b>	<b>\$2.296</b>	<b>\$0.757</b>
<b>Statistical Systems to Support Monitoring</b>	<b>\$0.159</b>	<b>\$0.086</b>	<b>\$0.073</b>
<b>Research</b>	<b>\$2.604</b>	<b>\$1.945</b>	<b>\$0.659</b>
NIH diabetes-related research (including diabetes education) <sup>b</sup>	\$1.055	\$1.055	\$0.000
NIH research on related risk factors for diabetes	\$0.814	\$0.814	\$0.000
Other relevant research in HHS and elsewhere	\$0.735	\$0.076	\$0.659
<b>Related Regulation (e.g., FDA, FTC, Commerce)</b>	<b>\$0.290</b>	<b>\$0.265</b>	<b>\$0.025</b>
<b>FEDERAL DOMESTIC FOOD ASSISTANCE PROGRAMS</b>	<b>\$48.880</b>	<b>\$0.539</b>	<b>\$48.341</b>
Direct feeding or vouchers	\$16.491	\$0.539	\$15.952
Food Stamps	\$32.389	\$0.000	\$32.389

Source: MPR analysis of FY 2005 federal spending, mainly as reported in the FY 2007 budget documents and related program information. Additional detail on methods are presented in Appendices A-C.

Note: Domestic spending only; excludes active military spending. While programs may serve multiple purposes, we place them within the single category that best typifies most spending because available data do not allow greater differentiation.

<sup>a</sup> SCHIP, State Children’s Health Insurance Program (CMS); PHS, Public Health Service.

<sup>b</sup> Includes NIH funds for the National Diabetes Education Program cosponsored by NIH and CDC.

## **I. BACKGROUND AND RATIONALE BEHIND THIS STUDY**

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### **A. WHY DIABETES IS A NATIONAL CONCERN**

Diabetes is a serious threat to the nation's health. Today, over 20.8 million Americans have diagnosed diabetes (Centers for Disease Control and Prevention (CDC) 2005). Among those 20 years and older, 7 percent have diagnosed diabetes and another 3 percent have diabetes that has not been medically diagnosed (Figure 1). Between 1980 and 2004, the percentage of Americans with diabetes doubled (Figure 2). In 2005, the last year for which complete data are available, 1.5 million new cases of diabetes were diagnosed. Another 54 million are estimated to have laboratory values indicative of pre-diabetes.<sup>1</sup> As the sixth leading cause of death in the United States, diabetes carries a high price tag, costing society over \$132 billion each year (American Diabetes Association (ADA) 2003).<sup>2</sup>

Diabetes affects Americans of all ages, racial/ethnic backgrounds and socioeconomic status (CDC 2005), but African Americans, Hispanics, American Indians and Alaska Natives are at particularly high risk (Figure 3). Diabetes strikes across the age spectrum, from childhood to older adulthood (Box 1).

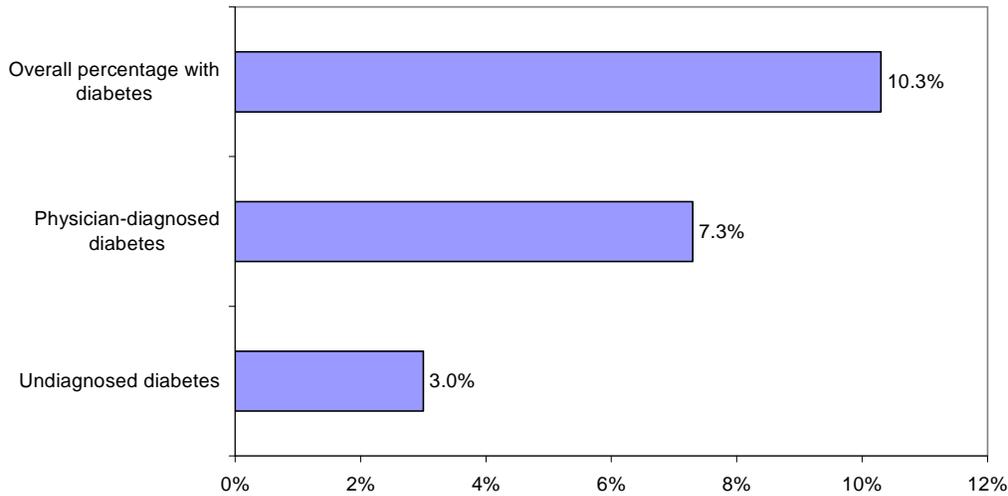
Diabetes is a group of diseases marked by high levels of blood glucose that result from defects in insulin production, insulin action or both (Box 2). The disease is associated with many serious health complications, including a markedly higher risk for heart disease, the leading cause of death in the United States (Olin and Rhoades 2005). Additional complications include stroke, blindness, kidney disease, various neuropathies, lower limb amputations, high blood pressure, periodontal disease, complications of pregnancy and other adverse effects (National Diabetes Information Clearinghouse 2006) (Box 3).

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<sup>1</sup> Estimate for 2002 based on research by Cowie et al. (2006)  
<http://diabetes.niddk.nih.gov/dm/pubs/statistics/index.htm#3>, accessed January 29, 2007.

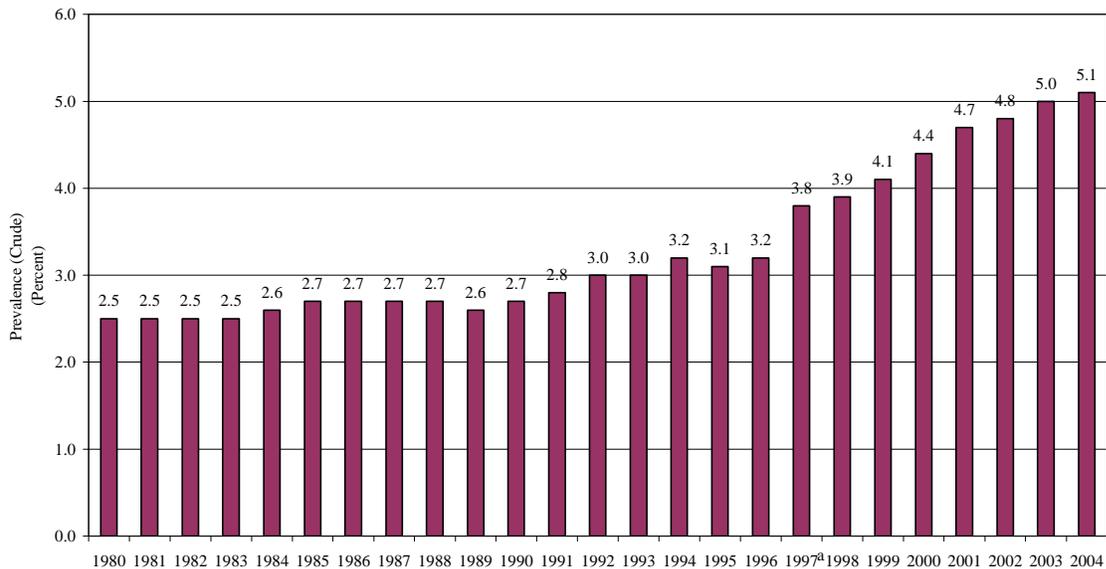
<sup>2</sup> In this study for the American Diabetes Association (ADA), The Lewin Group, Inc., estimated that the direct and indirect costs of diabetes to society were \$132 billion in 2002. Indirect costs include lost workdays, restricted activity days, permanent disability, and premature mortality.

**Figure 1. Percent of the Population with Diagnosed and Undiagnosed Diabetes, Adults 20 Years and Over, 2001-2004**



Source: Table 55, Health United States, 2006. Data from the 2001-2004 National Health and Nutrition Examination Survey.

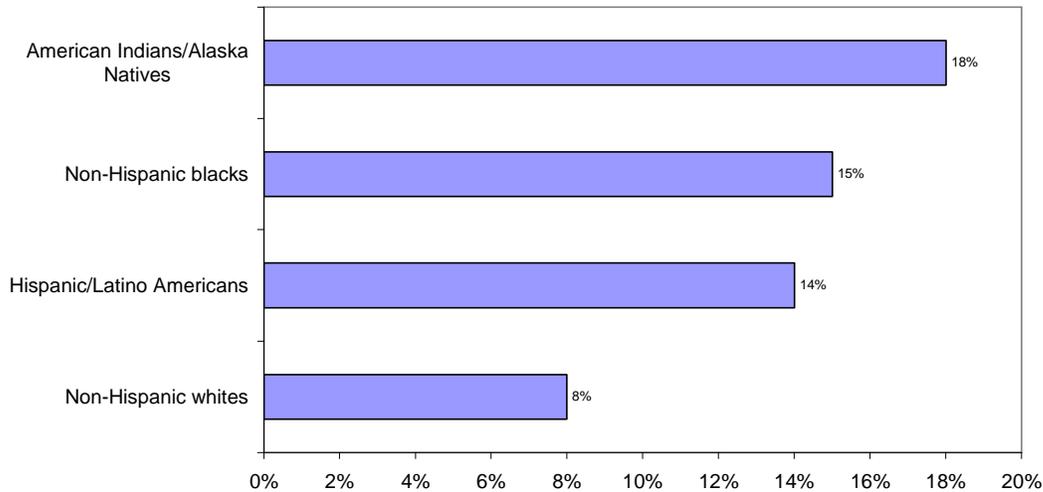
**Figure 2. Diabetes Prevalence Among General Population (All Ages), 1980-2004**



Source: Centers for Disease Control and Prevention, National Center for Health Statistics, Division of Health Interview Statistics, data from the National Health Interview Survey. U.S. Bureau of the Census, census of the population and population estimates. Data computed by the Division of Diabetes Translation, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention. (<http://www.cdc.gov/diabetes/statistics/prev/national/tableage.htm>)

<sup>a</sup>The NHIS was redesigned in 1997, a fact that could explain the jump from 3.2 percent to 3.8 percent between 1996 and 1997. (<http://cdc.gov/diabetes/statistics/prev/national/methods.htm>)

**Figure 3. Estimated Age-Adjusted Total Prevalence of Diabetes in People 20 Years and Older**



Source: National Diabetes Fact Sheet 2005, based on projections from 1999-2002 National Health and Nutrition Examination Survey, supplemented with additional information from the Indian Health Service.

### Box 1

#### DIABETES: A GROWING CONCERN ACROSS THE AGE SPECTRUM

**Children.** Although prevalence rates among children are much lower than for adults, the rates are rising. CDC calculates that two of every 1,000 children under 20 years of age have been diagnosed with diabetes (National Diabetes Fact Sheet 2005). Furthermore, although type 1 diabetes is still the dominant form for children, a growing share are being diagnosed with type 2 diabetes, spurred in part by an increase in obesity.

**Pregnant Women.** Gestational diabetes is diagnosed in about 7 percent of all pregnancies, requiring efforts to normalize maternal glucose levels and avoid infant complications (National Institute of Child Health and Human Development, 2006; ADA 2004). Women with gestational diabetes have a greatly elevated risk of developing diabetes later in life; their children also are at higher risk.

**Older Ages.** Among adults, the prevalence of diabetes increases with age. In 2005, 20.9 percent of all adults over age 60 had some form of diabetes, though not all were diagnosed (CDC 2005; National Diabetes Fact Sheet 2005). Complications and comorbidities are more prevalent among this age group and the potential for disability and need for support is increased.

## Box 2

### DIABETES

**Diabetes.** Diabetes is a group of diseases marked by high levels of blood glucose that result from defects in insulin production, insulin action, or both.

**Type 1 Diabetes.** Previously called insulin-dependent diabetes mellitus (IDDM) or juvenile-onset diabetes, type 1 diabetes develops when the body's immune system destroys the pancreatic cells that make the hormone insulin that regulates blood glucose. While it can arise at any age, it usually strikes children and young adults and accounts for 5 percent to 10 percent of all diagnosed cases of diabetes. Although both genetic and environment factors clearly play a role in type 2 diabetes, the genetic components of type 1 diabetes are not well understood and the environmental factors contributing to type 1 diabetes are currently unknown. Thus, at present time, there are no methods to prevent this type of diabetes, although much work is going on in the area.

**Type 2 Diabetes.** Previously called non-insulin-dependent diabetes mellitus (NIDDM) or adult-onset diabetes, type 2 diabetes accounts for 90 percent to 95 percent of all diagnosed cases of diabetes. Type 2 diabetes typically reflects insulin resistance, a disorder in which the cells do not use insulin properly. Eventually, the pancreas loses its ability to produce it. This type of diabetes is associated with older age, obesity, family history, history of gestational diabetes, impaired glucose metabolism, physical inactivity and race/ethnicity.

**Gestational Diabetes.** This is a form of glucose intolerance diagnosed in some women during pregnancy, which requires efforts to normalize maternal blood glucose levels to avoid complications in their infants. After pregnancy, 5 percent to 10 percent of women with gestational diabetes are found to have type 2 diabetes. Women with gestational diabetes have a 20 percent to 50 percent chance of developing diabetes within five to 10 years.

**Other Types.** About 1 percent to 5 percent of all cases may result from other causes, including genetic conditions, surgery, drugs, malnutrition, infections and other illnesses.

Source: Abbreviated text from National Diabetes Fact Sheet 2005 (CDC 2005).

### Box 3

#### HEALTH COMPLICATIONS RELATED TO DIABETES

**Diabetic Retinopathy and Other Vision Problems.** This is the leading cause of adult blindness—11 percent of new adult cases of legal blindness are due to diabetic retinopathy. Of all people who are legally blind, 9 percent have diabetes as a cause. Cataracts and glaucoma are also more likely to affect those with diabetes than others in the population.

**Neuropathy.** Diabetes can cause damage to the body's nervous system. The two major forms in people with diabetes are peripheral neuropathy and autonomic neuropathy. Peripheral neuropathy is most common, affecting mainly the legs and feet and occurring in up to 70 percent of all people with diabetes. Autonomic neuropathy is also common, often undiagnosed and can cause digestive problems, incontinence and sexual dysfunction.

**Kidney Disease.** About 35 percent of all new cases of end stage renal disease in the United States are due to diabetes and persons with diabetes are the fastest growing subgroup of people receiving renal dialysis or transplants. Risks are particularly high for African Americans. Those with diabetes are also at higher risk for other renal diseases, such as kidney infections and inflammation.

**Peripheral Vascular Disease.** Those with diabetes are at risk for lower extremity arterial disease that is identified clinically by intermittent pain and/or absence of pulses in the lower legs and feet. In one study, those with diabetes were about 10 times more likely to have these symptoms and mortality rates were two to three times greater than in the general population.

**Lower Extremity Foot Ulcers and Amputations.** About 2 percent to 3 percent of persons with diabetes are likely to have a foot ulcer in any given year, with cumulative prevalence rates higher. About 0.4 percent to 0.8 percent of Americans with diabetes have an amputation in any given year, with diabetes accounting for about half of all amputations.

**Heart Disease and Stroke.** Heart disease appears earlier in life in people with diabetes and is more often fatal among people with diabetes. Adults with diabetes are more likely to have hypertension, although that is not the only factor leading to increased risk. Adults with heart disease are at risk for stroke or death at rates two to four times higher than adults without diabetes.

**Oral Complications.** Periodontal disease is both more prevalent and more severe among people with diabetes. Risk of periodontal disease is about twice as high for people with diabetes as the population at large and almost one-third of those with diabetes have severe enough periodontal disease to have a loss of gum attachment to the teeth of five millimeters or more.

**Psychosocial Complications.** People with diabetes have a higher prevalence of depression, although not necessarily any greater than those with other chronic conditions. Depression is more likely, particularly with complications such as blindness, impotence or cognitive impairment.

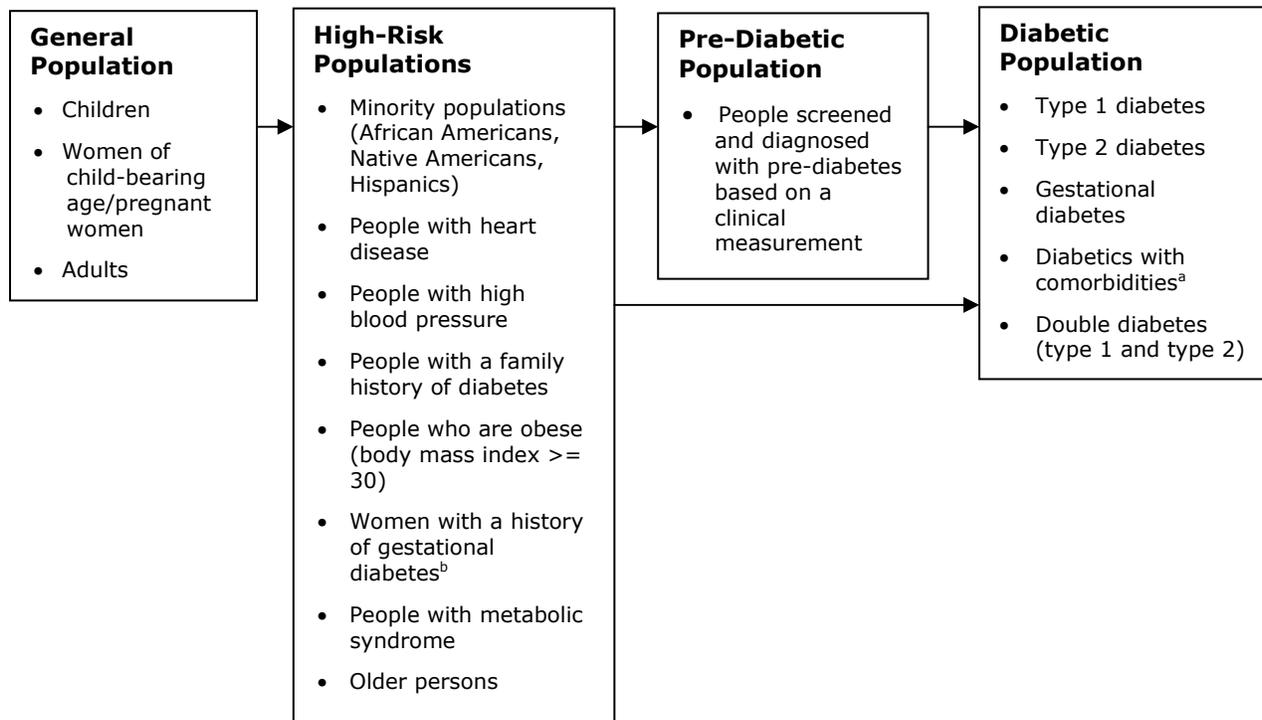
**Infections.** People with diabetes have a higher risk of infections than the general population, along with a probable higher rate of mortality from influenza and pneumonia.

**Disability.** At every age, people with diabetes are more likely to be unable to work than those without diabetes. Those with limitations of activities of daily living also are likely to use more medical care than others.

Source: Diabetes in America, Second Edition 1995; National Diabetes Fact Sheet 2005 (CDC 2005).

Lifestyle has a significant affect on diabetes; however, there are other risk factors like age, family history, racial or ethnic status and gestational history. In addition to obesity, which is increasing among children and adults in the United States (Institute of Medicine 2005; Ogden et al. 2006; Hedley et al. 2004; Robert Wood Johnson Foundation (RWJF) 2005), key risk factors for diabetes that are potentially modifiable include diet, nutrition and physical activity, because of their influence on obesity (CDC 2003). Along with smoking, being overweight or obese contributes to many chronic diseases, including diabetes, heart disease and some cancers (Department of Health and Human Services (HHS) 2000; McGinnis and Foege 1993). Because of this, preventive efforts are critical to combating diabetes. Controlling glucose, blood pressure and blood lipids and other preventive care practices to reduce specific complications of diabetes are known to be effective, yet many individuals with diabetes go undiagnosed and others receive insufficient education and care to minimize complications (CDC 2005). By the time diabetes manifests itself, certain risks may be hard to eliminate. Intervention at the pre-diabetic stage, or even earlier, to reduce the earliest manifestations of risk and encourage preventative practices, can yield valuable payoffs (Figure 4).

**Figure 4. Characterizing People and Population Groups**



<sup>a</sup> Common comorbidities with diabetes: high blood pressure, dyslipidemia, obesity, cardiovascular disease.

<sup>b</sup> Because this can be associated with large babies, some consider the latter a possible marker of undiagnosed gestational diabetes, leading to subsequent risk for diabetes.

The U.S. federal government has expressed a commitment to fighting diabetes. *Healthy People 2010* sites reducing diabetes prevalence as a critical national goal: “Through prevention programs, reduce the disease and economic burden of diabetes and improve the quality of life for all persons who have or are at risk of diabetes” (HHS 2000).

## **B. PURPOSE OF THIS STUDY**

This study, commissioned by the Novo Nordisk’s National *Changing Diabetes* Program (NCDP),<sup>3</sup> seeks to identify federal program authority and estimate federal spending on diabetes. It takes a broad-based look at the potential ways in which federal policies and programs may help shape the incidence, prevalence and progression of diabetes. Unlike many prior efforts, this study goes beyond the traditional public health and health program focus to consider the totality of federal efforts that may influence the incidence and progression of diabetes. Specifically, we examine two components of federal activity and spending: (1) direct medical treatment programs and their costs and (2) prevention and other relevant costs, both on diabetes-specific and broader-based efforts.

Our review of federal activity indicates that virtually every department in the federal government with the possible exception of three—the Department of State, the Department of Energy and the General Services Administration (GSA)—has some form of policy or program responsibility that could contribute to achieving federal diabetes goals. In some cases, this is through direct influence on the progress of the disease, while in others, activities indirectly influence diabetes through their—often unrecognized or underappreciated—impact on important risk factors such as nutrition (diet), physical activity and obesity. We also find that although the federal government bears a significant share of the additional costs associated with treating diabetes and its complications, it allocates very limited funds specifically to preventing diabetes.

Furthermore, while a surprisingly large amount of federal funds indirectly affect diabetes by influencing its risk factors, such potential leverage may be undermined by efforts that are fragmented, incentives that are not coordinated and are sometimes misaligned and responsibilities that are dispersed across many agencies. The study findings help illuminate areas where a better focus could lead to more

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<sup>3</sup> Novo Nordisk’s National *Changing Diabetes* Program (NCDP) seeks to be a catalyst in changing how diabetes is perceived, treated and overcome. The three core strategies the program employs are: (1) increasing *understanding and awareness* of the shortcomings of current health care programs in addressing diabetes; (2) supporting development and models and pilot *programs* to enhance prevention and treatment, with widespread adoption of effective programs; and (3) advocating reform in health care *policy* to improve diabetes prevention, treatment and self care. This study is central to NCDP’s interests in framing a national debate leading to actions that effectively reduce the medical, human and financial impact of diabetes in this country.

effective efforts to reduce the prevalence of and complications associated with diabetes and provide a call to action—both for those already working to reduce the burden of the disease and those who may fail to appreciate the high costs to the nation generated by diabetes. The intent of the study is to promote a discussion among all diabetes stakeholders.

## **C. METHODOLOGY**

### **Capturing Relevant Programs**

This analysis of federal spending on diabetes aims to capture how federal policies, programs and spending may influence the development and progression of diabetes by influencing people directly, using the health care system, or through families, communities and the environment in which people live. To do so, we develop a logic model that uses four categories to represent the different stages of diabetes at which policies and programs are targeted: prevention, detection, treatment and management of diabetes with complications.<sup>4,5</sup> The logic model illustrates how the rate and severity of the disease progression may be influenced at all key points (Figure 5; see Appendix A for additional detail). While the focus is on individuals, the model shows the influence of both the health care system and the social and ecological system—family, community and the broader environment—on the progression of diabetes. At each stage, research can be performed to determine the prevalence of people with the characteristics of interest as well as to identify effective interventions (Figure 6).

