

## The Increasing Prevalence of Diabetes and Its Economic Burden

Based on a presentation by Frank Basile, MD, MBA

### **Presentation Summary**

The prevalence of diabetes is increasing. The number of people with type 2 diabetes is expected to double in the next 2 decades, and diabetes will be more prevalent in younger populations than in the past. To keep pace with these increases, managed care organizations will have the challenge

of improving the management of diabetes. New therapies with enhanced efficacy and safety will be a factor in that improvement; their use may reduce costly long-term diabetes-related complications and short-term side effects, such as hypoglycemia. Epidemiologic studies and cost analyses are also discussed in this presentation.

**B**ecause of its rising prevalence and its significant consequences, diabetes demands serious attention. Currently, an estimated 120 to 140 million people worldwide have diabetes. Moreover, this population is predicted to double by the year 2025.<sup>1</sup>

In the United States alone, there are approximately 16 million people with diabetes, at least 90% of whom have type 2 diabetes. One in 5 Americans by age 65 will have developed diabetes. Approximately one third of those with diabetes await diagnosis and are, in the interim, unaware of the accumulating consequences of hyperglycemia.<sup>2</sup> There are a number of causes for the increasing prevalence of diabetes in the United States such as population growth and longer life span. Other considerations driving this national trend include the increasing preference for a high-carbohydrate, high-calorie Western diet; a sedentary lifestyle; and the changing ethnic composition of the coun-

try, with a larger representation of diabetes-prone groups such as Latin Americans and certain Asian groups.<sup>3,4</sup>

### **Healthcare Resource Consumption by Patients with Diabetes**

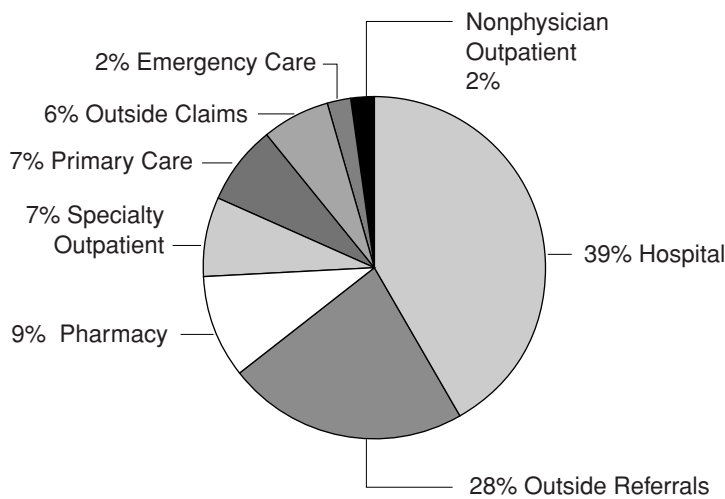
A large portion of healthcare costs in the United States can be attributed to diabetes, accounting for 1 in every 7 national healthcare dollars spent and approximately \$100 billion of direct and indirect medical costs annually. Approximately 62% of the \$44 billion in direct costs is spent on inpatient care. Moreover, two thirds of diabetes-related expenditures are for the care of patients who are 65 years or older.<sup>2</sup>

One Northern California health maintenance organization (HMO) compared the medical care costs of members with diabetes with those of members without diabetes.<sup>5</sup> The HMO found that \$283 million of excess costs during 1994 went to the care of their 85,000 members with diabetes, or approximately \$3500

excess costs per patient. Approximately 39% of the excess cost was expended in the inpatient setting (Figure 1). Improving utilization of resources in diabetes care may offset preventable hospitalizations. In addition, national

data reveal a major portion of diabetes costs is committed to managing the long-term complications of hyperglycemia; 27% of diabetes expenditures are needed in the areas of cardiovascular, renal, and neural disease, as well as lower-limb amputation and other long-term diabetes-related complications (Figure 2).<sup>6</sup>