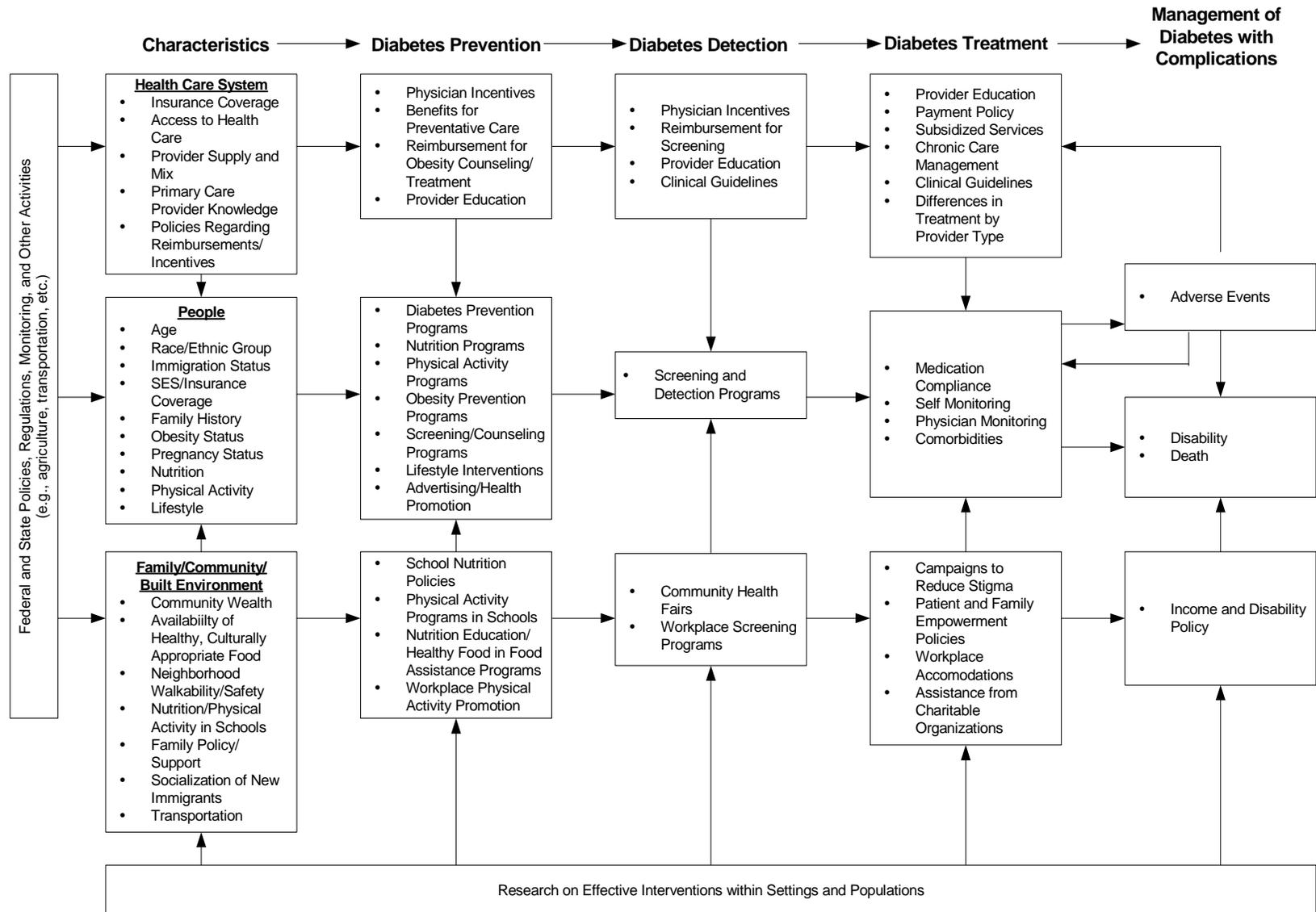
We use the conceptual framework to help define federal programs, policies, research and surveillance activities of interest. The study seeks to identify policies and programs that may influence the development of diabetes and its treatment and any federal costs associated with diabetes-related disabilities or key risk factors such as nutrition (diet), obesity and physical activity. To do so, we have constructed a summary review of each department in the federal government and each agency within HHS (Gold et al. 2007). We selectively asked experts in-house and in a few agencies to review the summaries.

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<sup>4</sup> CDC (2003) defines four critical transition points in the development of diabetes: from no diabetes to unrecognized diabetes (primary prevention), from unrecognized to recognized diabetes (screening/early diagnosis), from no care to applied diabetes care (access), and from improper care to proper care and intervention (secondary and tertiary prevention). The four categories in the logic model correspond to these transition points.

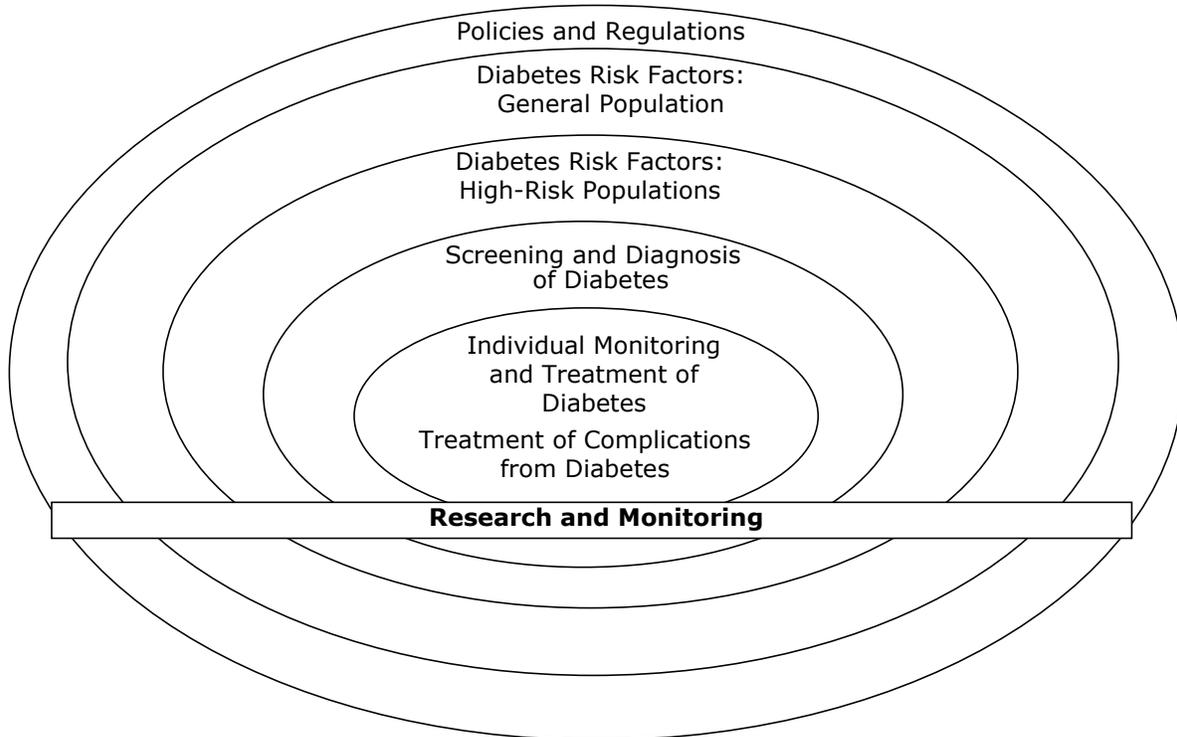
<sup>5</sup> We include pre-diabetes within the prevention stage. Pre-diabetes is a term used to distinguish people as being at a higher risk of diabetes because they have impaired fasting glucose (IFG) and/or impaired glucose tolerance (IGT) (CDC 2005). People with pre-diabetes are identified as high-risk through testing. Pre-diabetes is one of several factors that increase the risk of diabetes. The diabetes prevention stage includes prevention efforts targeting all levels, ranging from the general population to high-risk populations. While individuals in this population may have diabetes that is not detected, identifying them is critical to support effective early treatment.

Figure 5. Logic Model for Progression of Diabetes



Source: Mathematica Policy Research, Inc.

**Figure 6. Conceptual Framework for Interrelationships Between Federal Policies and Programs and the Progression of Diabetes**



Source: Mathematica Policy Research, Inc.

### **Estimating Federal Spending**

The study uses fiscal year (FY) 2005 federal spending estimates, the latest year for which detailed data was available at the time the study was conducted (late 2006). The spending analysis is based on a combination of two approaches. The first approach, using a traditional cost-of-illness methodology, estimates the additional federal expenditures incurred to treat people with diabetes compared to those without. The second approach, using budget analysis techniques, estimates the total amount of federal spending allocated to federal programs that may influence or respond to diabetes and its risk factors. These results, however, are not additive, as the first approach captures a marginal cost—the difference between the cost of those with diabetes and those without diabetes—and the second approach captures total program costs.

- **Calculating Medical Treatment Cost Using a Traditional Cost-of-Illness Approach.** For the major federal medical care financing programs, we estimate federal expenditures by focusing on the difference between program expenditures for people identified as having diabetes compared to

those without diabetes. We use traditional cost-of-illness methods (applied to aggregate program data) to do so. The analysis includes estimated additional costs to Medicare, Medicaid, the State Children’s Health Insurance Program (SCHIP) (federal share), the Department of Defense health programs, the Veteran’s Administration (VA), the Federal Employees Health Benefits Program and a few smaller programs, such as the Indian Health Service. Diabetes-related disability costs reflect spending by the Social Security Administration for disabilities due to diabetes and its complications. Unlike traditional cost-of-illness studies, however, the analysis does not capture loss of productivity in the federal workforce associated with diabetes. Appendix B provides additional details.

- **Calculating Total Program Costs Using a Budget Analysis Approach.** For additional federal programs that may influence or respond to diabetes and its risk factors, we use budget analysis techniques to estimate the amount of federal spending allocated to these programs. Our accounting for *prevention* includes both programs focused on the general population and those without diabetes and prevention for those at high risk of diabetes. Within the prevention area, we distinguish between programs that target diabetes directly; target general risk factors for diabetes, such as diet, physical activity and obesity; or more broadly target risk factors, such as community walkability programs. We also account for federal *research* and *monitoring* activities.

Next, we provide spending estimates for each of the programs. Spending estimates, however, are often reported in the aggregate and do not necessarily show how much funding is allocated to the specific programs identified in our departmental analysis. In these cases, we estimate the share of diabetes-relevant spending based on guidelines and selected program reviews. Appendices C and D offer additional details. In Appendix E we compare our approach to an example of the more traditional analysis in one department (HHS).<sup>6</sup> While spending estimates are smaller with the narrower form of traditional analysis, both approaches are consistent in their patterns and yield similar conclusions. More generally, we found that while one can debate how best to apportion spending between diabetes-related and other purposes, the findings we generate are relatively robust in terms of their implications, even if one modifies assumptions and estimates.

### **Capturing the Complex Picture of Federal Spending**

While many programs have an important influence over the general environment in which diabetes develops and progresses, this study focuses most extensively on programs that directly impact the prevention of diabetes (or its

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<sup>6</sup> The example is from “FY 2008 Moyer Material” prepared by the HHS office of the Assistant Secretary for Resources and Technology for submission to Congressional appropriations committees.

major risk factors) and its treatment. Environmental influences excluded by the use of our definition include programs with a much broader focus, such as general food safety policies, poverty programs, anti-smoking programs and substance abuse prevention programs. For example, we do not count income-support programs such as Temporary Assistance for Needy Families (TANF), although such programs have the potential to influence the health of recipients. We do count nutrition education and counseling services such as those provided through domestic food assistance programs—for example, the Food Stamp Nutrition Education program and the Special Supplemental Nutrition Program for Women, Infants and Children (WIC).

Within the health sector, our definition includes programs that train providers on specific diabetes-related activities but would exclude general medical education, facilities construction and so forth. Additional populations and/or program costs excluded from this analysis include those with undiagnosed diabetes, those not engaged with the health system, active military personnel, programs targeting diabetes spending internationally and tax code-related expenditures for individuals or businesses that may influence diabetes.

The estimates are intended to offer an overall picture of federal spending that is in some way related to diabetes to support analysis across federal agencies, not to provide a detailed profile of activity in specific agencies or programs. Undoubtedly, some relevant programs have been inadvertently excluded. Furthermore, our estimates for some of the included programs may vary from the way agencies themselves view or present their efforts.

## **II. THE SCOPE OF DIABETES-RELATED FEDERAL ACTIVITY**

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Almost every department in the federal government has some programmatic responsibility relevant to diabetes (Box 4). Primary activities include delivery of medical treatment to those with diabetes; implementation of prevention, education and assistance programs; policy and regulatory authority; and research and monitoring. The extent of responsibility, however, varies by department, ranging from significant leadership and programmatic activity in HHS and the U.S. Department of Agriculture (USDA) to little or no activity in the Department of Energy (DoE), the Department of State and GSA.

### **A. RANGE OF FEDERAL ACTIVITY**

#### **Medical Treatment and Disability Compensation for Individuals with Diabetes**

The departments most directly involved in diabetes-relevant activity include those that provide direct medical treatment and disability compensation to people with diabetes. Through its responsibility for Medicare, Medicaid, SCHIP, the Indian Health Service and other health programs, HHS provides health care for a substantial share of the population. However, HHS is not alone among federal agencies in this regard. VA operates the largest integrated health care system to provide care for people with (and without) diabetes (VA 2006). The Department of Defense's TRICARE programs provide a worldwide system of direct and purchased health care services for the uniformed services, retirees and their families. The federal government is a major employer and its Federal Employees Health Benefits Program (FEHBP) often is looked to for leadership on health care program design. The Social Security Administration (SSA) oversees a family of programs providing disability coverage to qualified former workers, including those disabled because of diabetes.

## Box 4

### DIABETES-RELATED RESPONSIBILITIES ACROSS FEDERAL AGENCIES

#### Most Extensive Responsibilities

**Department of Health and Human Services (HHS).** HHS provides overall leadership for the nation on enhancing the health and well-being of the United States population. HHS coordinates cross-agency work to lower risk factors, diabetes prevalence and complications and operates national data systems and reporting that support surveillance and monitoring. HHS research institutes provide support for basic and applied research relevant to diabetes in many ways. HHS is also responsible for Medicare, Medicaid and SCHIP, making it the largest national payer nationwide of health services. HHS agencies oversee relevant health programs for American Indians/Alaska Natives and provide access to care and culturally competent services for underserved populations and high-priority subgroups. Programs for children, like Head Start, have major health components. Aging services provide nutritional and preventive support to vulnerable elderly. HHS also helps oversee the safety and efficacy of the nation's food and drug supply and works with other agencies to advise the nation on dietary guidelines.

**Department of Agriculture (USDA).** USDA is responsible for the provision of safe, affordable, nutritious food and reducing hunger and improving health through good nutrition. It operates a large number of programs that influence nutritional status and food intake, including Special Supplemental Nutrition Program for Women, Infants and Children (WIC), Food Stamps, School Breakfast and National School Lunch Programs. Jointly with HHS, USDA also develops and disseminates the *Dietary Guidelines for Americans*, which are the foundation for all federal guidance on diet to the general population and are used as the nutrition standards for domestic food assistance programs.

**Department of Defense (DoD).** With responsibility for military forces, DoD's health programs (TRICARE) serve uniformed service members, retired military and their respective families worldwide through a system of direct and purchased health care services. DoD also oversees selected services abroad, including responsibility for nutrition- and exercise-related services in schools.

**Department of Veteran's Affairs (VA).** VA is responsible for administering programs for veterans, their families and survivors. The VA health system is the largest integrated health care system to provide care to people with diabetes. In addition, VA includes a number of diabetes-related treatment and preventive activities within its purview and supports relevant research in this area.

**Office of Personnel Management (OPM).** Responsible for the federal workforce, OPM operates the Federal Employees Health Benefits Program for active workers, annuitants and their dependents and is responsible for encouraging health promotion and disease prevention in the federal workforce.

**Social Security Administration (SSA).** SSA is responsible for advancing the economic security of the American people through Social Security Programs. SSA's old age and survivors insurance, disability insurance and supplemental security income programs provide critical income support for qualified disabled workers, including those whose primary cause of disability is diabetes-related. SSA also works with the Centers for Medicare and Medicaid Services (CMS) to support Medicare eligibility processes and education.

(Box 4 continued)

### **Targeted and Focused Responsibilities**

**Department of Commerce.** The Commerce Department is responsible for foreign and domestic commerce. Its Census Bureau is responsible for collecting demographic data that supports disease surveillance. The Patent Office registers patents for health technologies and devices, some likely to be related to diabetes detection and management.

**Department of Education.** The Department's mission is to ensure equal access to education and to promote education excellence throughout the nation. Selected grant programs fund physical education in schools and recreational opportunities. Physical activity affects risk for diabetes but the provision of physical activity programs also competes with academic demands on schools, including those within the *No Child Left Behind* program.

**Environmental Protection Agency (EPA).** Responsible for protecting human health and the environment, EPA's diabetes-related work involves education about safe disposal of insulin syringes. However, the agency is also responsible for research on human health and the ecosystem and efforts to help build healthy communities for active aging.

**Federal Trade Commission (FTC).** The FTC is responsible for, among other things, enforcing consumer protection. It oversees federal truth-in-advertising laws and related claims on food, drugs, dietary supplements and other products promising health benefits, as well as advertising and marketing directed at children.

**Department of Homeland Security (DHS).** Responsible for leading the unified national effort to secure America, DHS's major influence over diabetes is its work to monitor the health impacts of disaster situations and procure medications and medical services in crisis areas. The agency also oversees what can be taken on aircraft. Customs and Border Patrol have responsibilities for immigration and entry and exit of people and goods in and out of the country, though these have a more tenuous connection to diabetes.

**Department of Housing and Urban Development (HUD).** HUD is responsible for increasing home ownership, community development and access to affordable housing free from discrimination. It impacts diabetes through its effect on the physical environment and its influence on physical activity—primarily through the Community Development Block Grant and other programs supporting economic development.

**Department of the Interior (DoI).** With a mission to protect and provide access to the nation's natural and cultural heritage, the Interior Department's National Park Service affects the nation's recreational opportunities. The Bureau of Indian Affairs influences education of Indian students.

**Department of Justice (DoJ).** Responsible for enforcing the law and defending the legal interests of the nation, DoJ operates the federal prison systems and its related health services. Though the DoJ caseload is small, many federal prisoners are likely to be at risk for, if not already diagnosed with, diabetes.

(Box 4 continued)

**Department of Labor (DoL).** Responsible for fostering and promoting the welfare of job seekers, wage earners and retirees, DoL oversees health benefits offered by private sector employer plans, the Family and Medical Leave Act and disability employment policy. The agency also collects and analyzes economic statistics, including statistics related to consumer spending on food, insurance coverage and other factors relevant to diabetes.

**Department of Transportation (DoT).** Focused on ensuring a fast, safe, efficient, accessible and convenient transportation system that meets national interests and enhances quality of life, DoT's transportation policies and programs influence land use and the built environment in ways that affect physical activity. DoT also oversees aspects of transportation safety related to operators with diabetes.

**Department of the Treasury.** The Treasury Department's Internal Revenue Service is responsible for the tax system, which exerts wide-ranging influence over activities that affect risk factors for diabetes and treatment incentives. The Treasury Department also has responsibility for selected health financing provisions of the tax code.

**National Science Foundation (NSF).** Responsible for promoting the progress of science by supporting basic research across fields, NSF does not directly support medical research, but its investments benefit medical sciences and related industries. It has funded research that is diabetes-related.

#### **Limited Responsibilities**

**Department of Energy (DoE).** The mission of this agency is to discover solutions to power and securing America's future. Diabetes-related efforts appear peripheral to this agency except to the extent that energy policy influences physical activity.

**Department of State.** With a mission to create a more secure, democratic and prosperous role, the State Department is generally internationally focused. However, its responsibilities related to refugees and immigration—as well as worldwide health—provide some linkages to diabetes-related concerns.

**General Services Administration (GSA).** Responsible for supporting federal acquisitions, GSA's programs do not appear directly relevant to diabetes, although GSA does assist in procurements related to recreation. GSA's main influence over diabetes is likely to be through its potential influence on the design of federal facilities and their support for physical activity.

Source: Mathematica Policy Research, Inc. (MPR) analysis based on review of agency mission statements and programmatic plans.

### **Implementation of Prevention, Education and Assistance Programs**

Most departments are involved in prevention, education and assistance programs that in some way influence diabetes, although some are more involved than others. As the agency responsible for providing leadership on the health and

well-being of the American population, HHS is responsible for many federal preventive programs, but other agencies also have significant responsibilities.

For the most part, prevention efforts focused specifically on diabetes tend to reside in HHS unless they are part of the formal structure of specific health financing and delivery programs discussed above. HHS's diabetes work is typically led or co-sponsored by the CDC and the National Institutes of Health (NIH), including efforts under the Center for Diabetes Translation, the National Diabetes Education Program and the National Diabetes Information Clearinghouse. The Indian Health Service is tasked by Congress with specific prevention efforts relevant to American Indians and Alaska Natives. A few smaller efforts reside in other agencies, like the National Highway Traffic Safety Administration (NHTSA), which has responsibility for driving risks associated with vision problems, including those related to diabetes.

HHS also provides general leadership for the health and well-being of the American people and, as such, is responsible for programs and policies that influence health and risk factors that may affect diabetes and other chronic conditions like cardiovascular disease and cancer. *Healthy People 2010* sets overall health goals and priorities for the nation (HHS 2000). Annual reports like *Health U.S.*, the *National Health Quality Report* and the *National Health Disparities Report* provide valuable trend data to analyze progress in achieving goals and emerging problems (National Center for Health Statistics 2006). To support its efforts, HHS leads a number of coordination efforts, including the Diabetes Mellitus Interagency Coordinating Council, whose members include representatives of diverse HHS agencies, as well as the Veteran's Health Administration. HHS also draws on the Secretary's Council on National Health Promotion and Disease Prevention, *Healthy People 2010* Steering Committee, U.S. Preventive Services Task Force, Interagency Committee on School Health, Intradepartmental Council on Native American Affairs, HHS Rural Health Task Force and other coordination bodies.

Within HHS, both CDC and other agencies sponsor a variety of focused preventive programs. For example, CDC's Racial and Ethnic Approaches to Community Health (REACH) program addresses concerns for disparities in health care and its Active Community Environments Initiative encourages physical activity. Other HHS agencies have prevention programs consistent with the specific subpopulations of their concern. For example, the Health Resources and Services Administration (HRSA) has a special focus on maternal and child health and on the medically underserved. The Administration on Aging has programs to support healthy aging as well as significant responsibility for food programs directed at the aging, such as congregate and home-delivered meals. The Administration on Children and Families is responsible for programs with significant health components, such as Head Start.

Because it is responsible for the safety and efficacy of the nation's food supply, the USDA plays an important role in shaping health. USDA programs that influence nutritional status and food intake include the Special Supplemental Nutrition Program for Women, Infants and Children (WIC), Food Stamps, school meals and

other child nutrition programs (USDA 2006). Although these programs contain embedded nutritional objectives, the intensity of effort spent on nutritional guidance varies substantially. Furthermore, these food assistance programs may influence supply and price for various foods in ways that reflect the economic objectives for the nation rather than the dietary and health objectives (see the Policy and Regulatory section, below).

Other departments that are not directly involved in diabetes prevention or health promotion still affect the environment and communities where people live and provide important opportunities to improve individuals' behaviors and lifestyles. For example, the Department of Transportation (DoT) aims to ensure fast, safe, efficient, accessible and convenient transportation; its policies and programs influence incentives and barriers to walkability. HUD supports re-development efforts through the Community Development Block Grant programs and urban renewal programs that influence the physical environment and access to physical activity. The EPA's responsibilities include research on human health and the ecosystem, including healthy communities for active aging. The Department of Interior's (DoI) National Parks Service oversees a range of recreational opportunities. Through its *No Child Left Behind* program and others, the Department of Education affects local school district programming decisions in ways that may influence physical activity.

### **Policy and Regulatory Authority**

In partnership with HHS, USDA develops and disseminates the *Dietary Guidelines for Americans*, which are the foundation for all federal guidance on diet and used as the nutrition standards for federal domestic assistance (USDA and HHS 2005). Many other federal departments also have policy or regulatory authority that affects diabetes. The Department of Labor (DoL), for example, oversees health benefits offered by private employers, the Family and Medical Leave Act and disability employment policy. The Federal Trade Commission is responsible for consumer protection, including product health claims and advertising and marketing directed at children—such as working with the Food and Drug Administration (FDA) to stop deceptive Internet diabetes ads. FDA oversees the labeling of foods and drugs. Although it is beyond the scope of our study, the Internal Revenue Service (within the Department of Treasury) also has a major impact on health and human behavior through the incentives of the tax code.

### **Research and Monitoring Activities**

HHS data systems and reports provide most of the population-based data upon which diabetes monitoring efforts are built, including the National Health Interview Survey, the National Health and Nutrition Examination Survey, the Medical Expenditure Panel Survey and others (Woteki et al. 2002). However, other departments provide the auxiliary data needed to support such analysis (National Research Council 2004). For example, the Department of Commerce's Census Bureau provides the demographic data needed for population monitoring. The DoL collects and analyzes economic statistics, including those related to consumer

spending on food, health care and other diabetes-relevant areas. Both VA and DoD have ongoing monitoring and research efforts targeted at the populations they are responsible for. Within the National Science Foundation, both basic and social science research touches on issues relevant to diabetes, although medical research is not the specific focus. These complement, of course, the extensive NIH work involving basic and applied research on diabetes and its risk factors. Although the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) leads NIH's diabetes-related efforts, it is by no means the only institute whose work influences diabetes.

## **B. FEDERAL INFLUENCE ACROSS THE LIFESPAN**

Traditionally, federal and state governments and the private sector have divided responsibilities for certain segments of the population, including those at different life stages. For example, beyond general health promotion, the federal government has prioritized providing support for those at the beginning and the end of the lifespan and for certain high-priority groups in between, such as pregnant women. This division is reflected in the intensity and focus of the federal government's diabetes-related programs and activities, described below in descending order.

### **Infants and Children**

A number of federal programs—including WIC, Medicaid, Healthy Start and the Maternal and Child Health (MCH) program—focus on women of childbearing age, their infants and families, with a view toward improving birth outcomes and ensuring a healthy early start in life. As infants grow, many of these efforts continue, augmented by programs targeting school-age children, such as Early Head Start and Head Start. Available resources tend to be directed toward low-income families or those meeting certain specific eligibility requirements—for example, residing on tribal lands or, in the case of WIC, at increased nutritional risk. Although SCHIP has expanded children's health coverage, reaching adolescents has been an ongoing challenge. CDC sponsors programs like VERB (a media campaign to encourage physical activity for young people ages nine to 13). CDC also works with USDA and states on school health and nutrition and physical activity promotion to prevent childhood obesity. The School Breakfast Program and National School Lunch Program influence the dietary intake of roughly 30 million students (USDA 2006). The DoT's Safe Routes to School Program influences students' physical activity.

### **Elderly**

At the other end of the spectrum, Medicare provides almost universal health care coverage for the elderly and the Medicaid program supplements available benefits and cost sharing for those with limited income and assets. Federal aging services support a national network that, among other goals, seeks to encourage good nutrition and physical activity through such programs as Meals on Wheels, nutrition education for elderly people using Food Stamps, Steps to Healthy Aging and others.

## **Priority Populations**

The federal government also has significant responsibilities for subgroups of the population with unique federal histories or responsibilities such as American Indians and Alaska Natives, prisoners, those now serving or having previously served in the military or their dependents. As the nation's largest public employer, the federal government also has additional responsibility for health and other benefits for employees and dependents.

## **Adults Under 65**

Fewer federal programs address this population, and those that do tend either to be relatively low-intensity interventions—for example, advertising and written publications—or focus their work specifically on women who are or may become pregnant. The WIC program and Healthy Start both provide services to pregnant women, including referrals to health care, social services, nutrition counseling and breastfeeding support; WIC also provides vouchers for a food package to supplement the diets of pregnant women, infants and young children. Yet we see little indication that ongoing preventive efforts for this subgroup was a central concern for many adult-focused prevention programs, even though pregnant women who have gestational diabetes (and their children) are at much higher risk for being diagnosed with type 2 diabetes later in life (National Institute of Child Health and Human Development 2006).

### **III. FINDINGS ON FEDERAL SPENDING FOR DIABETES**

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Our analysis of federal spending on diabetes-related costs shows that the federal government spends nearly \$80 billion to treat diabetes and its complications compared to what it costs for those without diabetes, and that the federal spending accounts for about 61 percent of total excess medical spending associated with diabetes nationwide (Table 1). In contrast, the federal government spends much less on prevention, encouragement and support of behavior that reduces the risk factors for diabetes and other chronic conditions, and even less on efforts specifically directed at preventing diabetes or, for those who have diabetes, encouraging effective care to prevent or minimize some complications. An estimated \$3.9 billion is spent across the government on disease prevention and health promotion activities around healthy behaviors and risk factors common to many chronic diseases—namely nutrition (diet), physical activity and obesity. Very little of it, only \$0.2 billion, is specifically targeted to diabetes.

#### **A. TREATMENT AND DISABILITIES**

##### **Incremental Costs for Treatment and Diabetes-Related Disability**

The federal government spent \$79.7 billion on diabetes treatment and related disabilities in FY 2005 (Table 1). This total reflects one in every eight dollars of federal health spending and is roughly equivalent to the total annual budget of the USDA or the Department of Education.<sup>7</sup>

##### **Medical Costs**

In FY 2005, the federal government spent an additional \$77.2 billion in its major health financing and delivery programs to treat people with diabetes compared to costs to treat those without diabetes (Table 1). Total federal spending on diabetes accounted for 61 percent of all spending on diabetes—by government, the private sector and individuals—in the United States during FY 2005 (Figure 7).<sup>8</sup>

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<sup>7</sup> The Office of Management and Budget (OMB) FY 2007 summary table 4-1 for FY 2005 shows total federal outlays of \$85.3 billion for USDA and \$72.9 billion for the Department of Education.

<sup>8</sup> The American Diabetes Association (2003) estimates that in aggregate an additional \$91.9 billion was spent nationally on direct medical care by those with diabetes compared to those without in 2002. To obtain an equivalent estimate for 2005, we make three adjustments. First, we adjust for medical cost inflation by increasing the 2002 estimate by 21.1 percent, which was the National Health Expenditure Accounts (NHE) increase in overall per capita health spending between 2002 and 2005, and then we adjust for overall population growth by increasing the 2002 estimate by a further 2.9 percent, per the National Health Interview Survey reported ratio of 2005 to 2002 population. These two adjustments yield an estimate of \$114.5 billion. In order to adjust for the observed changes in population age and the prevalence of diagnosed diabetes—which rose from 4.8 percent in 2002 to approximately 5.3 percent in 2005 for the overall U.S. population—we increase the estimate by a further 10.4 percent. This yields an estimated total direct medical cost of diabetes in 2005 of \$126.4 billion.

**Table 1. Summary Table: Federal Spending for Diabetes-Related Purposes by Spending Type, HHS Versus Other Agencies, FY 2005 (in billions)**

Type of Spending	All Departments	HHS	Other Agencies
<b>FEDERAL PROGRAM COSTS OF TREATING DIABETES AND DEALING WITH COMPLICATIONS</b>	<b>\$79.704</b>	<b>\$66.056</b>	<b>\$13.648</b>
<b>Direct Health Care Benefits/Treatment Costs</b>	<b>\$77.244</b>	<b>\$66.056</b>	<b>\$11.188</b>
Medicare	\$61.097	\$61.097	\$0.000
Medicaid (federal share)	\$ 4.669	\$ 4.669	\$0.000
Federal Employees Health Benefits (Actives, Annuitants & Dependents)	\$ 2.432	\$ 0.000	\$2.432
DOD (TRICARE)	\$ 3.033	\$ 0.000	\$3.033
Veteran Affairs Health System	\$ 5.723	\$ 0.000	\$5.723
Other (SCHIP, Indian Health Service, PHS Corps Retirees) <sup>a</sup>	\$ 0.290	\$ 0.290	\$0.000
<b>SSDI/SSI Spending for Diabetes-Related Disabilities</b>	<b>\$2.460</b>	<b>\$ 0.000</b>	<b>\$2.460</b>
<b>ADMINISTRATIVE SPENDING BY HEALTH CARE FINANCING PROGRAMS TO PROMOTE EFFECTIVENESS AND QUALITY (See Table 2)</b>	<b>\$1.084</b>	<b>\$0.891</b>	<b>\$0.193</b>
<b>PREVENTION AND HEALTH PROMOTION (see Table 3)</b>	<b>\$3.925</b>	<b>\$2.241</b>	<b>\$1.684</b>
<b>Targeted Diabetes Funding – Total</b>	<b>\$0.232</b>	<b>\$0.214</b>	<b>\$0.018</b>
CDC diabetes-related chronic disease spending	\$0.064	\$0.064	\$0.000
Indian Health Service diabetes prevention	\$0.150	\$0.150	\$0.000
Other	\$0.018	\$0.000	\$0.018
<b>Prevention Targeted at Risk Factors (Physical Activity, Diet, Nutrition, Obesity and Other Relevant Concerns) – Total</b>	<b>\$3.693</b>	<b>\$2.027</b>	<b>\$1.666</b>
CDC	\$0.414	\$0.414	\$0.000
HHS-wide	\$0.021	\$0.021	\$0.000
Other HHS spending	\$1.592	\$1.592	\$0.000
USDA nutrition guidance and services	\$0.915	\$0.000	\$0.915
Other federal departments and agencies	\$0.751	\$0.000	\$0.751
<b>RESEARCH AND MONITORING (See Table 4)</b>	<b>\$3.053</b>	<b>\$2.296</b>	<b>\$0.757</b>
<b>Statistical Systems to Support Monitoring</b>	<b>\$0.159</b>	<b>\$0.086</b>	<b>\$0.073</b>
<b>Research</b>	<b>\$2.604</b>	<b>\$1.945</b>	<b>\$0.659</b>
NIH diabetes-related research (including diabetes education) <sup>b</sup>	\$1.055	\$1.055	\$0.000
NIH research on related risk factors for diabetes	\$0.814	\$0.814	\$0.000
Other relevant research in HHS and elsewhere	\$0.735	\$0.076	\$0.659
<b>Related Regulation (e.g., FDA, FTC, Commerce)</b>	<b>\$0.290</b>	<b>\$0.265</b>	<b>\$0.025</b>
<b>FEDERAL DOMESTIC FOOD PROGRAMS (see Table 5)</b>	<b>\$48.880</b>	<b>\$0.539</b>	<b>\$48.341</b>
Direct feeding or vouchers	\$16.491	\$0.539	\$15.952
Food Stamps	\$32.389	\$0.000	\$32.389

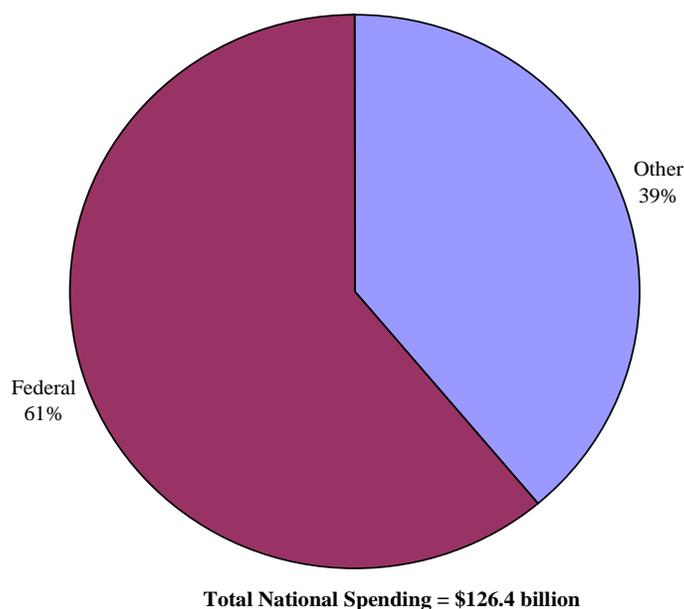
Source: MPR analysis of FY 2005 federal spending, mainly as reported in the FY 2007 budget documents and related program information. Additional detail on methods are in Appendices A-C.

Note: Domestic spending only; excludes active military spending. While programs may serve multiple purposes, we place them within the single category that best typifies most spending because available data do not allow greater differentiation.

<sup>a</sup>SCHIP, State Children’s Health Insurance Program (CMS); PHS, Public Health Service.

<sup>b</sup>Includes NIH funds for The National Diabetes Education Program cosponsored by NIH and CDC.

**Figure 7. Federal Diabetes-Related Spending as Share of National Diabetes Spending, FY 2005**



Source: MPR analysis. Total spending based on inflation of ADA/Lewin estimates of treatment related national diabetes spending to 2005 (excludes indirect costs due to disability and lost productivity).

Nearly 80 percent of this total accounts for the additional federal spending due to diabetes in Medicare alone.<sup>9</sup> Specifically, the federal government spends \$7,665 more to treat a Medicare beneficiary with diabetes than to treat a beneficiary without diabetes. Overall, Medicare spends \$108.6 billion for those with diabetes—\$61.1 billion more than what it otherwise spent to treat those without diabetes (Appendix B, Table B-1). The difference accounts for 18.4 percent of all Medicare spending.<sup>10</sup>

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<sup>9</sup> Because these estimates were for FY 2005, they predate the shifts in federal spending associated with the introduction of the Medicare drug benefit in 2006. This change will increase federal diabetes-related spending in Medicare, part of which will be offset by reduced spending on the federal match in Medicaid.

<sup>10</sup> Total spending for Medicare beneficiaries with diabetes was 32.7 percent of the Medicare budget. The estimate above is just for the difference between spending for those with diabetes in Medicare compared to those without. (See Appendix B for additional detail.)

## Disability-Related Costs

The federal government spent \$2.5 billion in FY 2005 for diabetes-related disability payments through Social Security Disability Income and Supplemental Security Income programs (SSDI/SSI). We have estimated these costs using a much more narrow definition of indirect costs of disability due to diabetes than Lewin used in its national study for the American Diabetes Association in 2002 (ADA 2003). The \$2.5 billion we calculate reflects solely the federal costs of disability as incurred by the SSDI/SSI program. The estimates include annual disability costs for those covered by the program whose primary cause of disability was coded as diabetes, as well as a share of those disabled by visual impairments and renal failure, because such complications are likely with diabetes. The estimates understate the full economic costs of diabetes to the federal government because they do not account for lost productivity in the federal workforce or the impact on federal tax revenue of diabetes-related illness and disability.

## Administrative Spending to Encourage Effective Treatment

Recognizing the opportunity costs associated with diabetes and its complications (as well as with other chronic diseases), financing programs can encourage effective practices for prevention and treatment. They can do this by overseeing the quality of care provided, encouraging providers to use care consistent with national guidelines, measuring and publicly reporting on performance and promoting what research shows to be effective ways of managing care or testing new approaches. However, while treatment costs typically come out of the entitlement (mandatory) part of the federal budget, funding to enhance quality and effective treatment typically is supported through discretionary funds provided in the federal budget. We estimate that only about \$1.1 billion (not included in the \$79.7 billion) is spent directly by the federal government in administrative costs associated with these functions (Table 2).

**Table 2. Estimated Federal Spending in Health Care Financing Programs Associated With Encouraging Quality and Effectiveness of Services, FY 2005 (in billions)**

<b>HHS</b>	<b>\$0.891</b>
Medicare quality improvement organizations (50% share)	\$0.199
Medicare general operations (5% share)	\$0.241
Federal contributions to state Medicaid administration (5% share)	\$0.419
Other federal CMS administrative costs (5% share)	\$0.032
<b>Other</b>	<b>\$0.193</b>
DOD health program management (5% share)	\$0.026
VA medical services administration (5% share)	\$0.167

Source: MPR analysis of FY 2005 spending allocations as reflected in departmental FY 2007 budget justifications provided to Congress.

## B. EFFORTS TO PREVENT DIABETES AND ITS COMPLICATIONS

*Healthy People 2010* goals call for efforts to reduce avoidable risk factors for diabetes and increasing blood sugar control among those already diagnosed; unhealthy blood sugar is a strong predictor of complications (Appendix A, Table A.1 offers a complete list of goals). Many federal programs have the potential to contribute to this outcome if appropriately leveraged.

We find that an estimated \$3.9 billion is spent across the government on disease prevention or health promotion activities around healthy behaviors and risk factors common to many chronic diseases, including diabetes—namely nutrition (diet), physical activity and obesity. Very little of it—only \$0.2 billion—is exclusively focused on diabetes (Table 3).<sup>11</sup> The specific diabetes spending mainly reflects CDC’s diabetes-related spending through the Chronic Disease Program and earmarked Indian Health Service funds for diabetes prevention.

**Table 3. Federal Funding Related to Preventing Diabetes and Reducing Risk Factors, Including Health Promotion, FY 2005 (in billions)**

<b>PROGRAMS SPECIFICALLY FOCUSED ON DIABETES</b>	<b>\$0.232</b>
CDC’s diabetes-specific programs within Chronic Disease Prevention Programs (health promotions)	\$0.064
Indian Health Service Diabetes Program	\$0.150
NHTS Injury Prevention Program (5% share, diabetes, eyesight and driving)	\$0.009
Federal Motor Carrier Safety (DOT, 5% share for insulin-dependent drivers)	\$0.009
<b>PROGRAMS ADDRESSING RISK FACTORS COMMON TO DIABETES AND OTHER CHRONIC CONDITIONS (PHYSICAL ACTIVITY, DIET, OBESITY)</b>	<b>\$3.693</b>
HHS-wide leadership for health promotion (5% share of OS)	\$0.021
CDC	\$0.414
Chronic Disease Prevention programs	
Nutrition, physical activity, obesity	\$0.042
Steps program	\$0.044
Health promotion programs	\$0.026
Genomics (10% share)	\$0.001
Heart disease prevention (75% share for common risk factors)	\$0.034
Cancer prevention (25% share for common risk factors)	\$0.077
Other preventive efforts (50% share)	\$0.108
Health marketing efforts (50% share)	\$0.022
Preventive health block grant (50% share)	\$0.060

<sup>11</sup> NIH sponsors and contributes to the National Diabetes Education Program and National Diabetes Information Clearinghouse. However, these funds are included in our tallies of research spending rather than here because of the lack of information about the share of NIH’s diabetes-related research spending that supports the National Diabetes Education Program and other efforts at prevention and education.

(Table 3 continued)

Other HHS Programs	
Aged (AoA) nutrition services (25% share for education)	\$0.180
Aged (AoA) preventive services (75% share)	\$0.017
Aged (AoA) home and community services (25% share)	\$0.089
Head Start (ACF) activities (10% share)	\$0.684
Social Services Block Grant (ACF) (50% share)	\$0.182
Community Services Block Grant (ACF) (10% share)	\$0.064
HRSA health centers (10% share) <sup>a</sup>	\$0.157
HRSA program management (5% share for Collaboratives, etc.)	\$0.008
MCH Block Grant (10% share)	\$0.072
Indian Health Service preventive care (25% share)	\$0.083
Healthy Start (HRSA) (25% share)	\$0.024
SAMSHA initiatives (1% share)	\$0.032
Department of Agriculture (Nutrition Guidance)	\$0.915
Nutrition education in food assistance programs <sup>b</sup>	\$0.500
WIC (including nutrition screening, counseling, medical referrals) (25% share) <sup>c</sup>	\$0.348
Expanded Food and Nutrition Education Program (including Tribes)	\$0.060
USDA administrative coordination (5% share)	\$0.007
Other Departments	\$0.751
Department of Education Recreation and Physical Activity Programs	\$0.076
Safe Routes to School (Department of Transportation)	\$0.054
Department of Transportation policy analysis (5% share)	\$0.014
Community Development Block Grants (HUD, 5% share for walkability)	\$0.235
National Park Services (Interior, 5% share for recreation)	\$0.084
Take Pride in America (Interior, 5% share for activity)	\$0.163
DOD education budget (5% share for nutrition, health, activity)	\$0.079
Department of Justice preventive care (5% share of administration)	\$0.007
Department of Homeland Security (1% share for disaster relief, supplies)	\$0.026
OPM employee prevention support (25% share of Center administration)	\$0.006
EPA Healthy Communities and Aging program	\$0.007

Source: MPR Analysis of federal FY 2007 budgetary documents (for FY 2005 spending) and related program information.

<sup>a</sup> Although this includes treatment as well as prevention, health centers focus on primary care. We therefore include the diabetes-related spending for health centers (and MCH and Healthy Start spending) in this category, rather than in treatment. The methods used to allocate these costs to diabetes-related purposes bear more similarity to those used in this part of the analysis than in the treatment-related and complications cost analysis.

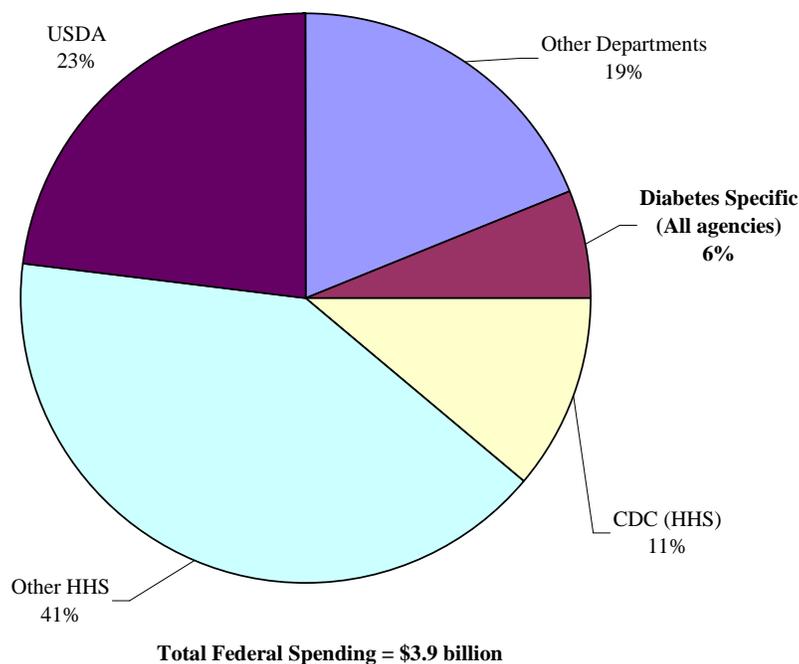
<sup>b</sup> Food and Nutrition Service, including Food Stamp Nutrition Education, WIC, Team Nutrition, Child Nutrition programs and others.

<sup>c</sup> Accounts for a 25 percent share of direct services (excluding food vouchers).

As described in the previous section, the federal government funds many programs that focus on healthy behavior and reducing associated risk factors for many chronic diseases (including diabetes), namely nutrition (diet), physical activity and obesity (Figure 8).

- **HHS:** Accounting for \$2.2 billion (56 percent) of total federal spending in this area, HHS provides leadership to the federal government's efforts on prevention and health promotion. CDC, a recognized leader within HHS in prevention, accounts for only \$0.4 billion (20 percent) of HHS spending (and 12 percent of all federal spending) for this purpose. A number of additional agencies within HHS spend the remaining \$1.8 billion (80 percent). For example, the Administration for Children and Families (ACF) and the Administration on Aging (AoA) oversee block grant programs that support diabetes-related prevention activity. Additionally, the Health Resources and Services Administration (HRSA) programs to improve access to health care contribute heavily to prevention, detection and early treatment of diabetes and to the reduction of risk factors, particularly for vulnerable subgroups of the population.
- **USDA:** The USDA accounts for \$0.9 billion (23 percent) of federal spending on diabetes prevention and health promotion. The USDA primarily funds nutrition guidance and prevention, including \$0.5 billion for nutrition education across domestic food assistance programs and \$0.3 billion for relevant work in the WIC program (such as breastfeeding promotion, referrals to health services and nutrition counseling).
- **Other Departments:** The remaining \$0.8 billion (20 percent) is spent by a number of other federal government departments on small shares of their programs with prevention goals. For example, programs in DoT, HUD, DoI and the National Park Service have physical activity components. The Department of Education and the Department of Defense (DoD) sponsor recreation and/or healthy behaviors education as part of their school-based activities. While these programs were often initially established to meet departmental goals unrelated to diabetes, they are relevant due to their focus on lifestyle improvements that may prevent diabetes.

**Figure 8. Distribution of Spending Prevention/Health Promotion Funds Across Agencies**



Source: MPR analysis of departmental budget documents.