**Figure 1.** Diabetes Healthcare Expenditures by Cost Center

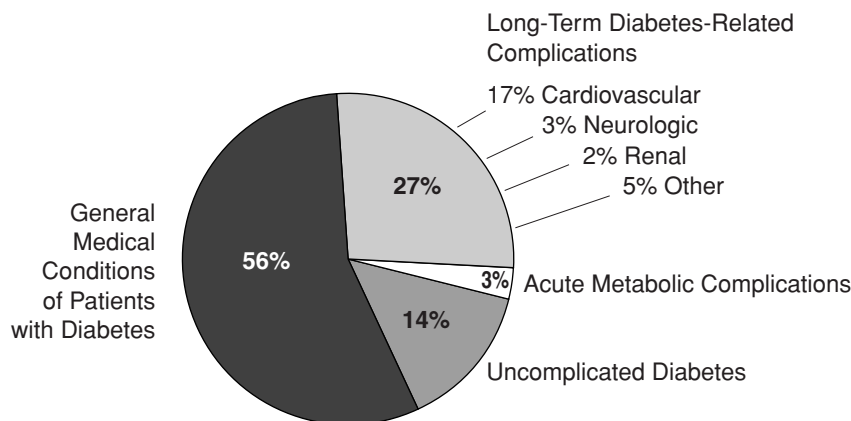


Source: Selby JV, Ray GT, Zhang D, et al. Excess costs of medical care for patients with diabetes in a managed care population. *Diabetes Care* 1997;20:1396-1402. Reprinted with permission from the American Diabetes Association.

**The Cost of Diabetes Care Correlates with Glycemic Control**

A cross-sectional study from another HMO found that cost savings could be achieved with only a 1% reduction in hemoglobin A1c (HbA1c) concentration.<sup>7</sup> For example, reduction of HbA1c levels from 10% to 9% in patients with diabetes over the 3-year period of the study resulted in cost savings of \$1205; in patients with diabetes, heart disease, and hypertension, cost savings rose to \$4116 (Figure 3). Improved HbA1c levels also resulted in reduced incidence of complications, such as retinopathy, kidney disease, and neuropathy. Unfortunately, in terms of resource consumption or reduction of complications, many of these benefits were not fully captured. One reason is that, in general, diabetes is not well managed—there are significant gaps in care and variation among practitioners.

**Figure 2.** Healthcare Costs for Patients with Diabetes



Source: Reference 6.

One survey of managed care members demonstrated that in some managed care groups as few as 38% of members with diabetes received HbA1c monitoring at least once a year (Table).<sup>8</sup> Under the most diligent of managed care systems, 89% of patients received routine (ie, once a year) HbA1c monitoring. Preventive care foot exams were performed in only 55% to 65% of members with diabetes, depending on the managed care group; eye exams were performed for 23% to 83% of members with

diabetes; and microalbumin was tested in 31% to 61% of members with diabetes.<sup>8</sup>

**Identifying Those at Risk**

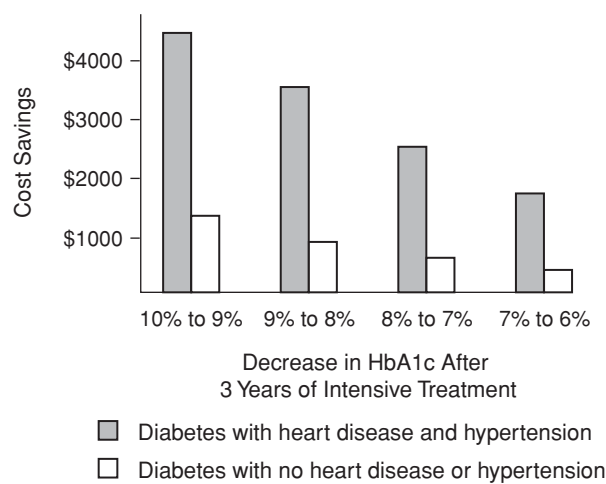
In addition to necessary improvements in the management of patients who have been diagnosed with diabetes, an improvement in identifying those at risk is needed. Of the estimated 16 million people with diabetes in this country 5 million have undiagnosed diabetes.<sup>2</sup> Individuals with impaired (subclinical) fasting blood glucose<sup>4,9,10</sup> and impaired postprandial glucose<sup>11,12</sup> are at increased risk for cardiovascular disease and all-cause mortality. In addition, impaired fasting blood glucose and impaired postprandial glucose are a precursor for diabetes.<sup>13</sup>

According to data from the Third National Health and Nutrition Examination Survey (NHANES III), 9.6% to 22.5% of the adult US population has impaired fasting glucose and/or undiagnosed diabetes, depending on the diagnostic criteria (Figure 4).<sup>4</sup> These adults are at significant risk of developing long-term complications. Glucose management might improve their overall outcomes.