Whether the amount now currently spent by the federal government is an appropriate amount is a question that can be debated. The findings are clear, however, that most efforts are not focused specifically on preventing diabetes and its complications and that current funding is highly fragmented.

### **C. DIABETES-RELATED RESEARCH AND MONITORING**

The federal government spent about \$3.1 billion in FY 2005 in diabetes-related research, monitoring and oversight of the food and drug supply and other regulatory functions (Table 4). Approximately two-thirds of the spending in this category is by NIH for research with immediate applications as well as that with long-term investigative goals. NIH estimates that \$1.0 billion of its spending is in some way diabetes-related, although only \$0.5 billion of this occurs in the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK)—the rest is for other NIH nutrition, obesity and prevention research that we assumed had some relationship to diabetes. A small share of this funding supports core statistical systems that provide the basic data on diabetes prevalence, complications and costs (\$0.2 billion). Another small share covers the work of FDA and others to regulate drugs, devices, food and the claims made about them (\$0.3 billion).

**Table 4. Federal Funding for Research and Monitoring Related to Diabetes and Associated Risk Factors, FY 2005 (in billions)**

<b>Total Diabetes-Related Spending of this Type</b>	<b>\$3.053</b>
<b>Basic Statistical Systems for Diabetes and Risk Factor Monitoring</b>	<b>\$0.159</b>
NCHS statistical systems (NHANES, NHIS and Vital Statistics) (50% share)	\$0.055
MEPS (AHRQ) (50% share)	\$0.028
Indian Health Service (5% share for epidemiology surveillance)	\$0.003
BLS surveys (10% share for consumer behavior data)	\$0.052
USDA statistics (10% share for nutrition-related work)	\$0.013
Commerce Department (10% share for surveys and economics statistics)	\$0.007
DOJ health statistics (1% share)	\$0.001
<b>NIH Research<sup>a</sup></b>	<b>\$1.869</b>
Diabetes-related spending (100% of NIH estimate) <sup>b</sup>	\$1.055
Other relevant nutrition-related spending (35% of NIH estimate) <sup>c</sup>	\$0.382
Relevant obesity research not included above (10% of NIH estimate)	\$0.052
Relevant prevention research not included above (5% of NIH estimate)	\$0.355
National Library of Medicine (10% share)	\$0.025
<b>Monitoring and Regulation</b>	<b>\$0.290</b>
FDA biologics (5% share)	\$0.009
FDA devices (5% share)	\$0.013
FDA drug evaluation and regulation (10% share)	\$0.025
FDA food safety and applied nutrition (50% share, nutrition surveillance)	\$0.218
FTC regulation of health advertising claims (10% share)	\$0.012
Department of Commerce, medical patents (5% share)	\$0.013
<b>Other Relevant Research</b>	<b>\$0.735</b>
<b>HHS Agencies</b>	<b>\$0.076</b>
AHRQ health care cost and quality research (10% share) <sup>d</sup>	\$0.026
AHRQ program support (5% share)	\$0.008
CMS state grants and demonstrations (5% share)	\$0.020
CMS general research and development (5% share)	\$0.006
CDC public health research (e.g., Prevention Research Centers) (50% share)	\$0.016
<b>Other Departments</b>	<b>\$0.659</b>
VA Health Atlas, social, behavioral and economic research (5% share)	\$0.010
VA medical and prosthetics research (25% share)	\$0.101
Department of Defense health-related research (5% share)	\$0.026
USDA nutrition/obesity-related research (25% share)	\$0.317
NSF (5% behavioral research and 1% nanotechnology)	\$0.013
EPA human health and ecology efforts (5% share)	\$0.009

Source: MPR Analysis of FY 2005 agency spending as reported in FY 2007 budget documents, along with other programmatic information.

<sup>a</sup> Based upon NIH reported spending by condition with adjustments made by MPR for expected overlap across conditions; the spending may contribute to other goals, such as prevention. However, the available data do not support more detailed estimates.

(Table 4 notes continued)

<sup>b</sup> Includes NIH funding of the National Diabetes Education Program and National Diabetes Information Clearinghouse (among other funding uses).

<sup>c</sup> Based on institution specific comparison for spending reported for diabetes and nutrition which was examined to assess overlap and potential relevance of the remaining uses of funds. The estimates for nutrition count 50 percent of the NHLBI and NCI reported nutrition spending and 25 percent of other agencies reported nutrition spending. Of the \$1.082 billion NIH reports spending on nutrition research, the diabetes-related share is estimated at \$0.382 billion.

<sup>d</sup> A large share of the funds in this AHRQ's budget category that this represents are mandated for use in patient safety and information technology. Although these areas are relevant to diabetes, they are typically broader in focus and not counted in our estimates. By including the funds that we did, we intended to capture how much is spent by AHRQ on quality indicators and measures, on effectiveness studies, on the National Healthcare Quality Report, the National Health Care Disparities Report and on other relevant grants and activity.

Outside of NIH, there is some diabetes-related research in the Agency for Healthcare Research and Quality (AHRQ), the Centers for Medicare and Medicaid Services (CMS) and the CDC that is used to enhance knowledge of effective practices, support clearinghouses for guidelines and relevant tools and similar efforts. These activities comprise only about \$0.08 billion of federal spending, which means that there is likely a substantial imbalance between spending on clinical research versus efforts to modify human behavior and the environment in ways that build on research-based effective practices. Other departments spend an additional \$0.7 billion on diabetes-related research; almost half of this is in USDA and goes toward research on nutrition and obesity.

## **D. DOMESTIC FOOD ASSISTANCE PROGRAMS**

Our analysis (Table 5) indicates that the federal government spent at least \$48.9 billion on food, provided either directly through programs (\$16.5 billion) or by income transfer through Food Stamps (\$32.4 billion) in FY 2005. This is in addition to specific nutrition education work. It also excludes funding for farm subsidies and other economically targeted food programs that do not directly address health concerns but may influence what food is available and at what price.

**Table 5. Federal Domestic Spending on Food Assistance Programs, FY 2005  
(in billions)**

<b>Total</b>	<b>\$48.880</b>
<b>Direct Feeding or Voucher Programs</b>	<b>\$16.491</b>
HHS Administration on Aging Nutrition (75% for food)	\$0.539
USDA Child Nutrition Programs (includes National School Lunch, School Breakfast programs, Child and Adult Care Feeding program and a special milk program) <sup>a</sup>	\$12.049
WIC (less direct services) <sup>a</sup>	\$3.583
Other USDA food and nutrition assistance (includes Summer Food Service, emergency food, food distribution and community food programs) <sup>a</sup>	\$0.320
<b>USDA Food Stamp program (less nutrition education)<sup>a</sup></b>	<b>\$32.389</b>

Source: MPR analysis of federal departmental budgets and related information.

Note: Excludes spending on farm support programs (\$19.599 billion in FY 2005 for Farm Service Agency Commodity Programs) and other direct expenditures or tax incentives that relate to the agricultural sector. Excludes share of programs which provide food in ways that cannot be easily distinguished (e.g., Head Start).

<sup>a</sup>See Appendix C for additional detail on methods.

## **IV. MISSED OPPORTUNITIES TO LEVERAGE FEDERAL EFFORTS**

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Figure 6 (shown previously) illustrates how federal policies and programs influence diabetes and its complications at many levels. The spending analysis shows that the federal government bears a heavy burden in treating the complications of diabetes because of its responsibility for Medicare, Medicaid and other programs that serve individuals disproportionately later in life. In contrast, the federal government is not effectively leveraging its other programmatic and policy responsibilities to limit the need for such spending. Below, we review some of the missed opportunities revealed in this study, beginning with those most immediately relevant to treatment and then addressing an increasingly broader frame of reference (Box 5 provides suggestions by specific program).

### **A. REDUCING COMPLICATIONS THROUGH EARLY DETECTION AND EFFECTIVE TREATMENT**

Although recent improvements have been made, health care financing and delivery is still structured to pay for illness, rather than promote health and limit the progression of disease and its complications. For example, research shows that glycemic control can greatly reduce complications and that achieving such control requires active patient involvement (Diabetes Prevention Program Research Group 2002); however, there are many gaps.

In 2006, NIH responded to a Congressional Request for analysis of the disparities between actual treatment for type 2 diabetes and what available guidelines show should be done (NIDDK 2006). The federal Diabetes Interagency Coordinating Committee agreed that the evidence highlighted a gap that was not improving, overall, in the share of the population that met guidelines for blood sugar control. The report identified actions the government can take to close the gap, including: (1) identifying better ways to treat diabetes; (2) promoting education on diabetes management; (3) overcoming financial barriers to care; (4) enhancing systems of care; and (5) supporting and enhancing diabetes surveillance. Yet while the report describes ongoing federal activity in each of these areas, it is clear that the scale of that activity is far too limited to effectively reduce the gap. There are many examples of where more can be done.

Medicare now pays for self-management training on doctors' referral and diabetes screening for those at risk was authorized in 2005. Nevertheless, the structure of the medical care process may not sufficiently emphasize the importance of these tasks. Little is known about the use of the new diabetes screening benefit and uptake may be limited (*Congressional Quarterly* 2006).

## Box 5

### ILLUSTRATIVE ADDITIONAL OPPORTUNITIES FOR LEVERAGE ON DIABETES RISK FACTORS

**Medicare.** Address concerns that the uptake of the new Medicare diabetes screening benefit is less than desirable. Evaluate how the new Part D benefit has influenced access to drugs and supplies for those with diabetes.

**Medicaid.** Review recent GAO study results on state coverage of diabetes-related drugs and supplies to determine whether access barriers due to coverage limitations or cost sharing requirements are sufficient to warrant federal intervention to encourage more complete access to services that have the potential to reduce costly complications. Use Medicaid's Early and Periodic, Screening, Diagnosis and Treatment (EPSDT) program authority to encourage screening and early detection of diabetes.

**Federal Employees Health Benefits Program (FEHBP).** Encourage the Office of Personnel Management (OPM) to more aggressively pursue a prevention agenda in contracting with health plans and working with agencies.

**Food Stamp and Other Feeding Programs.** Identify how to leverage this major investment in food programs and income-support to encourage good nutritional choices.

**Farm Subsidy Programs.** Review programs and tax policy for potential inconsistencies with nutritional concerns and feeding programs.

**Child Care Block Grant.** Assure that information on nutrition and exercise opportunities are incorporated into concerns parents may want to consider in thinking about child care options.

**No Child Left Behind.** Address potential unintended consequences of federal performance requirements in the *No Child Left Behind* program to the extent that they lead schools to reduce opportunities for physical activity.

**Refuge Assistance.** Use the opportunity for personal engagement to warn about potential changes in diet or physical activity associated with relocation that could have adverse consequences.

**Federal Transportation Programs.** Encourage considerations of walkability, bikeability and access to public transportation in how urbanized formula grants are used. Assess potential inconsistencies between concerns for physical activity and the structure of transportation policy.

**Federal Urban Renewal Programs.** Encourage more consideration of the way the built environment supports physical activity by incorporating walkability, bikeability and access to public transportation and recreation facilities, into plans for the physical environment.

**Disability Policy.** Review concerns raised about the way diabetes-related conditions relate to the Americans for Disability Act, for example.

Similar limitations exist in other programs. For example, because of the way Medicaid is structured, states decide whether to cover optional services, which include diabetic supplies and pharmaceuticals. While many states provide such coverage, cost sharing can serve as a barrier to access (Kaiser Family Foundation 2005). In the Federal Employees Health Benefits Program, there is no standardized benefit package and while coverage tends to be comprehensive, there is variability across plans—including in coverage for diabetes-related services (General Accounting Office (GAO) 2005).

Recognizing the importance of care management, Medicare, VA and other federal health care delivery and financing programs have developed care management programs and other initiatives to enhance quality and encourage effective diabetes care that may avoid complications (Box 6). Outcomes reported from the VA's work are particularly impressive (Kupersmith et al. 2007).

#### **Box 6**

##### **SELECTED FEDERAL PROGRAMS TO MEASURE AND PROMOTE EVIDENCE-BASED CARE AND IMPROVE QUALITY**

National Quality Guidelines Clearinghouse (AHRQ)  
Effective Healthcare Program (AHRQ)  
Innovations Clearinghouse/Quality Tools (AHRQ)  
MedQIC Web Site (CMS)  
Medicare Quality Measurement Initiatives (CMS)  
Medicare Disease Management Programs/Demonstrations (CMS)  
Medicaid/SCHIP Quality Initiative (CMS)  
Health Disparities Collaboratives (HRSA, AHRQ)  
Web Based Resources on Cultural Competency (HRSA)  
VA Efforts to Screen and Monitor Diabetes Prevalence  
VA Clinical Practice Guidelines

Source: MPR analysis of agency Web sites

However, improving care for those with chronic illness remains a challenge in health financing programs, particularly when efforts receive little funds and are overlaid on a health delivery system that remains relatively fragmented and with payment systems that include few incentives for prevention (MedPAC 2002, 2004 and 2006; Berenson and Horvath 2003). The Congressional Budget Office (CBO) (2004) found that disease management efforts have so far failed to generate the returns they promise in terms of costs, though CBO noted that their focus was on overall cost impacts, not the overall value of these programs, some of which may

generate clinical improvements in particular subgroups of patients. With respect to diabetes, for example, CBO notes the strong evidence that disease management can reduce patients' HbA1c levels and increase compliance with getting recommended examinations and screening (such as foot and eye exams), but also that there is not comparable evidence for effects on other targets (such as lowering weight, blood pressure and cholesterol levels) or for improvements in health outcomes such as rates of blindness or kidney failure.

Others conducting cross-cutting reviews of studies conclude that there is some evidence that improved management of diabetes can improve health outcomes (Renders et al. 2001) and that self-management programs for older adults have improved care both for hypertension and for diabetes (Chodosh et al. 2005). Multifaceted interventions may be particularly effective, including efforts that link community organizations to the health system, provide self-management support, redesign the delivery system, provide decision-support to providers and incorporate clinical information systems that aid in tracking the progression of diabetes (Bodenheimer, Wagner and Grumbach 2002; Wagner et al. 2001).

Understanding how to get patients and providers to practice what research identifies as effective ways to improve diabetes outcomes is important, yet our research shows that there are scant funds available to support such analysis, particularly in relation to the amount spent on clinical research.

## **B. LEVERAGING FAMILY, COMMUNITY, SCHOOLS AND THE WORKPLACE TO INCREASE PREVENTION, DETECTION AND EARLY TREATMENT OF DIABETES**

As highlighted in the logic model, reducing the prevalence and complications of diabetes is more likely if programs take into account the social system and environment in which individuals function (their families, communities and broader environment) as well as the health care system that supports their care. The structure of health care financing programs typically focuses on the individual and as a result may fail to leverage the social systems that can support individuals in making lifestyle improvements as previously discussed (Wagner et al. 2001).

National studies indicate that lifestyle changes can be more effective in reducing the incidence and progression of diabetes than drugs alone (Diabetes Prevention Research Group 2002). However, such interventions require substantial investment of resources over a long period of time. Given the time people spend at home, at work, in school and in community gathering places, these areas make obvious targets for outreach and encouragement of behavior change. Although some programs, such as WIC and Head Start, are structured to leverage families and communities to achieve health goals, many are not—providing important points of missed opportunity. Evidence suggests that diabetes self-management education interventions for adults with type 2 diabetes should occur in community gathering places, that adolescents with type 1 diabetes should be reached in the

home and that studies continue on how to leverage other sites, such as recreational camps, worksites and schools (CDC 2003; HHS 2004).

Current prevention and health promotion programs are structured in a way that is likely to miss important subgroups of the population at risk for diabetes. For example, while gestational diabetes is a major risk factor for subsequent type 2 diabetes, it is not clear that these high-risk people receive adequate targeted attention and follow-up after they transition from their prenatal provider back to regular care. Similarly, because income requirements apply to many programs, federal efforts may miss opportunities to inform other high-risk populations about diabetes and associated complications and how to reduce their risk.

### **C. ENCOURAGING IMPROVEMENTS IN THE BUILT ENVIRONMENT TO INCREASE PHYSICAL ACTIVITY**

Lack of physical activity is a major risk factor for diabetes because of its influence on obesity. But it is difficult to encourage physical activity if the environment in which people live does not support it or creates incentives that run counter to an emphasis on physical activity. Leveraging investments in ways that modify people's environment may also broaden the reach of prevention efforts. DoT, HUD, DoI and others have programs that influence the built environment<sup>12</sup> in ways that may affect physical activity. However, we find only a small share of funds targeted in this direction in relation to the size of these programs. Further, some programs may have unintended consequences that conflict with public health objectives. The *No Child Left Behind* program, for example, has been criticized as encouraging less attention to physical activity in its efforts to improve test scores. In contrast, WIC, Healthy Start and Head Start are among the federal programs that attempt to integrate individual and community efforts.

### **D. LEVERAGING DOMESTIC FOOD ASSISTANCE PROGRAMS**

Our study shows that the federal government spends \$49 billion directly on the food component of food assistance programs. With obesity a major risk factor for diabetes, this spending can be used in part to influence behavior and address environmental risk factors related to diabetes and its complications. Yet many argue that the food provided through federal feeding programs is not as well matched with dietary guidance as it should be.

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<sup>12</sup> The built environment are those aspects of our environment that are human modified such as homes, schools, workplaces, parks, industrial areas, farms, roads and highways. The challenges related to the built environment pertain to transportation, urban sprawl, air pollution, city planning and diminishing natural resources (National Institute of Environmental Health Sciences 2006).

Nutritional guidance is intended to be a component of these programs,<sup>13</sup> but its effectiveness is unclear.<sup>14</sup> A GAO (2004) review of nutrition education efforts found that limited resources and competing demands to meet program requirements affected the ability to deliver nutrition education and recommended stronger linkages and coordination between programs. In various ways, critics have said that the nutritional guidance provided by the federal government sets the bar too low and that tension between public health and economic concerns for the agribusiness sector may lead to compromises and conflicting incentives (Nestle 2003a and 2003b). For example, USDA economists estimate that significant shifts in agriculture would be needed if Americans followed the USDA *Dietary Guidelines* and the MyPyramid Food Guidance System (USDA 2006; Buzby et al. 2006). The additional demand for healthy foods would require USDA agriculture to increase cropland by 7.4 million acres (or 1.7 percent) for fruits, vegetables and whole (and total) grains and increase milk production by 65 percent.<sup>15</sup> Furthermore, the U.S. food supply is nearly double what is needed per person, resulting in an overabundance of calories and intensive food marketing by industry, especially to children (IOM 2006; USDA 2004; Nestle 2003b and 2006).

A 2006 study of obesity funded by the Robert Wood Johnson Foundation and conducted by the Trust for America's Health examined perceived shortcomings in the way federal food program funds are leveraged to promote healthy behavior. The report recommended changes at all levels of influence to address these shortcomings (Box 7).

The Institute of Medicine's (IOM) proposed changes to the WIC Food Package provide a renewed opportunity to increase dietary quality with more attention to energy balance and obesity (IOM 2005).<sup>16</sup> WIC's research to identify best practices

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<sup>13</sup> USDA spends about \$0.5 billion in nutrition education through the Food Stamp Nutrition Education (FSNE) Program, WIC, Team Nutrition in schools and child nutrition feeding programs, and the Expanded Food and Nutrition Education Program (EFNEP) (Food and Nutrition Service 2006; Abt Associates, Inc. 2006).

<sup>14</sup> USDA's nutrition education ranges from broad dissemination of the Food Guide Pyramid and *Dietary Guidelines for Americans* to more intensive 10 to 12 EFNEP sessions delivered at camps, recreation sites and other community locations (GAO 2004; Abt Associates, Inc. 2006). WIC provides an average of two 15-minute nutrition education sessions per WIC participant every six months (Besharov and Germanis 2001; IOM 2002). FSNE operates through schools, WIC clinics, elderly service sites, emergency food sites, and youth education sites such as YMCAs and preschools (Abt Associates, Inc. 2006). USDA-funded nutrition education ranged from \$0.20 to \$103 per participant in 2002 (GAO 2004).

<sup>15</sup> The study did not estimate the decreases in meat, fats, oils and sweeteners (added to processed foods and drinks) needed to meet the *Dietary Guidelines for Americans*, so the net effects on agriculture are unclear.

<sup>16</sup> WIC provides nutrition services and food vouchers to about 8 million low-income women, infants and young children (USDA 2006). Although the program is effective in increasing nutrient intake and the prevalence of iron-deficiency anemia among infants, there is debate about its effectiveness in improving the diet and nutritional risk of women and of children ages one to four, based on the level of nutrition counseling provided (Besharov and Germanis 2001).

in breastfeeding promotion is important, as breastfeeding in infancy is associated with reduced risk of type 2 diabetes in later life (Owen et al. 2006). Furthermore, since WIC reaches nearly half of all infants in the United States, further breastfeeding promotion has the potential to reduce the long-term risk of diabetes among infants and children.

There are likely to be other ways in which food programs and nutritional support can be better targeted at concerns specific to those at high-risk for diabetes or those already diagnosed with diabetes whose complications could be reduced by a more effective diet.

## Box 7

### **THE TRUST FOR AMERICA'S HEALTH RECOMMENDATIONS FOR FEDERAL ACTION TO REDUCE OBESITY—A KEY RISK FACTOR FOR DIABETES**

This Robert Wood Johnson Foundation funded report analyzed the failures of obesity policies in America, concluding that concerted action was needed to address the failures. The report included recommendation focused on all levels: individual and family, community, state, school districts, employer, industry and federal government. Federal recommendations are listed below. Federal funds and policies also may support activity by others.

#### **The federal government should raise the bar in its requirements and services:**

- Overhaul the federal Food Stamp and WIC Supplemental nutrition programs to focus on maximum nutrition for cost including adapting the program for the new recommended federal food guidelines, doing more to enable healthier food choices and taking more action to provide useful nutritional counseling.
- Within Medicaid, provide routine screenings for those at risk of obesity-related illnesses, including mandated routine screening programs along with routine nutritional and obesity counseling. Medicaid also should subsidize or provide reimbursement for community fitness programs.
- Raise requirements on school meal programs to provide maximum nutrition to students rather than meeting minimum nutritional standards.
- Fix the food pyramid and add corresponding physical activity guidelines that address public concerns and add more physical activity information.
- Offer and emphasize prevention benefits provided to federal employees.
- Use clout as food purchaser, employer and service provider to veterans by setting high standards for nutrition. Incentive programs should be explored.
- Bolster obesity research with an expanded behavioral risk factor surveillance system, prioritize and fund key research initiatives focused on identified priorities and explore economic incentives for promoting good nutrition and exercise.
- Increase the availability of obesity initiatives and grants to states, including full funding for STEPS and DASH and additional targeted public education efforts, particularly those for children and a focus on high-risk communities with consistent messages.

Source: Trust for America's Health. "F as in Fat: How Obesity Policies are Failing in America, 2006". Issue Paper available at <http://healthyamericans.org/reports/obesity2006/Obesity2006Report.pdf> on [www.healthyamericans.org](http://www.healthyamericans.org)

## V. CONCLUSIONS AND RECOMMENDATIONS

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### A. CONCLUSIONS

Our study highlights the enormous and growing toll of diabetes on this country and the importance of a broad range of federal programs to preventing diabetes and its complications. Our research finds that the federal government spent \$79.7 billion in FY 2005 in additional treatment costs for those with diabetes compared to those without diabetes—an amount that is about 61 percent of the total United States medical spending across all payers for additional treatment costs associated with diabetes. For context, the amount the federal government pays to treat those with diabetes, compared to those without, is more than the entire budget of the Department of Education.<sup>17</sup> It is 12 percent of the *total federal health care spending* nationwide—roughly one of every eight dollars in federal health spending.<sup>18</sup>

A significant share of this spending is potentially avoidable, to the extent that diabetes and its complications can be prevented. Research shows that savings can result from efforts focused on prevention, early treatment and greater use of evidence-based practices that reduce risk factors for diabetes, control blood sugar and decrease complications and resulting disability. In FY 2005, the federal government spent \$3.9 billion on prevention and health promotion around healthy behaviors and risk factors common to many chronic diseases—namely nutrition (diet), physical activity and obesity. Very little of these funds—only \$0.2 billion—are specifically targeted to diabetes.

These funds are spread across numerous departments and are mostly focused on healthy behaviors, not specifically the populations at highest risk for diabetes. In addition, as noted, other federal programs contain elements that may not necessarily encourage a healthy lifestyle, good diet and physical activity, and therefore conflict with federal diabetes-related goals.

Compared to spending on treatment, the federal government spends very little (\$1.1 billion) to enhance the quality and effectiveness of the care it pays for. Further, while the federal government invests \$3.1 billion in research and surveillance related to diabetes and general risk factors, there are important gaps in emphasis. For example, while much is spent on clinical research, relatively less attention is devoted to identifying effective ways to modify human behavior or

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<sup>17</sup> \$72.9 billion, Table 4.1 “Outlays by Agency: 1962-2011, The Budget for Fiscal Year 2007,” Historical Tables, OMB.

<sup>18</sup> Table 3, National Health Care Expenditure Projections, projected total federal spending was \$645.9 billion of the \$2,016 billion estimated to be spent nationally on health care in calendar year 2005.

encourage providers and delivery systems to implement practices that research has shown to be effective.

## **B. RECOMMENDATIONS**

Without strong federal leadership, the human and economic costs for diabetes and its complications—at least some of which are avoidable or controllable—will continue to mount. This increase in cost will only escalate as the prevalence of diabetes within our society grows. Furthermore, the nation will not reach the *Healthy People 2010* goal of using prevention to reduce the prevalence and economic burden of diabetes and improve the quality of life for people with or at risk of diabetes. This is not the first study to identify the challenge. In 2004, HHS released a report entitled *Diabetes: A National Plan to Action* (HHS 2004), calling for diabetes prevention, detection and treatment to be the focus of a national action plan with a comprehensive action-oriented approach involving all stakeholders. To reduce the burden of diabetes on the government and the nation, we recommend, based on our study, the following actions for consideration by the federal government and diabetes community.

### **1. The federal government should take steps to get the most out of current spending in medical care programs.**

- The government should make appropriate screening and early detection of diabetes and its antecedent risk factors a priority in all federal health programs, particularly Medicare and Medicaid. It must be willing to increase appropriate spending in this area, encouraged by the knowledge that doing so is likely to reduce the costs of treating the complications of diabetes.
- CMS should analyze why use of the new Medicare diabetes screening and the ten-year-old self-management benefits have apparently been low and what actions are needed to enhance effective screening and other preventive modalities, especially in high-risk populations. CMS should use its authority to take steps to increase use of these benefits, so diabetes is detected and self-management is used effectively to control blood glucose and thereby reduce the risk of complications.
- CDC should work with CMS, OPM, VA and other relevant departments to use national data on diabetes prevalence and health behaviors to inform major health care financing programs in areas such as benefit design and reimbursement policy that will support effective approaches to diabetes prevention and treatment. The government should also make it easier for major federal financing programs, like Medicare, Medicaid, the Federal Employees Health Benefits Program and others, to monitor diabetes at the program level and the effectiveness of innovations, such as are being recommended here, by better capturing data on diabetes risk and outcomes among those served by these programs.

- HHS should identify, disseminate and encourage the uptake of knowledge about the strategies that yield the highest pay-off in self-management and care management of diabetes. Research clearly shows that glycemic control can greatly reduce the complications of diabetes and that active patient involvement is essential to this outcome. Yet there are significant—and costly—gaps between what research shows to be effective and the way care is currently provided. Because the federal government plays an extensive role in financing care for people with diabetes, federal leadership in education and improving care for diabetes is essential.
- The Secretary of HHS should strengthen research and develop effective strategies for: (1) educating and promoting behavior changes that can lead to risk reduction for diabetes and its complications and (2) motivating and rewarding health providers for adopting evidence-based interventions for diabetes prevention and control.

## **2. The federal government should lead by example and effectively promote the health of its workforce.**

- OPM should strengthen the activities of the *Healthier Feds* initiative by building into their negotiations with health plans appropriate standards and activities to reduce risk factors for diabetes and encourage education, prevention and early treatment of diabetes to reduce costly complications. They should publicly report on a periodic basis what has been achieved.
- Congress should ask IOM to analyze and report on the number and characteristics of people at high risk for diabetes and its complications who are reached by the major federal programs that address diabetes. This should include an assessment of the differences in reach and intensity of effort based on socio-demographics (because many programs have maximum income requirements), as well as the identification of any gaps or shortcomings that impede the reach and effectiveness of these programs.

## **3. The federal government should enhance interdepartmental coordination to more effectively apply its resources to reduce the risk factors for and complications of diabetes.**

- The federal government should require that USDA and HHS work together to examine ways to heighten the impact of federal spending on food and nutrition to reduce risk factors for diabetes, diabetes prevalence and complications. The goal should be to harmonize efforts so that effective diabetes prevention and a diet more consistent with federal guidelines become a central component of nutrition and food programs.

- There is a role for strong federal leadership in addressing the problems of obesity and lack of physical activity with a view toward the way they contribute to diabetes and its costly complications. While the Diabetes Mellitus Interagency Coordinating Committee is responsible for coordination around diabetes, its focus and membership does not necessarily position it to mobilize the full resources of the federal government toward its end as aggressively as it might. The White House should work with Congress to identify how best to make every federal agency responsible for understanding the ways its programs may influence diabetes and its complications—as well as broader public health goals—and be accountable for actions designed to mitigate the risk factors for and complications of diabetes.
- The federal government should enhance and protect its databases that are critical to monitoring and improving outcomes for all aspects of diabetes—such as the National Health Interview Survey, the National Health and Nutrition Examination Survey, the Medical Expenditure Panel Survey and the National Vital Statistics System. Solid national data in all areas—diabetes prevalence and its associated risk factors, the care patients with diabetes receive, the complications they experience and the outcomes and costs associated with diabetes—are vital to set health policy, plan and evaluate programs and track progress in meeting the nation’s diabetes objectives.

#### **4. Further research is needed in at least two areas.**

- The Medicare Payment Advisory Commission (MedPAC) should estimate the amount by which projected federal Medicare cost increases could be reduced through efforts to address avoidable complications of diabetes and recommend steps and associated funding to achieve these savings.
- The government should develop a white paper that synthesizes what is known about the effectiveness of food assistance programs directed at people at high risk for diabetes, the kinds of nutrition education provided and the strengths and weaknesses of these efforts. Based on these findings, the government should recommend modifications to maximize the effectiveness of these programs.

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## **APPENDIX A: LOGIC MODEL AND TEXT**

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*By Allison Hedley and Marsha Gold*

### **Why Diabetes Is a National Concern**

Diabetes is widely recognized as a growing threat to the nation's health and productivity. Reducing its prevalence is one of only 28 critical national goals expressed in *Healthy People 2010*: "Through prevention programs, reduce the disease and economic burden of diabetes, and improve the quality of life for all persons who have or are at risk of diabetes" (Centers for Disease Control and Prevention (CDC) 2000; see Table A.1 at the end of this appendix).

The prevalence of diabetes—particularly type 2 diabetes—is rising rapidly throughout the nation, as are its complications, which include a markedly higher risk for heart disease, stroke, high blood pressure, blindness, kidney disease, various neuropathies, lower-limb amputations, periodontal disease, complications of pregnancy and other adverse effects [National Diabetes Information Clearinghouse (NDIC) 2006]. In addition to being the seventh leading cause of mortality, diabetes is a major risk factor for heart disease, the leading cause of death in the nation (Olin and Rhoades 2005). In a study for the American Diabetes Association (ADA), The Lewin Group, Inc., estimated that the direct and indirect costs of diabetes to society totaled \$132 billion in 2002 (NDIC 2006).

### **What Logic Models Are and How We Use Them Here**

As documented extensively in the literature, logic models show the progression from a starting point with various inputs, to activities and processes that generate outputs and have short-term effects. The models then move on to intermediate and long-term effects and outcomes for individuals and society (Kellogg 2004). The model for this study is intended: (1) to help us identify the likely ways in which federal policy, programs and spending influence such a progression and (2) to set the stage for the next step in the study (see Figure A.1 at the end of this appendix).

CDC (2003) defines four critical transition points in the development of diabetes: from no diabetes to unrecognized diabetes (primary prevention), from unrecognized to recognized diabetes (screening/early diagnosis), from no care to applied diabetes care (access) and from improper care to proper care and intervention (secondary and tertiary prevention). The logic model for this project uses four categories that correspond to these transition points to represent the different stages of diabetes in terms of how policies and programs are targeted: diabetes prevention, diabetes detection, diabetes treatment and management of

diabetes with complications.<sup>19</sup> The logic model illustrates how interventions at all key points of transition influence the rate and severity of diabetes progression. At each stage, research can determine the prevalence of the disease among people with the characteristics of interest and identify effective interventions.

### **The Progression of Diabetes: Key Stages in the Logic Model**

Federal programs and policies may affect the development and progression of diabetes—positively, negatively, or neutrally—by the way they influence the process of development and progression at each stage. While individual programs or policies may influence the progression of diabetes at several stages, it is useful to delineate each stage of progression distinctly—as we do below—in order to provide guidance as to the types of programs and policies of relevance to this project.

- **Diabetes Prevention.** Programs and policies in the prevention category are broadly defined. In various ways, they have an affect on risk factors that may influence people in ways that may affect the likelihood that they will develop diabetes. Prevention programs or policies span a spectrum. At the broadest level, they are targeted to the general population and may not even be specifically directed at diabetes; what makes them germane is that they, intentionally or unintentionally, influence risk factors for diabetes and thus may increase or decrease the likelihood that diabetes will develop. Though many relevant programs target people (individuals), others target factors such as the physical environment and community infrastructure that ultimately affect people, as discussed below. Many prevention programs target risk factors for diabetes that can be influenced by, for example, increasing physical activity and reducing or preventing obesity (National Diabetes Data Group (NDDG) 1995). Other programs focus on more intensive interventions for people who are at a higher risk of diabetes, such as those of minority ethnicity (Black, Mexican American, Japanese American, Native American), older age cohorts and lower socioeconomic status (NDDG 1995). Another important focus area is diabetes screening and detection among people with pre-diabetes, a condition characterized by impaired fasting glucose or impaired glucose tolerance (CDC 2005). Studies have shown that an increase in physical activity and weight loss can prevent or delay the onset of diabetes in people with pre-diabetes (CDC 2005).
- **Diabetes Detection.** The goal of diabetes detection programs and policies is to identify people with diabetes. In 2005, approximately seven percent of the U.S. population had diabetes. Of these 20.8 million people, nearly 30

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<sup>19</sup>We identify the stage before the detection of diabetes as diabetes prevention instead of “pre-diabetes.” Pre-diabetes is a term used to distinguish people at higher risk of diabetes because of impaired fasting glucose (IFG) and/or impaired glucose tolerance (IGT) (CDC 2005). People with “pre-diabetes” are identified as high-risk through testing, but they exhibit other characteristics that increase the risk of diabetes as well. The diabetes prevention stage includes prevention efforts targeted at all levels, ranging from the general population to high-risk populations.

percent had undiagnosed diabetes (CDC 2005). Identifying people with the disease is the first step in the path to treatment and control of the disease. Many identification interventions focus on high-risk groups, such as pregnant women. The identification of gestational diabetes can lead to a treatment plan to normalize maternal blood glucose levels in order to avoid complications with the infant (CDC 2005).

- **Diabetes Treatment.** In terms of monetary and patient health, one of the largest costs of diabetes is related to the complications that accompany the disease. Diabetes is associated with an increased risk of heart disease, stroke, high blood pressure, blindness, kidney disease, nervous system disease, amputations and dental disease. In addition, people with diabetes are more susceptible to other illnesses and have worse prognoses (NDIC 2006). The goal of treatment interventions is to improve the treatment of diabetes to prevent complications. Focus areas include access to treatment, provider training, patient behaviors to improve glucose, blood pressure and lipids control and preventive care for eyes, kidneys and feet (NDIC 2006).
- **Management of Diabetes with Complications.** Complications from diabetes can lead to adverse events, such as kidney failure and non-traumatic lower-limb amputations (NDIC 2006). Interventions treat complications and improve management of the disease to avoid further adverse events as well as to improve the quality of life of those disabled by the disease.

Federal policies and regulations affect the context in which diabetes occurs and progresses. Although we ultimately are interested in examining the way that federal spending on diabetes bears on people, the relevant programs and policies adopt a broader focus, recognizing that individuals are affected not just by their own behavior, but also by the environment in which they function, the community in which they reside, the health care system to which they have access and their risk factors, some of which may be mutable while others may not.

### **Relevant Foci for Program or Policy Influence**

The logic model shows three broad foci for programmatic or policy influence over diabetes: the Health Care System, People and Family/Community/Built Environment. The categories are explained in more detail below.

- **Health Care System.** The health care system is the environment in which health care is delivered. The way the health care system is structured may influence people's access to the system and how well the system works to prevent the development and progression of diabetes and to minimize complications associated with the disease. The structure of the system influences the types of advice people receive about their health (diabetes prevention), whether diabetes is diagnosed and treated early (screening, detection and treatment), whether the system provides effective treatment and how complications are avoided or managed. Relevant system variables

include the features of insurance coverage (e.g., benefits and cost-sharing requirements for preventive and treatment services and how payment policy influences incentives for patient education), whether the system encourages a medical home and coordinated care, whether providers are knowledgeable about diabetes, the types of providers who treat diabetes and any implications for treatment and outcomes, among others. Relevant policies and programs influence—positively, negatively, or neutrally—all of the above variables.

- **People.** The people category encompasses characteristics that affect the likelihood that patients will be diagnosed with diabetes and the effectiveness with which they will pursue treatment or changes in health behaviors. The extent to which these characteristics are subject to alteration varies, with some more susceptible to modification than others. Programs and policies focused on people target the individual, whereas interventions target changes that can be implemented only by individuals. For example, a person will need to decide to increase his or her physical activity level or comply with a medication regimen. However, given that changes in the health care system and the community will affect the individual's behavior, the logic model shows all interventions at the community and health care levels feeding into the people category.
- **Family/Community/Built Environment.** In general, the environment extends to policies and programs that are targeted more broadly than to merely the individual, but that are not targeted to the health care system. Programs that focus on the environment seek to affect the environment in which people live and make their decisions. For example, a woman who decides to exercise may need a safe place to do so; however, if her neighborhood is dangerous, she may not be able to act on her decision to exercise. Yet, if she is already involved in a program, such as Special Supplemental Nutrition Program for Women, Infants and Children (WIC), it may be possible to offer interventions within the WIC community to effect healthy changes.

### **Population Diversity**

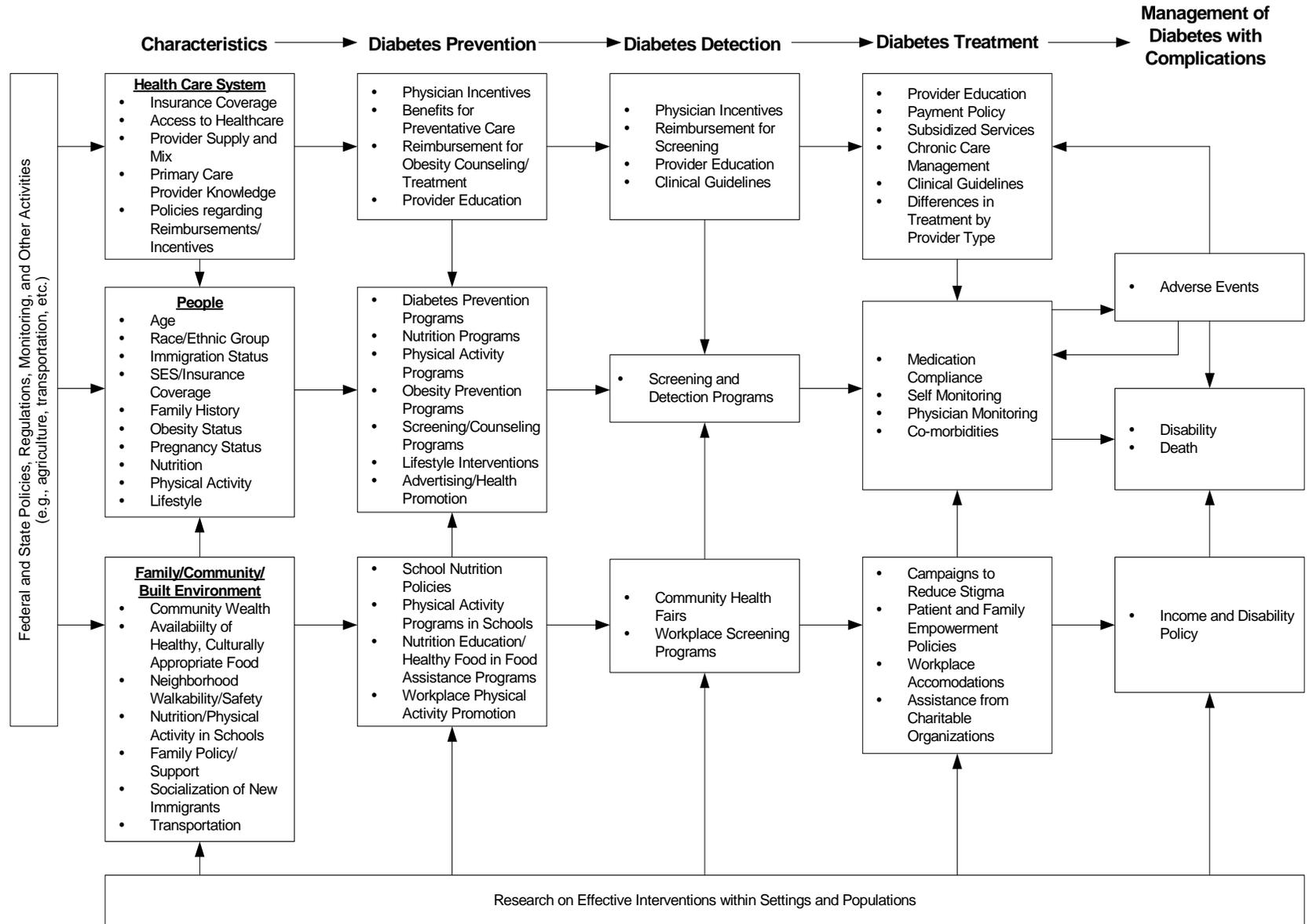
Across all population groups, the programs and policies of interest can be categorized into prevention, detection, treatment and management of diabetes. However, the focus of programs and policies may differ by the population of interest:

- **Children and Adolescents.** Type 2 diabetes, previously known as adult-onset diabetes, is being diagnosed more in children and adolescents (CDC 2005). As children and adolescents in the United States have become more overweight and inactive, the prevalence of type 2 diabetes has increased (National Diabetes Education Program (NDEP) 2006). Programs and policies targeted to children and adolescents largely focus on diabetes prevention and detection, such as improving nutrition in schools, increasing physical activity

opportunities in schools and communities, encouraging families to make lifestyle changes and increasing blood glucose screening.

- **Elderly.** Diabetes is most common in adults over 60 years of age (CDC 2000). As the population in the United States age 60 years and older increases, the number of cases of diabetes is expected to increase as well. Complications associated with diabetes accelerate in older persons with diabetes (CDC 2003). Programs and policies targeted to the elderly may include prevention strategies sensitive to age-related issues and Medicare policies that promote screening and improved treatment of diabetes.
- **Pregnant Women.** Gestational diabetes occurs when women develop glucose intolerance during pregnancy. Gestational diabetes can result in complications for the infant as well as in an increased risk of developing type 2 diabetes after pregnancy (CDC 2005). Programs and policies targeting pregnant women may include increased glucose screening during pregnancy in an effort to prevent and detect gestational diabetes as well as improved treatment of gestational diabetes.
- **Racial/Ethnic Groups at Higher Risk.** The burden of diabetes is greater among African Americans, Hispanics, Asian Americans, certain Pacific Islander groups and American Indians than among non-Hispanic whites in four ways: (1) higher number of cases of diabetes; (2) greater seriousness of diabetes; (3) inadequate access to proper diabetes prevention and control programs; and (4) poor quality of care (CDC 2000). Programs focused on higher-risk racial/ethnic groups may include more culturally relevant communication and increased emphasis on the importance of prevention, detection and treatment of diabetes.
- **Low-Income.** Living in poverty, lack of health insurance and lack of health care can increase the risk of diabetes and its complications (CDC 2003). Economic need-based federal programs are a natural vehicle for creating programs and policies that can reach low-income populations. Policies and programs focused on low-income populations may include improved food packages as part of WIC, Medicaid reimbursement policies for the screening and treatment of diabetes and policies to create affordable health insurance.

Figure A.1. Logic Model for Progression of Diabetes



## **Box A.1**

### **HEALTHY PEOPLE 2010 GOALS AND OBJECTIVES RELATED TO DIABETES (5.1-5.19)**

#### Goal:

Through prevention programs, reduce the disease and economic burden of diabetes and improve the quality of life for all people who have or are at risk for diabetes.

#### Objectives:

- 5.1 Increase the proportion of persons with diabetes who receive formal diabetes education (from a baseline of 45 percent to a target of 60 percent)
- 5.2 Prevent diabetes (from a baseline of 3.5 to 2.5 new cases per 1,000 people)
- 5.3 Reduce the overall rate of diabetes that is clinically diagnosed (from a baseline of 40 overall cases to 25 per 1,000 population)
- 5.4 Increase the proportion of adults with diabetes whose condition has been diagnosed (from a baseline of 68 percent to 80 percent of adults 20+ years)
- 5.5 Reduce the diabetes death rate (from a baseline of 75 deaths to 45 deaths per 100,000 population)
- 5.6 Reduce diabetes-related deaths among persons with diabetes (from a baseline of 8.8 deaths to 7.8 deaths per 1,000 persons with diabetes)
- 5.7 Reduce deaths from cardiovascular disease in persons with diabetes (from a baseline of 343 deaths to 309 deaths from cardiovascular disease per 100,000 persons with diabetes)
- 5.8 Decrease the proportion of pregnant women with gestational diabetes (developmental objective)
- 5.9 Reduce the frequency of foot ulcers in persons with diabetes (developmental objective)
- 5.10 Reduce the rate of lower extremity amputations in persons with diabetes (from a baseline of 4.1 to 1.8 lower extremity amputations per 1,000 persons with diabetes per year)
- 5.11 Increase the proportion of persons with diabetes who obtain an annual urinary microalbumin measurement (developmental objective)

(Box A.1 continued)

- 5.12 Increase the proportion of adults with diabetes who have a glycosylated hemoglobin measurement at least once a year (from a baseline of 24 percent to 50 percent of adults 18 and older with diabetes)
- 5.13 Increase the proportion of adults with diabetes who have an annual dilated eye exam (from a baseline of 47 percent to 75 percent of adults 18 years+ with diabetes)
- 5.14 Increase the proportion of adults with diabetes who have at least an annual foot exam (from a baseline of 55 percent to 75 percent of adults aged 18 and older with diabetes)
- 5.15 Increase the proportion of persons with diabetes who have at least an annual dental examination (from a baseline of 58 percent to 75 percent of persons aged 2 years and older with diagnosed diabetes)
- 5.16 Increase the proportion of adults with diabetes who take aspirin at least 15 times a month (from a baseline of 20 percent to 30 percent of adults aged 40 years and older with diabetes)
- 5.17 Increase the proportion of adults with diabetes who perform self-blood-glucose-monitoring at least once daily (from a baseline of 42 percent to 60 percent of adults aged 18 and older with diabetes)

Source: *Healthy People 2010 Objectives*

Note: These objectives are complemented by diabetes related objectives for preventive care generally (physical activity and fitness, nutrition and overweight, maternal, infant and child health) and for those with specific diseases, such as heart disease and stroke.

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## **APPENDIX B: METHODOLOGY FOR ESTIMATING FEDERAL HEALTH EXPENDITURES FOR DIABETES-RELATED TREATMENT AND DISABILITY**

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*By Cheryl Fahlman, Sue Felt-Lisk, Marsha Gold, Allison Hedley, Craig Thornton and Robert Weathers*

### **Federal Spending for Programs that Finance or Pay for Treatment**

This study used a traditional cost-of-illness approach to estimating the costs incurred by the federal government for treating diabetes and its complications.