Fasting plasma glucose concentration, which has been a cornerstone of diabetes diagnosis, may not fully capture those at risk. On the other hand, studies report that the importance of postprandial glucose has been underestimated. A number of observations have spurred the interest in postprandial glucose levels as an independent marker of hyperglycemic risk. First, early phase insulin release is the initial means by which the body counters postprandial hyperglycemia.<sup>14</sup> Second, and as will be discussed by Drs. Brancati and McCulloch, emerging evidence has demonstrated that isolated postprandial hyperglycemia, even in the absence of elevated fasting blood glucose, is highly associated with cardiovascular disease and mortality. Finally,

because HbA1c is the composite of fasting glucose and postprandial glucose, elevated postprandial glucose levels may contribute to overall worsening of HbA1c status.

**Figure 3.** Cost Savings as a Result of Reduction in Hemoglobin A1c (HbA1c)



Source: Reference 7.

**Table.** Preventive Care Among Health Plans

Managed Care Members Receiving Optimal Diabetes Preventive Care*	%
HbA1c test	38-89
Foot exam	55-65
Eye exam	23-83
Microalbumin test	31-61

\*Monitoring at least once per year.  
HbA1c = hemoglobin A1c.  
Source: Reference 8.

**Conclusion**

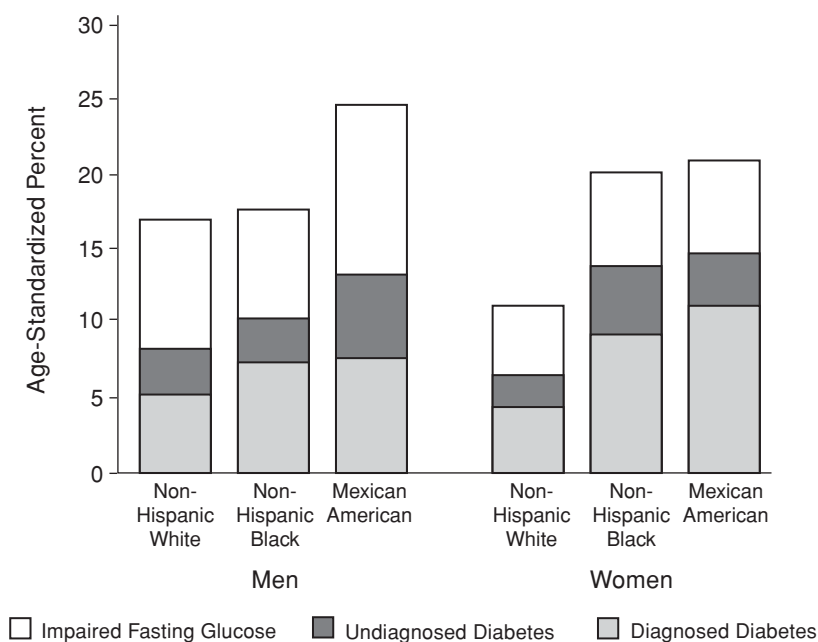
Diabetes has traditionally posed a challenge to medical care costs, in terms of its short- and long-term outcomes and its prevalence in our society. The dramatic increase in this disease will necessitate even greater consumption of resources. Medical care for the patient with diabetes consumes approximately 3 times the resources of patients without diabetes and is related to the extent of hyperglycemia. A significant portion of the cost of care for the patient with diabetes is expended on long-term complications. Tight glycemic control improves both health and economic

outcomes; identifying individuals at risk of hyperglycemia early in the disease course can also minimize the outcomes of diabetes.

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3. Barnett T. Epidemiology, complications

**Figure 4.** Age-Standardized Prevalence of Undiagnosed Diabetes and Impaired Fasting Glucose in the United States, Based on NHANES III, 1988-1994



Undiagnosed diabetes was defined by fasting plasma glucose of at least 126 mg/dL; and impaired fasting glucose by fasting plasma glucose 110 to 125 mg/dL. NHANES III = Third National Health and Nutrition Examination Survey.

Source: Harris MI, Flegal KM, Cowie CC, et al. Prevalence and diabetes, impaired fasting glucose, and impaired glucose tolerance in US adults. *Diabetes Care* 1998;21:518-524. Reprinted with permission from the American Diabetes Association.

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