### **General Approach**

We sought to estimate federal expenditures for diabetes-related care by focusing on the difference between expenditures for people identified as having diabetes and expenditures for those who do not. In computing expenditures, we included those for federal direct service delivery programs as well as those paid by claims or capitation under health financing programs, but we excluded all expenses paid by the recipient. The overall approach was to estimate the difference in per-capita costs for people with and without diabetes. For example, payments associated with the disproportionate incidence of heart attacks that accompany diabetes were included, as were disproportionately large payments for nursing home care where that care was a covered service and nursing home care used by people with diabetes exceeded the norm. This approach is consistent with the philosophy of the ADA/Lewin national estimate (ADA 2003).

To the extent feasible, we sought to use agency data for FY 2005 to develop an estimate based on the following allocation:

- ([Average annual cost, people with diabetes] – [Average annual cost, people without diabetes])
  - multiplied by the
- [Estimated number of people covered by the program]
  - multiplied by the
- [Estimated prevalence of diabetes in the covered population]

If available expenditure data pertained to a year before FY 2005, we used an appropriate inflator for per-capita spending. Because the prevalence of diabetes is increasing, the available program figure was inflated by the change in the diagnosed prevalence figure for the most relevant population available through the National Health Interview Survey. If national per-capita spending data for those with and without diabetes were either not available or seriously limited (by, for example, excluding pharmacy costs), we integrated into the analysis the most relevant national estimates available to approximate a comprehensive measure.

Diagnosed diabetes prevalence forms the basis for the estimates in the study. Knowing that diabetes is under-diagnosed, we attempted to capture what is currently spent on diabetes, not what might be spent if diabetes were identified earlier or more completely and complications were avoided.

### **Caveats**

The scope of this project did not allow us to calculate spending for diabetes directly from claims data (when the information was available). Instead, we used aggregate national program data as the basis for the estimates of federal spending attributable to diabetes.<sup>20</sup> We also excluded indirect costs to the federal government, such as losses to the productivity of federal workers associated with diabetes and the employment effects of disability payments from the Social Security Disability Insurance (SSDI) and Supplemental Security Income (SSI) programs.

Because FY 2005 is the latest year for which detailed data on actual federal spending was available, this year was the focus of the analysis. Since this report focuses on domestic programs and population, we did not include spending related to international programs or active military personnel. We also excluded an assessment of the impact of tax policy related to health care and diabetes on the federal budget. While these expenditures are potentially relevant, to include them in the analysis would have exceeded the scope of the project.

Our estimates of treatment expenditures include aspects of major financing programs that screen, detect and treat diabetes and its complications.<sup>21</sup> The major federal programs of interest are Medicare, Medicaid, Department of Defense (DoD) health programs, Veterans Administration (VA) health programs, the Federal Employees Health Benefits Program (FEHBP) and selected categorical programs such as the Indian Health Service (IHS).<sup>22</sup> Treatment programs with a primary focus on preventing risk factors for diabetes, such as Healthy Start, were excluded from this expenditure analysis and captured under other federal spending on diabetes.

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<sup>20</sup> The one exception to this rule is the Medicaid program, for which we were able to use claims data to examine expenditures for diabetes thanks to the help of Richard Kronick and Todd Gilmer at the University of California, San Diego.

<sup>21</sup> Estimates include spending to treat and control diabetes and prevent further complications, which can include eye disease, extremity neuropathy, limb amputation, kidney disease, heart disease and stroke and other conditions.

<sup>22</sup> This approach ignores the costs of screening and detection unless there is a difference between the population with and without a diagnosis, but this exclusion is not a limitation because these costs are typically a small proportion of overall program costs.

**Table B.1. Program - Medicare**

<b>Source Data</b> <sup>a</sup>	Year	Amount
Total program expenditures (billions) <sup>b</sup>	2002	\$226.22
Total population (million)	2005	42.4
Diabetes prevalence	2002	17.0%
Share of expenditures for beneficiaries with diabetes	2002	31.0%
Beneficiaries, all – average cost per month	2002	\$502
Beneficiaries, with diabetes – average cost per month	2002	\$942
<b>Calculations</b>		
Annual cost for diabetic beneficiaries	2002	\$11,304
Annual cost for non-diabetic beneficiaries <sup>c</sup>	2002 (est)	\$4,943
Cost differential per beneficiary		\$6,361
Inflation adjustor <sup>d</sup>		1.205
Prevalence rate <sup>e</sup>	2005 (est)	18.8%
Beneficiaries with diabetes (millions)	2005 (est)	7.971
<b>Results</b>		
Beneficiaries with diabetes average treatment costs	2005 (est)	\$13,621
Beneficiaries without diabetes average treatment costs	2005 (est)	\$5,956
Cost differential	2005 (est)	\$7,665
Total expenditures for people with diabetes (millions)	2005 (est)	\$108,578
Additional expenditures for those with diabetes (millions)	2005 (est)	\$61,097
Percent of total expenditures for beneficiaries with diabetes	2005 (est)	32.7%
Percent of total expenditures accounted for by the additional costs of diabetes	2005 (est)	18.4%

Note: The estimates do not make any adjustment for managed care though the source data are based on FFS experience. In 2005, only 12.7 percent of beneficiaries were in managed care. As a result of the way CMS is phasing in risk adjustment and the way capitation is paid, adjustments are difficult. Since Congress ultimately intends to have adjustments for diagnostic condition fully implemented, we felt this approach was appropriate. If Medicare Advantage has favorable selection, this may overstate diabetes-related spending, but the effect is likely small, especially given the overpayments inherent in Medicare Advantage.

<sup>a</sup> MedPAC 2004.

<sup>b</sup> This does not include premiums and other offsets worth \$25.99 billion.

<sup>c</sup> This is calculated as a weighted annual average, as follows:  
 $((\text{prevalence} \times 942 \times 12) + ((1 - \text{prevalence}) \times X)) = 502 \times 12$   
 where X = annual expenditures for non-diabetic beneficiaries.

<sup>d</sup> Adjustment factor:  $\$638.14 (2005) / \$529.63 (2002) = 1.205$  (USPCC, 2005).

<sup>e</sup> The 17 percent figure was adjusted to 2005 by applying an increase in crude prevalence for NHIS ages 65-74 from 2002 to 2005 using an exponential model. The data show relatively limited difference in the rate of change between those 65-74 and 75 and older, so only one adjustment factor was required.

**Table B.2. Program - TRICARE**

<b>Source Data</b>	Year	Population	
		Under 65 Years of Age	65 Years or Older
Total program expenditures (billions) <sup>a</sup>	2005	\$25.04	\$6.1
Total population (million) <sup>b</sup>	2005	5.66	1.73
Allocation of expenditures by age group (billions) <sup>c</sup>	2005 (est)	\$23.850	\$7.290
Ratio of costs for beneficiaries with diabetes to those without <sup>d</sup>		2.40	2.28
Diabetes prevalence <sup>e</sup>	2005 (est)	5.35%	18.1%
Expenditures for beneficiaries with diabetes (billions)		N/A	N/A
Share of expenditures for beneficiaries with diabetes		N/A	N/A
<b>Calculations</b>			
Beneficiaries, without diabetes – average annual cost	2005 (est)	\$3,920	\$3,421
Beneficiaries with diabetes – average annual cost	2005 (est)	\$9,408	\$7,800
Cost differential		\$5,488	\$4,379
Inflation adjustor <sup>f</sup>		N/A	N/A
Prevalence rate <sup>e</sup>	2005 (est)	5.35%	18.1%
<b>Results</b>			
Beneficiaries, without diabetes – average annual cost	2005 (est)	\$3,920	\$3,421
Beneficiaries with diabetes – average annual cost	2005 (est)	\$9,408	\$7,800
Cost differential		\$5,488	\$4,379
Additional diabetes related expenditures (billions)	2005 (est)	\$1.66	\$1.37
Percent of total expenditures accounted for by the additional costs of diabetes	2005 (est)	7.0%	18.8%

<sup>a</sup>These figures do not include expenditures for construction or procurement (DoD 2006).

<sup>b</sup>TRICARE paper to Congress 2006.

<sup>c</sup>The allocation of expenditures is calculated based upon the proportion of the population.

<sup>d</sup>The American Diabetes Association published a report of the economic costs of diabetes in the U.S. For people under 65 years of age, the cost ratio for medical care of those with diabetes versus those without was 2.4 (ADA 2003). In a Medicare population, the ratio is 2.28. We used these figures to calculate expenditures for each population.

<sup>e</sup>The NHIS prevalence rate for 65 and older was adjusted to 2005 by applying an increase in crude prevalence for NHIS ages 65-74 from 2003 to 2005 using an exponential model. For beneficiaries under 65, we used an average of the NHIS prevalence rates for those 0-44 and 45-64 years old, adjusting to 2005 rates using an exponential model.

<sup>f</sup>No inflation adjustment is required.

**Table B.3. Program - Medicaid**

Source Data	Year	Total	Population			
			Disability	TANF Adult	TANF Child	Aged
Total program expenditures (billions) <sup>a</sup>	2005	\$181.7	N/A	N/A	N/A	N/A
Total population (million) <sup>b</sup>	2005	49.1	8.3	11.3	24.8	4.7
Diabetes prevalence <sup>c</sup>	2005 (est)	N/A	15.2%	3.5%	0.2%	20.9%
Beneficiaries with diabetes (million)	2005 (est)	2.69	1.26	0.40	0.05	0.98
Additional expenditures for beneficiaries with diabetes (billions)	2005 (est)	\$8.191	\$3.833	\$1.865	\$0.238	\$2.255
Beneficiaries, all – average cost per month <sup>d</sup>	2001	N/A	\$257	\$446	\$428	\$196
Beneficiaries, with diabetes – average cost per month			N/A	N/A	N/A	N/A
<b>Calculations</b>						
Beneficiaries, all – average monthly cost	2005 (est)		\$317	\$549	\$526	\$241
Beneficiaries with diabetes – average annual cost <sup>e</sup> (≥ 6 months eligibility)	2005 (est)		\$3,671	\$5,650	\$5,738	\$2,772
Beneficiaries with diabetes – average annual cost <sup>f</sup> (< 6 months eligibility)	2005 (est)		\$918	\$1,591	\$1,632	\$699
Inflation adjustor <sup>g</sup>		1.23	N/A	N/A	N/A	N/A
Prevalence rate	2005 (est)		15.2%	3.5%	0.2%	20.9%
<b>Results</b>						
Additional expenditures due to diabetes (millions) <sup>e</sup>	2005 (est)	\$7,603	\$3,567	\$1,721	\$219	\$2,097
Additional expenditures due to diabetes (millions) <sup>f</sup>	2005 (est)	\$588	\$266	\$145	\$19	\$158
Beneficiaries, with diabetes (millions)	2005 (est)	2.69	1.26	0.40	0.05	0.98
Federal share of additional costs (millions) <sup>h</sup>	2005 (est)	\$4,669				
Share of expenditures for beneficiaries with diabetes	2005 (est)	2.6%	N/A	N/A	N/A	N/A

Note: Estimates do not distinguish FFS versus MCO because most Medicaid spending is for those in eligibility groups that are least likely to be in managed care (aged and disabled) and because the actuarial equivalence rule aims to encourage similar payment across the two programs.

<sup>a</sup>HHS 2006.

<sup>b</sup>These estimates include beneficiaries in either FFS or MCO who have any Medicaid coverage during the calendar year (Kronick and Gilmar 2006).

(Table B.3 notes continued)

<sup>c</sup>The prevalence rate by eligibility group is estimated based on Kronick and Gilmar (2006). The adjustment is based on the rate of change in Medicaid adults and the aged between 2002 and 2005, calculated with exponential change. The disabled are assumed to follow the same pattern as the aged and no change is assumed for children.

<sup>d</sup>Kronick and Gilmar 2006.

<sup>e</sup>For all beneficiaries with six months or more Medicaid eligibility. On average, disabled recipients had 11.6 months, TANF adults had 10.3, TANF children 10.9 and the aged 11.5 months of eligibility.

<sup>f</sup>For all beneficiaries with less than six months of Medicaid eligibility. On average, disabled recipients had 2.9 months, TANF adults had 2.9, TANF children 3.1 and the aged 2.9 months of eligibility.

<sup>g</sup>Holanan, John and Mindy Cohen. "Understanding the Recent Changes in Medicaid Spending and Enrollment Growth between 2000 and 2004." Kaiser Commission on Medicaid and the Uninsured, May 2006.

<sup>h</sup>We assumed the federal share of Medicaid expenditures was 57 percent.

**Table B.4. Program–Federal Employees Health Benefits Program (FEHBP)**

Source Data	Year	Population			
		Employees	Dependents	Annuitants	Total
Total program expenditures (millions) <sup>a</sup>	2004	N/A	N/A	N/A	\$27,535
Total population (million) <sup>b</sup>	2004	2.203	4.006	1.832	8.041
Total population (million)	2005	N/A	N/A	N/A	N/A
Diabetes population <sup>c</sup>	2004	209,242	48,076	331,681	588,998
Share of expenditures for beneficiaries with diabetes		N/A	N/A	N/A	N/A
<b>Calculations</b>					
Enrollees, non-diabetic – average annual cost <sup>d</sup>	2004 (est)	N/A	N/A	N/A	\$3,106
Enrollees, with diabetes – average annual cost <sup>d</sup>	2004 (est)	N/A	N/A	N/A	\$7,454
Inflation adjustor <sup>e</sup>		N/A	N/A	N/A	1.06
Prevalence rate <sup>d</sup>	2005 (est)	N/A	N/A	N/A	N/A
Beneficiaries, with diabetes (millions)	2005 (est)	N/A	N/A	N/A	N/A
<b>Results</b>					
Enrollees with diabetes average treatment costs	2004 (est)	N/A	N/A	N/A	\$7,454
Enrollees without diabetes average treatment costs	2004 (est)	N/A	N/A	N/A	\$3,106
Cost differential per enrollee	2004 (est)	N/A	N/A	N/A	\$4,348
Proportion of beneficiaries for enrollees with diabetes (millions)	2005 (est)	N/A	N/A	N/A	N/A
Percent of total expenditures accounted for by the additional costs of diabetes	2005 (est)	N/A	N/A	N/A	9.3%
Additional expenditures due to diabetes (millions) <sup>f</sup>	2005 (est)	N/A	N/A	N/A	2,432

<sup>a</sup>PAR 2005.

<sup>b</sup>Factbook 2005.

<sup>c</sup>The prevalence rate by eligibility group is estimated based on the National Health Interview Survey (NHIS).

<sup>d</sup>ADA (2003), estimated that the cost of medical care for people with diabetes is approximately 2.4 times higher than for those without diabetes. Based on this assumption the average medical costs for the FEHBP population with and without diabetes were calculated as follows:

$$X = \text{the cost of medical care for non-diabetics} \\ (\text{pop with diabetes}) * 2.4X + (\text{pop without diabetes}) * X = \$27,535,000,000$$

<sup>e</sup>The adjustment factor: ( $\$6683/\$6280=1.06$ ) (CMS 2005).

<sup>f</sup>To estimate the cost of diabetes in 2005, we assumed that diabetes would account for the same share of costs in 2005 as it did in 2004. Approximately 9.3 percent of 2004 expenditures, are attributable to diabetes related spending. We then applied this to the 2005 net expenditures (\$26,144 million) for FEHBP.

**Table B.5. Program – Department of Veteran’s Affairs (VA)**

<b>Source Data</b>	Year	Amount
Total program expenditures (billions) <sup>a</sup>	2000	\$19.5
Total population (million) <sup>b</sup>	2000	4.410
Beneficiaries with diabetes <sup>b</sup>	2000	617,647
Total population (million) <sup>c</sup>	2005	5.3
Expenditures for beneficiaries with diabetes (billions) <sup>b</sup>	2000	\$4.76
Share of expenditures for beneficiaries with diabetes	2000	24.4%
<b>Calculations</b>		
Beneficiaries, without diabetes – average annual cost	2000	\$3,887
Beneficiaries, with diabetes – average annual cost	2000	\$7,708
Inflation adjustor <sup>d</sup>		1.413
Diabetes prevalence <sup>e</sup>	2005	20%
Beneficiaries with diabetes (millions)	2005 (est)	1.060
<b>Results</b>		
Enrollees with diabetes average treatment costs	2005 (est)	\$10,892
Enrollees without diabetes average treatment costs	2005 (est)	\$5,493
Cost differential	2005 (est)	\$5,399
Additional diabetes related expenditures (billions)	2005 (est)	\$5.723
Percent of total expenditures accounted for by the additional costs of diabetes	2005 (est)	16%

Note: The expenditures in published data exclude payments for long-term care. Research reports the incremental cost of long-term care is 11 percent of health care costs in the VA system (Yu et al. 2004). This could result in up to an additional \$4 billion in expenditures.

<sup>a</sup>Treasury 2006.

<sup>b</sup>VA 2000.

<sup>c</sup>VA 2006.

<sup>d</sup>The adjustment factor: ( $\$6683/\$4729=1.413$ ) (CMS 2005).

<sup>e</sup>VA 2006.

**Table B.6. Program – Indian Health Service (IHS)**

<b>Source Data</b>	Year	Amount
Total program expenditures (billions) <sup>a</sup>	2005	\$2.024
Total population (million) <sup>b</sup>	2001	2.1
Beneficiaries, with diabetes <sup>c</sup>	2001 (est)	317,061
Total population (million) <sup>d</sup>	2005 (est)	2.304
Expenditures for treatment and prevention of diabetes (billions)	2005 (est)	\$0.506
Share of expenditures for beneficiaries with diabetes <sup>e</sup>		25%
<b>Calculations</b>		
Enrollees, with diabetes – average annual cost	2005 (est)	\$1,596
Enrollees, non-diabetics – average annual cost	2005 (est)	\$845
Cost differential per enrollee		\$751
Inflation adjustor <sup>f</sup>		N/A
Diabetes prevalence <sup>g</sup>	2005	15%
Beneficiaries, with diabetes	2005 (est)	345,596
<b>Results</b>		
Enrollees with diabetes average treatment costs	2005 (est)	\$1,596
Enrollees without diabetes average treatment costs	2005 (est)	\$845
Cost differential per enrollee	2005 (est)	\$751
Additional diabetes related expenditures (millions)	2005 (est)	\$259
Percent of total expenditures accounted for by the additional costs of diabetes	2005 (est)	13%

<sup>a</sup>IHS summaries.

<sup>b</sup>PHS 2002.

<sup>c</sup>The agency's outpatient database indicates an overall prevalence of 15 percent, ranging from 6 percent for those 20-44 to 30 percent for 65 and older, along with increasing prevalence rates including adolescents.

<sup>d</sup>Between FY 1997 and FY 2001 the IHS population increased by 174,739 (9 percent). The growth rate for this four-year period was applied to the FY 2001 population to obtain an estimate for the FY 2005 population.

<sup>e</sup>We assumed that 25 percent of clinical spending is related to diabetes prevention or treatment. This may undercount the true cost differential since the additional treatment costs associated with conditions common to both populations, such as high blood pressure, could not be attributed directly to diabetes care.

<sup>f</sup>Since the expenditure numbers are based on FY 2005 information, no adjustment figure is required.

<sup>g</sup>The prevalence of diabetes was assumed to remain constant between 2003 and 2005.

**Table B.7. Program – Social Security<sup>a</sup>**

Source Data	Year	Population			
		Title XVI Children <sup>b</sup>	Title XVI Adult <sup>c</sup>	Title II Adult <sup>d</sup>	Title II and Title XVI (concurrents) <sup>e</sup>
Total program expenditures (billions)	2004	N/A	N/A	N/A	N/A
Total population (millions)	2004	0.993	2.850	5.756	1.007
Beneficiaries with diabetes related impairments (millions) <sup>f</sup>	2004	0.015	0.043	0.163	0.028
Beneficiaries with diabetes		N/A	N/A	N/A	N/A
Share of expenditures for beneficiaries with diabetes		N/A	N/A	N/A	N/A
Average monthly benefit, all	2004	\$506	\$546	\$948	\$655
<b>Calculations</b>					
Average annual beneficiary expenditure <sup>h</sup>	2004 (est)	\$6,072	\$6,552	\$11,376	\$7,860
Diabetes prevalence rate <sup>g</sup>	2002	1.52%	1.52%	2.84%	2.84%
Beneficiaries with diabetes	2004 (est)	15,096	43,332	163,473	28,620
<b>Results</b>					
Annual expenditures for beneficiaries with diabetes related disabilities (billions)	2004 (est)	\$0.091	\$0.284	\$1.859	\$0.225

Note: Some beneficiaries may qualify for benefits based upon multiple conditions. Published data on secondary conditions is not available, so we were unable to capture these diabetes-related cases. The estimate may understate the amount of benefits paid because we did not count benefits paid to such beneficiaries. At the same time, we are attributing the full benefit amount paid to beneficiaries with diabetes, even though they may have a secondary disability that is not diabetes-related but that contributes to their eligibility for benefits. Attributing full benefits to these beneficiaries may overstate the diabetes-related benefits.

<sup>a</sup> The diabetes-related impairments and their Social Security Administration (SSA) codes captured for the analysis include: diabetes mellitus (2500), diabetic acidosis (2760) and diabetic and other peripheral neuropathy (3570). Since additional complications of diabetes include renal failure and visual impairments but SSA does not distinguish the underlying cause of the disability, we assumed a portion of these conditions were attributable to diabetes. For chronic renal failure (5850), we assumed 35 percent of cases are diabetes-related. Ten percent of vision impairments are attributed to diabetes. This includes: retinal detachment defects (3610), other retinal disorders/diabetic retinopathy (3620), glaucoma (3650), cataract (3660), visual disturbances (3680) and blindness/low vision (3690).

<sup>b</sup> Those beneficiaries collecting only Supplemental Security Income benefits who are under the age of 18. These amounts also include federally administered state income supplements.

<sup>c</sup> Those beneficiaries collecting only Supplemental Security Income benefits who are between the age of 18 and 64. These amounts also include federally administered state income supplements.

<sup>d</sup> Those beneficiaries collecting only Social Security Disability Insurance benefits who are between 18 and 64.

(Table B.7 notes continued)

<sup>e</sup> Those beneficiaries collecting both Social Security Disability Insurance and Supplemental Security Income benefits, who are between the ages of 18 and 64. These amounts also include federally administered state income supplements for Supplement Security Income.

<sup>f</sup> Title XVI under 18 came from Table 4 and all information on the remaining beneficiaries came from Table 59 (SSA 2004).

<sup>g</sup> Diabetes prevalence was calculated based on estimates from July 2002 for diabetes-related impairments for Title XVI adults and beneficiaries receiving both Title II and XVI benefits. Program information does not disaggregate Title II and beneficiaries receiving both payments. We assumed that Title XVI beneficiaries under 18 years of age had a prevalence rate similar to Title XVI adults, while Title II and beneficiaries receiving concurrent benefits had the same prevalence rate as the combined population.

<sup>h</sup> Beneficiary monthly benefits were annualized by multiplying by 12.

## **PROGRAMS: MISCELLANEOUS**

### **Public Health Service Commissioned Corps Retirees**

- Assume the same share of FY 2005 costs as we use for Medicare, under the assumption the mix of the population is similar. Our estimates show the excess at 18.4 percent.
- Thus, \$0.057 billion in FY 2005  $\times$  0.184 = \$0.010 billion.

### **State Children's Health Insurance Program (SCHIP)**

- Assume the same share as the excess spending for children under Medicaid.
- Assuming children account for the same share of Medicaid spending in FY 2005 as they do in 2003 (the latest available data; KFF Fact Sheet), they would account for 18 percent of Medicaid FY 2005 federal spending less administration (\$173.3B) or \$31.200 billion. Our Medicaid calculations indicate that \$0.135 billion of that is the federal share of excess spending for those with diabetes, or 0.4 percent.
- In FY 2005, \$5.129 billion in federal funds was spent on SCHIP (we are conservative here and do not include the adjustments for surplus funds in prior years). Thus, \$5.129  $\times$  0.4% = \$0.021 billion.

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## **APPENDIX C: METHODOLOGY FOR ESTIMATING OTHER FEDERAL SPENDING FOR DIABETES**

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*By Ronette Briefel and Marsha Gold*

### **Costs of Other Federal Programs Important to Diabetes and its Risk Factors**

In addition to its direct role in paying for diabetes treatment and providing income support to qualified disabled workers, the federal government, through a variety of other programs, exerts a potentially important influence over the incidence of diabetes and its progression. Our approach to estimating federal spending for diabetes treatment and income support employs traditional techniques for analyzing budgets in order to estimate the amount of federal spending allocated to payment for programs that may have a role in influencing or responding to diabetes and its risk factors.

The federal role in such programs varies. Sometimes, the federal government leads programs, particularly with respect to national goal setting, public health surveillance or research investment. In other instances, federal programs provide support for activities delivered at the state or local level through the government, the private sector or both. While the federal government may set parameters for how its funds are spent, grantees often have the authority to exercise considerable discretion in using funds to address their own needs and priorities. Our estimates of federal spending related to diabetes deal with broad program purposes and do not necessarily reflect the actual disbursement of funds, although we did identify budget outlays to the extent possible.

### **General Approach**

This section of the study aimed to identify federal spending relevant to diabetes prevention and treatment, including programs, policies, regulations, research and surveillance activities. Appropriate programs and activities were identified through a Web-based review of the budget justifications, annual reports, strategic plans, other related documents for each department/key federal agency and a search of the Catalogue of Federal Domestic Assistance (CFDA) using key terms.<sup>23</sup> Based on this information, federal spending for FY 2005 related to diabetes was calculated by applying a variety of facts and assumptions as outlined in the next section.

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<sup>23</sup> The search terms included cardiovascular disease/heart disease; chronic care; chronic disease; clinical guidelines/clinical practice guidelines; community health programs; diabetes; diet; disease management; disease prevention; exercise; food; health care; health education; health promotion; health statistics; lifestyle intervention; maternal and child health; nutrition; obesity; physical activity; pregnancy; school programs; screening tests; walkability; and weight control.

## Caveats

We focused on federal programmatic spending for domestic populations and programs related to diabetes in FY 2005 and, therefore, did not address spending allocated to international programs or active military personnel. In addition, we did not assess the impact of tax policy incentives related to diabetes for either individuals or businesses. While such incentives are relevant, an analysis of them is beyond the scope of the project.

## Defining and Classifying Relevant Federal Programs

The overall approach to categorizing diabetes-related federal programs, policies, research and surveillance activities builds on the logic model and related conceptual framework. We sought policies and programs that may influence the development of diabetes and its treatment, including progression of the disease and any federal costs associated with diabetes-related disabilities. We identified such programs by constructing a summary review of each department in the federal government and, within the Department of Health and Human Services (HHS), each agency.

In keeping with the study's "broad brush" focus, we used a basic classification scheme for federal programs related to diabetes and made distinctions among four types of programs as follows:

- **Prevention.** Within the area of prevention programs, we aimed to differentiate between programs that target diabetes directly or target general risk factors for diabetes.<sup>24</sup> Programs affecting the broader environment are beyond the scope of this project. Thus, we did not include general food safety policies related to maintaining a safe food supply, poverty programs, smoking programs and alcohol and substance abuse programs. Given that federal spending for food and nutrition assistance programs overwhelmed (in scale) other spending, the analysis estimates the share of funds in these programs that involve health and nutrition education and then counts the remaining funds separately under a category of food assistance.
- **Treatment.** Treatment programs encompass the direct treatment costs incurred in federal programs that pay for health care or disability in the project's cost-of-illness component (as discussed in Appendix B). In addition, we capture other administrative costs associated with treatment programs that are relevant to diabetes, including identifiable and distinct federal spending for disease management, quality improvement and related

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<sup>24</sup> These activities could be freestanding or part of broader programs that address risk factors for diabetes under their broader purpose (e.g., selected block grants, community walkability programs). A broad look at federal spending also identified other programs and activities that may influence diabetes risk and/or prevalence in an indirect way and fall outside our logic model. They are not included in the spending estimates, but do provide insight into the "broad picture" and complement the fiscal analysis with additional information on potential federal levers to prevent diabetes.

activities designed to promote effective care for diabetes as part of an agency's administration of federal treatment programs.

- **Research and Monitoring.** Monitoring programs include national, state and local surveys and surveillance systems that assess the incidence and prevalence of diabetes, morbidity and mortality attributed to diabetes, risk factors associated with diabetes and utilization and costs of medical care for diabetes. Monitoring systems concentrate on the general population, high-risk groups, or people already diagnosed with diabetes. Within the research and monitoring category, we also include federal regulatory efforts that involve food, drugs, medical devices and related supplies, including oversight of advertising and award of patents. Research addresses basic research into the causes, detection, treatment and prevention of diabetes; community interventions; clinical trials; translation of clinical findings into practical applications for providers and patients; and grants for demonstration programs.
- **Food Assistance Programs.** Domestic food assistance programs encompass federal costs associated with programs that pay or provide food beyond the nutrition education spending already counted under prevention.

### **Determination of Share of Program Costs Relevant to Diabetes**

Under the assumption that federal funds support the overall goal of preventing or mitigating the impact of diabetes and its risk factors, this study attempted to estimate the federal government's total spending on diabetes-relevant prevention and health promotion, surveillance and research.<sup>25</sup>

### **Prevention and Health Promotion Programs**

Prevention and health promotion programs include broad programs that focus on ways of monitoring and reducing the prevalence and burden of diabetes. Therefore, we applied relatively direct rules and assumptions to the available budget data to estimate the diabetes-related costs of prevention and health promotion programs. Based on detailed information about agency activity relevant to diabetes on the various agency Web sites, we used a "top-down" approach to estimate budgetary spending that took advantage of departmental budgets allocated to diabetes-related purposes. Information on the Web sites was not

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<sup>25</sup> Readers should note that classifying an expenditure as diabetes-related does not necessarily mean that the expenditure would be eliminated if diabetes were eliminated. In a number of cases, programs aim for multiple objectives. Preventive efforts that deal with risk factors like nutrition (diet), physical activity and obesity are relevant to many chronic diseases. Federal surveys used for monitoring provide data for multiple objectives. Because these types of efforts are, we judged, central to aspects of work around diabetes, we tended to include a relatively large share of such spending in our estimates. For example, we included 50 percent of spending on NCHS statistical systems because they are crucial to monitoring diabetes prevalence, risk factors and costs, though these systems obviously serve many purposes.

necessarily comprehensive and did not always show the budget spending for the activities described, thus raising the risk either of double counting or significant omissions. Specific decision rules and assumptions included the following:

- Use of the budget justifications for each department for FY 2007, where possible, to define relevant programs and federal spending in FY 2005. Reported figures are typically FY 2005 outlays or actual spending.<sup>26</sup> In other words, the analysis defined relatively broad categories that might encompass many specific efforts and employed broad assumptions to distinguish diabetes-related spending from other spending.
- Use of each agency's own estimates, where available, to allocate diabetes-related spending. In particular, the Centers for Disease Control and Prevention (CDC) functional budget distinguishes chronic disease spending by focus area, such that we incorporated focus allocations into cost estimates. Similarly, we used the National Institutes of Health's (NIH) FY 2005 condition-specific spending estimates.<sup>27</sup>
- Use of 100 percent of funds if the budgeted program focused exclusively on a relevant activity (e.g., diabetes prevention, obesity and/or nutrition).
- If programs included diabetes-relevant activities within a larger constellation of efforts, the creation of broad assumptions about allocations based on what we were able to learn about the programs were developed. If not all funds were allocated, we applied one of the following assumptions: 75 percent, 50 percent, 25 percent, 10 percent or 5 percent.<sup>28</sup> We used 5 percent to

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<sup>26</sup> We found these preferable to the Monthly Treasury statements on outlays because they provided more detail on the use of funds. To identify relevant programs, we also used a variety of search terms to search the Catalogue of Federal Domestic Assistance (CFDA) for relevant FY 2005 funds. However, when we compared results against departmental figures, we found that the CFDA was incomplete and provided inconsistently coded information. We use the data selectively, primarily to identify research grants. The CFDA was helpful for a few programs that seemed to have had a complex fiscal history in FY 2005 (e.g., health centers).

<sup>27</sup> We adjusted the estimates to address the fact that NIH estimates allow the same spending to be applied to several purposes.

<sup>28</sup> Though such assumptions are inherently subjective, we sought to make them as consistent and objective as possible in several ways. First, we based decisions on general magnitude on what we learned from examining more detailed information on programs and spending obtained through our review of each agency's Web site (Gold et al January 2007). For example, such analysis indicated that Head Start, as documented in its regulations and operations, places substantial emphasis on health promotion, family involvement and a medical home. Because this also is not obviously its major mission, we allocated 10 percent of spending to our estimates of spending that has a bearing on diabetes. Analogously, in examining the Agency on Aging's preventive health services, we found that an apparently large share of resources go to support work on nutrition, physical activity and aging. We therefore counted 75 percent of these funds in our estimates. Second, the two principal investigators involved in this analysis met to review their individual assumptions to resolve differences in perspectives so that the assumptions used across programs were reasonably consistent. Third, we asked two uninvolved senior staffers at Mathematica Policy Research, Inc. to review our assumptions

allocate a share of administrative costs for programs with relevant activities that could not be individually identified in the budget.

- Exclusion of estimates that assumed less than 5 percent of the budget unless a compelling reason suggested otherwise. Such exclusions occurred in the case of the Substance Abuse and Mental Health Services Administration (SAMSHA), the Department of Commerce's patent spending and programs that by statute mandated the allocation of 1 percent of spending for a specific purpose.
- Recognition of the important role of federal statistical systems in diabetes and health surveillance was determined by counting 50 percent of key HHS systems as diabetes-related and 10 percent of other systems as diabetes-related.

## **SPECIAL CASES**

**NIH Spending.** NIH is a complex organization with many institutes, each of which has substantial discretion in the use of funds. For the analysis, we used NIH calculations, prepared for Congress and the NIH user community, of how much the various institutes spend for diabetes and related purposes (NIH 2005 and 2006). NIH aggregates the estimates across the institutes to summarize the total spending for particular purposes in a given year. The data have two potential limitations, which are as follows:

- The first limitation is that NIH may be overly generous in counting its spending by purpose. This issue is of particular concern because NIH provides no back-up material that would allow users to identify the specifics behind each estimate, thereby preventing users from evaluating the estimates or making adjustments for particular purposes.<sup>29</sup>

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*(continued)*

and rationales with a concern both for reasonableness and consistency. We also had the outside advisory panel that the National *Changing Diabetes* Program formed for this project review the analysis and assumptions in draft from a similar perspective. We used their feedback to further refine estimates, especially for spending in nutrition and health education-related efforts within food programs.

<sup>29</sup> NIH staff, however, provided a breakdown of spending by institute for diabetes. A similar breakdown for nutrition was available on the NIH Web site. The estimates provide some insight into the involvement of diverse institutes in diabetes and nutrition. Unfortunately, the diabetes spending data are aggregated for each institute and therefore do not support analysis of spending by purpose other than the fact that the institute has determined that spending is generally related to the condition of interest (Personal communication, Joan Chamberlain, NIH/NIDDK, December 19, 2006). Furthermore, although the nutrition-specific spending data were broken down by institute and by coded categories, the data did not include a code for nutrition, and its connection with diabetes, as a category.

- The second limitation is that the NIH estimates do not provide mutually exclusive spending totals; rather, they provide independent estimates of how NIH spending addresses individual high-priority conditions. The same use of funds could be relevant to more than one purpose.

Based on NIH's reported spending by condition, we made adjustments for expected overlap across conditions. We examined institute-specific spending for diabetes and nutrition to assess the overlap and potential relevance of the remaining funds. We also examined NIH spending for other purposes that might not be included in the diabetes spending estimates.<sup>30</sup> The estimates for nutrition included 50 percent of the National Heart, Lung and Blood Institute (NHLBI) and the National Cancer Institute (NCI) reported nutrition-related spending and 25 percent of the other institutes' reported nutrition spending. This assumes that the combination of diabetes and nutrition captures most obesity-related spending; accordingly only 10 percent of the remaining NIH spending is attributed to obesity-related purposes and 5 percent to prevention. We did not separately assign a share of heart disease-related NIH spending to diabetes, because we assumed that the other allocations would include the most relevant cardiac-related NIH activity.

**Food Assistance Programs.** Given the critical role played by nutrition (diet), obesity and physical activity in diabetes, we included programs that attempted to address these factors even if the focus was not diabetes-specific. While the inclusion of such programs is not controversial when related to nutrition education, people may disagree on how to assess the role of federal food and nutrition assistance programs in diabetes.

The original intent was to include in the estimates all federal spending on feeding programs, since promoting good nutrition among low-income and high-risk groups is directly relevant to health, but the sums were so large that they dwarfed other spending on prevention and health promotion and led to confusion. Therefore, prevention and health promotion estimates include only the share of spending in food assistance programs directly related to nutrition education or counseling, or the provision of nutrition and medical services in the Special Supplemental Nutrition Program for Women, Infants and Children (WIC). The remaining spending on food programs is included in a category separate from the estimates of federal spending related to prevention, health promotion, surveillance and diabetes-related research.

We distinguished food programs that provide food (or specific vouchers) from the Food Stamps Program in that the latter is an income transfer program.

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<sup>30</sup> These other purposes were primarily directed to the prevention of risk factors.

**The Food Stamps Program.** In addition to providing Food Stamps, the federal government supports nutrition education through the Food Stamps Program by matching state administrative costs for nutrition education. An Abt Associates Inc. report (2006) for the Department of Agriculture (USDA) showed \$225 million in federal spending on nutrition education in FY 2004, down from \$661,000 in 1992, the first year of the program, when seven states received funding. We assumed that \$225 million of the FY 2005 budget was spent on nutrition education and thus counted the remainder as food program payments.

**WIC.** WIC provides nutrition counseling and medical services to pregnant and postpartum women, infants and children up to age five.<sup>31</sup> It also pays for supplemental food. A FY 2004 analysis showed that about 71 percent of WIC spending went for food (FNS Summary FY 2004 WIC Food Package Costs).

In FY 2005, WIC outlays totaled \$4.975 billion. In FY 2005, monthly WIC spending per person was \$37.33. If we assume that an average eight million people are fed for 12 months, WIC spends \$3.583 billion annually for food, leaving \$1.392 billion for WIC's medical and nutritional services and counseling<sup>32,33</sup> (we used a 25% share of this figure for prevention spending).

**Child Nutrition.** Child nutrition includes a variety of programs that feed children at schools and other sites and incorporates some elements of nutrition education and promotion of healthy behavior. USDA reports that it spends approximately \$500 million per year across all programs on state efforts to improve eating and lifestyle behavior among food assistance recipients. Assuming that the Food Stamp Program funds are included in this estimate, \$250 million<sup>34</sup> would remain for programs focused on health promotion among food assistance recipients, with \$25 million allocated to other assistance programs such as emergency food and commodity programs. The food budget accounts for the remainder of USDA food-related expenditures.

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<sup>31</sup> In October 2006, the WIC population was made up of 8.3 million participants: 11 percent pregnant women, 6 percent lactating mothers, 8 percent non-lactating postpartum females, 26 percent infants, and 49 percent children age one to four years (USDA 2006).

<sup>32</sup> If 71 percent of WIC spending in FY 2005 was for food, the figure would imply \$3.53 billion, leaving \$1.443 billion for medical/nutrition services and counseling.

<sup>33</sup> In FY 2003, the cost of supplemental food in the WIC program was \$3.2 billion (Institute of Medicine 2005).

<sup>34</sup> The estimate includes \$10 million spent for Team Nutrition in schools.

**Other USDA Nutrition Costs.** We included in the estimates 5 percent of USDA’s departmental oversight/administrative office for coordination of nutrition policies and other nutrition-related costs. In addition, we included the \$60 million spent for USDA’s Cooperative State Research, Education and Extension Service’s Expanded Food and Nutrition Education Program (including \$58 million in general spending and \$2 million for tribal extension).

## APPENDIX C REFERENCES

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## APPENDIX D: FEDERAL EXPENDITURES BY AGENCY, FY 2005

By Ronette Briefel, Meredith Lee and Melissa Neuman

Table D.1. Expenditure by Department/Agency

Department/ Agency	Program Area/ Program	Source	Classification Code(s) <sup>1</sup>	FY 2005 Budget Outlay <sup>2</sup>	Relevant %	Budget Amount Relevant <sup>2</sup>	Target age Group(s) <sup>3</sup>	Rationale for Coding; Notes
Commerce	Medical patents	Agency budget	S	\$1.319	1%	\$0.013		Approval process for medical patents. 1.1% of patents are for drugs and biomedical therapies plus 0.3% for personal medical devices.
Commerce	Information technology; telemedicine	Agency budget	P4	\$0.007	0%	-		Encourages expansion of broadband communications into rural areas and telemedicine for chronic care management in rural areas.
Commerce	Surveys and economic statistics	Agency budget	S	\$0.069	10%	\$0.007		Collection of demographic data used when designing and conducting health surveillance.
DoD (Defense)	Health education/physical activity in schools	Agency budget	P2	\$1.588	5%	\$0.079	Children	Provision of health and physical education in public schools operated by DoD.
DoD (Defense)	Research, development, test, & evaluation	Agency budget	T	\$0.523	5%	\$0.026		
DoD (Defense)	TRICARE	MPR Calculation	T	\$25.700		\$3.033		Health care system for the active and retired uniformed service members and their families. See Appendix B.
DOJ (Justice)	Health Services, Prevention	Agency budget	P2	\$0.136	5%	\$0.007	Adult	5% of DoJ administrative costs for prevention activities for prisoners.
DOJ (Justice)	Health Statistics	Agency budget	S	\$0.136	1%	\$0.001	Adult	Surveillance of diabetes, health status of prisoners.
DOL (Labor)	Disability policy development	Agency budget	P4	\$0.051	0%	-	Adult	<i>Policy-relevant.</i> Technical assistance and dissemination of best practices for increasing employment opportunities of disabled persons.
DOL (Labor)	Family and Medical Leave Act	Agency budget	P4		0%	-		<i>Policy-relevant.</i> Stipulates conditions under which employers are required to allow employees to take unpaid leave to care for family.
DOL/ BLS	CPS, CES (surveys)	Agency budget	S	\$0.524	10%	\$0.052		5% of BLS budget for consumer behavior surveillance.
DOT	Federal Motor Carrier Safety Administration	Agency budget	P1	\$0.176	5%	\$0.009	Adult	Regulation of insulin-dependents operation of commercial vehicles.

Department/ Agency	Program Area/ Program	Source	Classification Code(s) <sup>1</sup>	FY 2005 Budget Outlay <sup>2</sup>	Relevant %	Budget Amount Relevant <sup>2</sup>	Target age Group(s) <sup>3</sup>	Rationale for Coding; Notes
DOT	FHWA improving access within public parks	Agency budget	P4	\$0.469	0%	-		Improved access to and transportation within national parks.
DOT	NHTSA Injury Prevention Program	Agency budget	P1	\$0.172	5%	\$0.009	Adult	Diabetes education related to eyesight and driving.
DOT	Office of Secretary of Transportation Policy	Agency budget	P3	\$0.289	5%	\$0.014		<i>Policy-relevant.</i> Transportation policies to improve access/walkability in urban areas, bike safety.
DOT	Safe Routes to School	Agency budget	P3	\$0.054	100%	\$0.054	Children	Promotes best practices for biking and walking to school.
DOT	Urban transit	Agency budget	P4	\$0.095	0%	-	Elderly	<i>Policy-relevant.</i> Urban transit improvements for disabled and elderly persons.
DOT	Urbanized Area Formula Grants	Agency budget	P4	\$3.593	0%	-		Urban mass transportation funding. 1% of grants to cities must include improved access for pedestrians, elderly, disabled, or historic preservation.
Education	21st Century Learning Centers	Agency budget	P3	\$0.001	25%	\$0.000	Children	Educational enrichment programs, primarily for low-income or underperforming schools. Includes some P2 recreation programs.
Education	Even Start		P4	\$0.215	0%	-	Children	Includes literacy, early childhood and parenting education for low-income families (includes nutrition education).
Education	No Child Left Behind	Agency budget	P4		0%	-	Children	Increased emphasis on classroom time and resources and potentially decreased time and resources for physical education.
Education	Recreation and Physical Education Programs	Agency budget	P2	\$0.076	100%	\$0.076	Children	Grants to improve physical education (\$0.074 billion for Carol White physical education program and \$0.002 billion for recreational program).
Energy	Energy policy	Agency budget	N/A			-		
EPA	Healthy Communities; Active Aging	Agency budget; MPR estimate	P3			\$0.007		Includes hazardous waste/syringe safety for people with diabetes (P1) and smart growth/active aging programs (P3).
EPA	Human Health Ecology Efforts	Agency budget	R	\$0.177	5%	\$0.009		Research on the effects of toxin exposure on persons with chronic conditions.
FTC	Consumer Protection	Agency budget	P3	\$0.115	10%	\$0.012		Enforces truth-in-advertising regulations, including those related to health, nutrition and obesity.
GSA	Sports, recreation equipment	Agency budget	P4		0%	-		Purchase of equipment for physical activity.
HHS/ACF	Child Care and Development Block Grant	Agency budget (HHS) p.78	P4	\$2.083	0%	-	Children	Opportunity for advising children and families.

Department/ Agency	Program Area/ Program	Source	Classification Code(s) <sup>1</sup>	FY 2005 Budget Outlay <sup>2</sup>	Relevant %	Budget Amount Relevant <sup>2</sup>	Target age Group(s) <sup>3</sup>	Rationale for Coding; Notes
HHS/ACF	Community Services Block Grant	Agency budget (HHS) p.78	P2/P3	\$0.637	10%	\$0.064		General poverty reduction as well as building capacity in disease prevention and health promotion.
HHS/ACF	Head Start	Agency budget (HHS) p.78	P2/P3	\$6.843	10%	\$0.684	Children	Health and nutritional services and education for low- income children.
HHS/ACF	Refugee Assistance (including Unaccompanied Children)	Agency estimate (HHS) p.78	P4	\$0.485	0%	-		Opportunity for advising refugees on health.
HHS/ACF	Social Services Block Grant	Agency budget (HHS) p.84	P3	\$1.822	10%	\$0.182		Funds for day care, meals and health support services for persons with special needs.
HHS/ACF	Stable Families	Agency estimate (HHS) p.78, 84	P4	\$0.407	0%	-	Children	Stronger families help (includes discretionary and entitlement portion).
HHS/AHRQ	Healthcare Costs, Quality and Outcomes	Agency budget (AHRQ) p.13	R	\$0.261	10%	\$0.026		Includes grants, work on effectiveness, including MMA, racial/ethnic disparities. Collaborative, quality improvement indicators and reports.
HHS/AHRQ	MEPS	Agency budget (AHRQ) p.13	S	\$0.055	50%	\$0.028		Surveys of national medical expenditures.
HHS/AHRQ	Program Support	Agency budget (AHRQ) p.13	T	\$0.162	5%	\$0.008		Includes MEPS staff, U.S. Preventive Services Task Force.
HHS/AoA	Home/Community Services	Agency budget (HHS) p.92	P3	\$0.354	25%	\$0.089	Elderly	Funds for aging services network, including multi- purpose senior centers, home personal care and health promotion for elderly persons.
HHS/AoA	Nutrition Services	Agency budget (HHS) p.92	Food	\$0.719	75%	\$0.539	Elderly	Home delivered and congregate meals.
HHS/AoA	Nutrition Services	Agency budget (HHS) p.92	P2	\$0.719	25%	\$0.180	Elderly	Nutrition education, screening for elderly nutrition program.
HHS/AoA	Preventive Services	Agency budget (HHS) p.92	P2/P3	\$0.022	75%	\$0.017	Elderly	Resource center and grants for local programs encouraging healthy behaviors among the elderly.
HHS/CDC	Cancer Prevention	Agency budget (CDC Fun)	P2	\$0.309	25%	\$0.077		Programs promoting behaviors that reduce the risk of cancer.
HHS/CDC	Diabetes	Agency budget (CDC Fun) p1	P1	\$0.064	100%	\$0.064		Research and programs designed to reduce the incidence of diabetes.
HHS/CDC	Genomics	Agency budget (CDC Fun) p.2	P2	\$0.007	10%	\$0.001		Research on genetic predisposition toward obesity.
HHS/CDC	Health Marketing	Agency budget (CDC Fun)	P3	\$0.044	50%	\$0.022		Health marketing programs encouraging a variety of healthy behaviors.
HHS/CDC	Health Promotion	Agency budget (CDC Fun)	P2	\$0.026	100%	\$0.026		Programs to promote physical activity and healthy

Department/ Agency	Program Area/ Program	Source	Classification Code(s) <sup>1</sup>	FY 2005 Budget Outlay <sup>2</sup>	Relevant %	Budget Amount Relevant <sup>2</sup>	Target age Group(s) <sup>3</sup>	Rationale for Coding; Notes
		Fun) p.2						lifestyles.
HHS/CDC	Heart Disease Prevention	Agency budget (CDC Fun)	P3	\$0.045	75%	\$0.034		Programs promoting behaviors that reduce the risk of heart disease.
HHS/CDC	Nutrition, PA, Obesity	Agency budget (CDC Fun)	P2	\$0.042	100%	\$0.042		Research and programs promoting healthy eating, physical activity and reducing the incidence of obesity.
HHS/CDC	Other Cardiovascular Prevention	Agency budget (CDC Fun)	P2	\$0.216	50%	\$0.108		Includes school health, REACH, youth media, Prevention Centers.
HHS/CDC	Preventive Services Block Grant	Agency budget (CDC Fun) p3	P2	\$0.119	50%	\$0.060		Flexible funding for states to administer preventive health programs.
HHS/CDC	Public Health Research	Agency budget (CDC Fun)	R	\$0.031	50%	\$0.016		Public health research, including research on care management for chronic conditions.
HHS/CDC	Steps to a Healthier US	Agency budget (CDC Fun), p 3139 of FY 2007 budget	P2	\$0.044	100%	\$0.044		Health promotion program targeted to 40 communities.
HHS/CDC/ NCHS	Health Statistics	Agency budget (CDC Fun)	S	\$0.109	50%	\$0.055		Collection of population health data: NHANES, NHIS, Vital Statistics, Health Care Statistics.
HHS/CMS	Fed Share XIX State Administration (HHS)	Agency budget (HHS) p.61	T	\$8.384	5%	\$0.419		
HHS/CMS	Medicaid Benefits	Agency budget (HHS) p.6; MPR Calculation	T	\$173.336		\$4.669		Health care for low-income individuals and families. See Appendix B.
HHS/CMS	Medicare Benefits	Agency budget (HHS) p.50.; MPR Calculation	T	\$291.258		\$61.097	Elderly	Health care for persons over 65 and disabled persons. 35.8 million aged, 6.6 million disabled, excludes premiums and other offsets; pre Part D. See Appendix B.
HHS/CMS	Medicare Operations	Agency budget (HHS) p.15	T	\$4.825	5%	\$0.241	Elderly	Excludes AIO, HCFAC and low-income determinations; Includes SSA transfer.
HHS/CMS	Medicare QIO	Agency budget (HHS) p.50	T	\$0.398	50%	\$0.199	Elderly	Diabetes and related conditions of high importance to this work.
HHS/CMS	Other federal operations	Agency budget (HHS ) p.73	T	\$0.642	5%	\$0.032		
HHS/CMS	Research and Development	Agency Budget	R	\$0.110	5%	\$0.006		
HHS/CMS	SCHIP	Agency budget (HHS)	T	\$5.129		\$0.021	Children	Omits redistributions. See Appendix B.
HHS/CMS	State Grants/ Demonstrations	Agency budget (HHS)	T	\$0.393	5%	\$0.020		EMS aliens, Ticket, SPAP.
HHS/FDA	Applied Nutrition &	Agency budget (HHS)	S	\$0.436	50%	\$0.218		Oversight of food safety and surveillance of

Department/ Agency	Program Area/ Program	Source	Classification Code(s) <sup>1</sup>	FY 2005 Budget Outlay <sup>2</sup>	Relevant %	Budget Amount Relevant <sup>2</sup>	Target age Group(s) <sup>3</sup>	Rationale for Coding; Notes
	Nutrition Surveillance							population dietary intake.
HHS/FDA	Biologics	Agency budget (HHS)	S	\$0.172	5%	\$0.009		Regulation of biological products, including blood, vaccines, tissue, allergenics and biological therapeutics. Offset by user fees.
HHS/FDA	Devices	Agency budget (HHS)	S	\$0.250	5%	\$0.013		Ensures safety of medical devices and radiation-emitting products. Offset by user fees.
HHS/FDA	Drug Evaluation & Research	Agency budget (HHS)	S	\$0.250	10%	\$0.025		Mostly in endocrine division.
HHS/HRSA	340B	Agency budget (HHS)	T	-	NA	-		Reduced-price drug program for eligible facilities.
HHS/HRSA	General Access (HHS)		P4	NA	0%	-		
HHS/HRSA	Health Centers	CFDA	P/T	\$1.570	10%	\$0.157		Provide primary care in underserved areas. (Using this because of recession and to be conservative.)
HHS/HRSA	Healthy Start	CFDA	P2	\$0.096	25%	\$0.024	Children, pregnant/postpartum women	Programs to reduce infant mortality through pre-natal and early childhood care for high-risk women. (Using this to be conservative because of recession.)
HHS/HRSA	MCH Block Grants	Agency budget (HHS) p.20	P2	\$0.724	10%	\$0.072	Children, pregnant/postpartum women	Grants to promote access to quality care for mothers and children.
HHS/HRSA	Program Mgmt	Agency budget (HHS) p.96	P/T	\$0.154	5%	\$0.008		Includes collaboratives
HHS/Indian HS	Direct Services	INS 2007 summary p.14; MPR Calculation	T	\$2.024		\$0.259		Health care for Native Americans. (Excludes facilities, offsets). See Appendix B.
HHS/Indian HS	Preventive Care	Agency budget (HHS) p.24	P2	\$0.110	75%	\$0.083		Preventive health programs in underserved communities. Diabetes is a priority area.
HHS/Indian HS	Research	Agency budget (HHS) p.24	S	\$0.062	5%	\$0.003		Monitoring of prevalence of diabetes and other conditions among Native Americans and related health research. (For surveillance systems, CFDA shows \$2 million for epidemiology grant.)
HHS/Indian HS	Special Diabetes	Agency budget (HHS) p.24	P1	\$0.150	100%	\$0.150		Grants for primary prevention and screening programs focused on preventing diabetes.
HHS/Indian HS	Urban Health	Agency budget (HHS) p.24	T	\$0.032	15%	\$0.005		Grants and contract-supported services for urban Indians not able to reach tribal services.
HHS/NIH	Diabetes	Agency budget (NIH Fun)	R1	\$1.055	100%	\$1.055		Basic and applied research on diabetes and complications.
HHS/NIH	NLM	Agency budget	R	\$0.252	10%	\$0.025		Funding for National Library of Medicine (Excludes biotechnology)

Department/ Agency	Program Area/ Program	Source	Classification Code(s) <sup>1</sup>	FY 2005 Budget Outlay <sup>2</sup>	Relevant %	Budget Amount Relevant <sup>2</sup>	Target age Group(s) <sup>3</sup>	Rationale for Coding; Notes
HHS/NIH	Nutrition	Agency budget (NIH Fun)	R2	\$1.082		\$0.382		Basic and applied research on nutrition. 50% of NCI and NHLBI nutrition budget; 25% of other institutes' nutrition budgets.
HHS/NIH	Obesity	Agency budget (NIH Fun); MPR Calculation	R2	\$0.519	10%	\$0.052		Basic and applied research on obesity.
HHS/NIH	Other, Prevention	Agency budget (NIH Fun); MPR Calculation	P	\$7.100	5%	\$0.355		Diabetes prevention programs (excludes eye, heart and cardiovascular diseases).
HHS/OS	OS Mgmt	Agency budget (HHS) p.96	P3	\$0.416	5%	\$0.021		Includes evaluations; excludes fraud and abuse.
HHS/OS	Retired Commissioned Corp	Agency budget (HHS) p.12; MPR calculation	T	\$0.057		\$0.010		Medicare share. See Appendix B.
HHS/SAMHSA	Misc. Health	Agency budget (HHS), p.12	P2	\$3.203	1%	\$0.032		
Homeland Security	Disaster relief, public health, medical supplies	Agency budget	P3	\$2.621	1%	\$0.026		Providing basic health services in disaster areas. (Excludes \$66.385 billion for supplemental hurricane relief.)
Homeland Security	TSA policies	Agency budget	P4	\$4.323	0%	-		TSA regulations related to carrying insulin and medication on commercial flights.
HUD	Community Development Block Grants	Agency budget	P3	\$4.700	5%	\$0.235		Local development grants; opportunity to promote recreational areas and pedestrian-friendly development.
HUD	Renewal Communities	Agency budget	P4			-		Local economic development programs in distressed urban and rural areas.
Interior	National Park Service, incl. recreation programs	Agency budget	P3	\$1.689	5%	\$0.084		\$1.689 billion is operation of the National Park System; CFDA lists \$90 million for outdoor recreation plans to states for general public.
Interior, BLM	Take Pride in Am.	Agency budget	P3	\$3.257	5%	\$0.163		Promote volunteer programs in national parks, including outdoor physical activity.
NSF	Nanotechnology R&D	Agency budget	R1	\$0.335	1%	\$0.003		Includes entire area \$335 million a year; diabetes-specific nanotechnology is \$700,000 since 2004 (or ~\$230,000 in FY 2005).
NSF	Social, behavioral and economic sciences research	CFDA, Agency budget	R2	\$0.197	5%	\$0.010		Basic scientific research.
OPM	FEHBP for employees	Agency budget, MPR Calculation	T	\$7.823		\$2.432	Adults	Health care for federal employees, not including dependents and actives.
OPM	Prevention programs for federal employees	Agency budget	P2		25%	\$0.006	Adults	Chronic disease prevention and health promotion activities for federal employees.

Department/ Agency	Program Area/ Program	Source	Classification Code(s) <sup>1</sup>	FY 2005 Budget Outlay <sup>2</sup>	Relevant %	Budget Amount Relevant <sup>2</sup>	Target age Group(s) <sup>3</sup>	Rationale for Coding; Notes
SSA	Social Security Disability Insurance	CFDA	F	\$83.765		-		Disability benefits.
SSA	SSI	CFDA	F	\$33.661		-	Elderly	Benefits to disabled, age 65+, or blind.
State	Immigration and refugee health screening policies	Agency budget	P4		0%	-		Ensures immigrant and refugee access to health care; opportunity to reach these populations.
USDA	Departmental activities/ coordination	Agency budget	P2	\$0.137	5%	\$0.007		Coordination of dietary guidance and food policy.
USDA, CSREES	Community Food Projects	Agency budget	Food	\$0.005	100%	\$0.005		Food assistance program.
USDA/ Farm Service Agency	Commodity programs	Agency budget	(Food)	\$19.599	0%	-		Administration of agricultural commodity programs.
USDA/AMS	Food Marketing	Agency budget	P4	\$0.217	0%	-		Food marketing; dissemination of information.
USDA/ARS	ARS research	Agency budget	R/S	\$1.268	25%	\$0.317		Includes obesity, diabetes and nutrition-related research; NHANES diet and food composition database work.
USDA/CSREES	Agricultural research grants - competitive	CFDA	R2	\$0.291	50%	\$0.146		Includes human nutrition and obesity, agriculture and food processing/production.
USDA/CSREES	EFNEP, tribal extension	Agency budget	P2	\$0.060	100%	\$0.060		Nutrition education for families with limited resources.
USDA/ERS	Agricultural and Rural Economic Research	CFDA, Agency budget	R2	\$0.074	50%	\$0.037		Social science research on agriculture, food, natural resources and rural America.
USDA/FNS	Child nutrition programs	Agency budget, MPR Calculation	Food	\$12.299		\$12.049	Children	Includes school lunch, school breakfast, CACFP, special milk program, Team Nutrition. See Appendix C.
USDA/FNS	Child nutrition/other programs nutrition education	Agency budget	P2	\$0.275	100%	\$0.275	Children, Elderly	Estimated from USDA estimate of \$500 M for all nutrition education across food assistance programs. See Appendix C.
USDA/FNS	Food Stamp Nutrition Education	Agency budget	P2	\$0.225	100%	\$0.225		Nutrition education within Food Stamp program. See Appendix C.
USDA/FNS	Food Stamp Program	Agency budget	Food	\$32.614		\$32.389		Includes state matching grants and assistance to Puerto Rico. See Appendix C.
USDA/FNS	Other food and nutrition assistance programs	Agency budget	P2	\$0.340		\$0.320	Children	Includes summer food service, emergency food, food distribution, community food projects. See Appendix C.
USDA/FNS	WIC	Agency budget, MPR Calculation	Food	\$3.583		\$3.583	Children, pregnant/postpartum women	Includes WIC Farmers markets; 70% estimate for food vouchers. See Appendix C.

Department/ Agency	Program Area/ Program	Source	Classification Code(s) <sup>1</sup>	FY 2005 Budget Outlay <sup>2</sup>	Relevant %	Budget Amount Relevant <sup>2</sup>	Target age Group(s) <sup>3</sup>	Rationale for Coding; Notes
USDA/FNS	WIC - Direct Services	Agency budget, MPR Calculation	P2, T	\$1.392	25%	\$0.348	Children, pregnant/postpartum women	Includes medical referrals, nutrition services, FitWIC, Eat Smart Play Hard and breastfeeding promotion. See Appendix C.
USDA/FSIS	Food Safety and Inspection Service	Agency budget	P4	\$0.811		-		Ensures safety of national food supply.
USDA/NASS	Agricultural statistics	Agency budget	S	\$0.127	10%	\$0.013		Collection of data on agricultural production, prices and labor.
VA	Administrative Costs	Agency budget	T	\$3.310	5%	\$0.167	Adults	
VA	Direct Medical Services	Agency budget, MPR Calculation	T	\$21.400		\$5.723	Adults	Medical services for veterans. 20% have diabetes and 70% overweight. See Appendix B.
VA	Disability compensation	Agency budget	F			-	Adults	Compensation for veterans with disabilities and their families.
VA	Health Atlas, Social, Behavioral, Economics Research	Agency budget	R	\$0.200	5%	\$0.010	Adults	Research on diabetes and complications of diabetes (medical care and basic science), as well as on heart and kidney conditions.
VA	Medical and Prosthetic Research	Agency budget	R1,R2	\$0.402	25%	\$0.101	Adults	415/2504 projects are diabetes, kidney or heart related (FY 2006 includes \$28 million in diabetes research)

<sup>1</sup>(Finance (F); Food; Prevention (P1, P2, P3, P4); Research (R1, R2); Surveillance (S); Treatment (T); not applicable (N/A).

<sup>2</sup>In billions.

<sup>3</sup>Postpartum women also includes lactating women.

## **APPENDIX E: COMPARISON OF MOYER ESTIMATES OF SPENDING FOR DIABETES AND MATHEMATICA POLICY RESEARCH, INC. ESTIMATES**

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*By Marsha Gold*

The Office of the Assistant Secretary for Resources and Technology of the Department of Health and Human Services (HHS) develops and submits analyses each fiscal year to an appropriations committee on spending in various priority areas.<sup>35</sup> The data studied contained little documentation to define the scope of what they seek to measure and the data sources used. The estimates are limited to HHS programs and appear to use a much more narrow definition of diabetes-related costs than we use, excluding efforts focused on risk factors for diabetes, monitoring of diabetes and significant federal health insurance spending programs other than Medicare.

To assist readers interested in understanding how the two sets of estimates differ, we compare them in Table E-1. Key findings and conclusions from that analysis are as follows:

- Both Moyer and Mathematica Policy Research, Inc. (MPR) appear to build on data provided by federal agencies. MPR was limited to data in the public domain, typically accompanying budget justifications. The two studies appear to use the same sources of Centers for Disease Control and Prevention (CDC) and National Institutes of Health (NIH) data on diabetes spending, but interpret the relevance of various kinds of spending differently.
- Though the Moyer figures are substantially lower than MPR's, both studies clearly confirm that federal spending on Medicare accounts for a disproportionate share of federal spending related to diabetes, with spending for prevention dwarfed by that for treatment. The Moyer study focuses exclusively on HHS whereas the MPR study examines federal spending across all government agencies.
- One major reason the HHS spending figures differ across the two studies is that the reports define their focus differently. The Moyer study appears to focus exclusively on spending on diabetes, excluding costs associated with risk factor reduction or treating complications associated with diabetes or accompanying it. MPR's study takes a more comprehensive approach to defining the federal role (and spending) that is relevant to diabetes concerns.

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<sup>35</sup> U.S. Department of Health and Human Services "FY 2008 Moyer Material" Submitted to Congress by the Office of the Assistant Secretary for Resources and Technology, February 2007. Material provided by Sean McCarville, Division of Budget Policy, HHS, March 5, 2007.

- There appear to be some significant HHS programs left out of the Moyer estimates. These include spending (largely related to diabetes treatment) in Medicaid and the Indian Health Service, and preventive and enabling services provided in Healthy Start, aging services (e.g., nutrition, prevention and healthy living), Head Start, the Maternal and Child Health (MCH) Block Grant and Substance Abuse and Mental Health Services Administration (SAMHSA) programs. While some exclusions probably reflect the different foci for the two studies, others (e.g., Medicaid) do not.
- MPR figures also include estimates to support monitoring diabetes through the national health information infrastructure.

The differences between the two sets of analyses could serve a valuable function in debating how best to leverage costs associated with diabetes—using resources effectively is much more important than debating how best to count the resources both parties likely will acknowledge exist.

**Table E.1. Estimates of Diabetes Related Costs within HHS, FY 2005 (in millions)**

Agency/Source of Spending (Moyer Qualification)	Moyer Estimate	MPR's HHS Estimate	Comment
<b>Total</b>	18,168.4	72,023	
FDA, Diabetes	4.3	47	MPR estimates include 10 percent share of the Food and Drug Administration (FDA) drug evaluation and research budget (\$25 million) and 5 percent each of the FDA biologics and devices budget (\$9 million and \$13 million respectively).
		218	MPR estimates include 50 percent of the FDA food safety and applied nutrition budget. FDA plays a vital role in oversight of the safety and labeling of the population's food supply.
CDC (Diabetes Core Programs)	63.5	64	MPR used what appears to be the same \$64 million CDC figures on diabetes-related spending within Chronic Disease programs as Moyer uses. The Moyer estimates indicate that the figure is specific to diabetes core programs.
		430	\$414 million is for additional funding related to risk factors common to a variety of chronic diseases, or common with cancer and heart disease, to prevention and to marketing. \$16 million is for prevention research centers (prevention research).
		55	MPR counted 50 percent of the costs related to core NCHS statistical systems (National Health and Nutrition Examination Survey (NHANES), National Health Interview Survey (NHIS) and National Vital Statistics System (NVSS)) because of their critical role in diabetes monitoring and health objectives.
NIH (across all institutes)	1,055	1,055	MPR used what appears to be the same \$1,055 million figure as Moyer from the NIH estimate of diabetes-related spending.
		814	This includes an estimated \$814 million for a share of otherwise excluded grants classified under nutrition spending, obesity and prevention research (10 percent of spending on the National Library of Medicine (NLM) is also included because this is a vital source of information on diabetes and NLM's costs do not appear to be included in the disease-specific spending NIH generates).

Agency/Source of Spending (Moyer Qualification)	Moyer Estimate	MPR's HHS Estimate	Comment
AHRQ (healthcare costs, quality and outcomes)	4.2	34	Moyer's estimates probably count only a few grants that most obviously focus on diabetes. Our estimates aimed to include research examining quality in which diabetes was an important part, assuming 10 percent of the research in health care costs, quality and outcomes (\$26 million) and 5 percent in program support (\$8 million). The estimates aimed to account for work like the National Healthcare Quality Report/National Healthcare Disparities Research (NHQR/NHDR), effectiveness work under the Medicare Modernization Act (MMA), clearinghouse efforts related to guidelines and effective practices, disparities collaboratives and related projects.
		28	MPR estimates include 50 percent of the costs of Medical Expenditure Panel Survey (MEPS) because of its vital role in monitoring performance and costs of diabetes care.
HRSA, health centers	115	163	MPR estimated this at 10 percent of program costs (\$157 million) and 5 percent of program support for collaboratives (\$8 million). MPR counted health center spending under risk factor prevention because it mostly focuses on prevention and primary care in ways important to preventing diabetes and its complications.
HRSA, MCH Block (SPRANS)	0.5	72	The Moyer figures appear to include only Special Projects of Regional and National Significance (SPRANS) grants. Ours include 10 percent of block grant funds and include Maternal and Child Health (MCH) services that bear on risk factors for pregnant women (like gestational diabetes) and children.
		24	MPR included 25 percent of Healthy Start spending for the same reason.
Indian Health Service Mandatory	150	150	MPR and Moyer each include the same figure for the mandated program.
Indian Health center Other	11	259	MPR estimates are estimates for the additional costs to treat someone with, versus without, diabetes, linked to program prevalence and spending on direct services.
		8	MPR estimates assume 5 percent of the program management budget is for diabetes related efforts.
		83	MPR includes 25 percent of spending for preventive care in underserved areas. Diabetes is a priority area in the Indian Health Service.
		3	This is 5 percent of the research budget and is what we assume is spent for epidemiological surveillance.

Agency/Source of Spending (Moyer Qualification)	Moyer Estimate	MPR's HHS Estimate	Comment
Medicare	16,763	61,097	MPR estimates are for the additional costs to treat someone with, versus without, diabetes, linked to program prevalence and spending on direct services. MPR estimates use as source data analyses of Medicare spending for beneficiaries with selected conditions that are projected forward.
		440	MPR estimates include 50 percent Medicare administrative costs for Quality Improvement Organizations (QIOs) (\$199 million) and 5 percent of Medicare general operations costs (\$241 million). Diabetes has been an important focus in Medicare's work in quality measurement and care improvement and people with diabetes account for a substantial share of beneficiaries.
Office of Secretary (OS)	2.3	21	MPR assumed that HHS-wide leadership for health promotion activity accounts for 5 percent of the OS budget. This includes work on initiatives like <i>Healthier US</i> , the National Prevention Summit and <i>Healthy People 2010</i> . Key work is undertaken by the Office of Disease Prevention and Health Promotion, Office of the Surgeon General, the Office of Women's Health and the Office of the Assistant Secretary for Planning and Evaluation (ASPE). It includes many interagency coordination efforts.
		10	Estimates of Public Health Service (PHS) Commissioned Corps Retirees cost for health benefits.
Other CMS Spending			MPR estimates for Medicaid and SCHIP spending are estimates for the additional costs to treat someone with, versus without, diabetes, linked to program prevalence and spending on direct services. The state match assumes 5 percent of administrative costs are diabetes related. Similarly, MPR assumes 5 percent of federal non-Medicare administrative spending is diabetes-related, as is 5 percent of spending on state grants and demonstrations and on general research and development.
Medicaid/SCHIP XIX (fed share)	--	4,669	
SCHIP (fed share)		21	
XIX Admin (state match)		419	
Other CMS Admin		32	
State grants/demos		20	
Research and Demo		6	
Agency on Aging			The key Agency on Aging (AoA) goal is to help older people stay active and healthy and to make it easy to gain access to health and social supports.
Nutrition Prevention		180	Assumes 25 percent for nutrition education.
		17	Assumes 75 percent relates to risk factors for diabetes.
Home/Community Services		89	Assumes 25 percent relates to risk factors for diabetes.
Food		539	Assumes 75 percent for feeding assistance.

Agency/Source of Spending (Moyer Qualification)	Moyer Estimate	MPR's HHS Estimate	Comment
ACF			The Administration for Children and Families' (ACF) mission includes developing strong healthy communities that can have a healthy impact. Head Start includes performance standards for child health.
Head Start		684	Head Start has significant health responsibilities; assumes 10 percent relates to risk factors for diabetes.
Social Services BG		182	Assumes 50 percent relates to risk factors for diabetes.
Community Svs BG		64	Assumes 10 percent relates to risk factors for diabetes.
SAMSHA		32	Assumes 1 percent relates to risk factors for diabetes.