

The Road Ahead in Diabetes Management

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What new information can we learn about the management of diabetes mellitus? After decades of landmark studies and billions of dollars in health system investments in education, medications, and disease management programs, it might seem as if clinicians, health administrators, and even much of the general public now realize that optimal diabetes management requires aggressive glycemic control along with treatment of the often coexistent hypertension and dyslipidemia. The difficulty, of course, is how to implement care that will achieve the goals that we know will reduce complications and improve outcomes for people with diabetes. *How can we close the gap between our knowledge of effective care and our delivery of actual care?* In this ongoing effort, we do indeed have much left to learn. And as made clear by the 2 papers in this supplement to *The American Journal of Managed Care*, what we learn may surprise us still.

The importance of improving diabetes management is highlighted by recent statistics about the scope of diabetes in the United States. The Centers for Disease Control and Prevention (CDC) now estimates that 18.2 million people—6.3% of the population—have diabetes, with 5.2 million remaining undiagnosed.¹ Moreover, there are now 41 million people with prediabetes, fasting or 2-hour postglucose challenge blood glucose levels that are above normal but not high enough to be diagnostic of diabetes. Without some change, most of these people will progress to developing diabetes within about 10 years. And although diabetes remains most prevalent in those 60 years of age or older (8.6 million, or almost 1 in every 5 individuals), the prevalence of diabetes is increasing in younger people. Over the past decade, the greatest rise in prevalence was seen in those

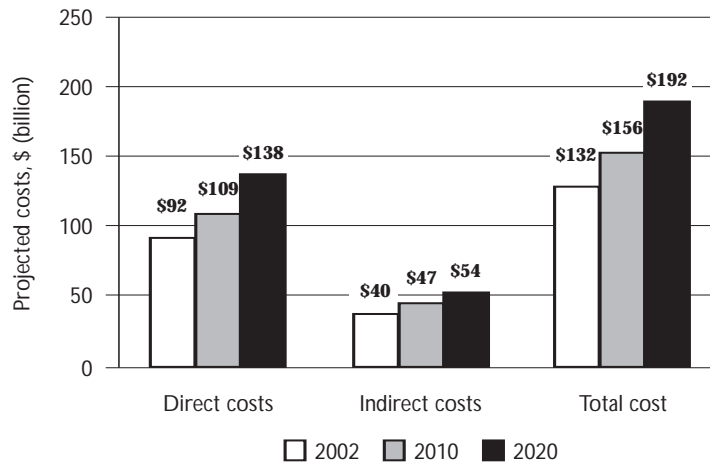
30 to 40 years of age, and the incidence of type 2 diabetes in children and adolescents is markedly increasing as well, particularly among Hispanic persons, African Americans, and American Indians. Of even greater concern are long-term CDC projections that individuals born in 2000 have a greater than 30% risk of developing diabetes in their lifetime, with the risk for Hispanic men and women now estimated at 45% and 53%, respectively.² Type 2 diabetes has indeed become epidemic, and a major contributor is another epidemic in our society: obesity.

Present and future costs associated with the micro- and macrovascular complications of diabetes are staggering. The total annual economic costs of diabetes are already estimated to be \$132 billion.³ The direct medical costs of \$91.8 billion are spent on diabetes care (\$23.2 billion), chronic complications (\$24.6 billion), and excess prevalence of general medical conditions (\$44.1 billion). Hospital and nursing home care account for more than half of this spending. The indirect costs for lost workdays, restricted activity days, premature mortality (186 000 deaths), and permanent disability (176 000 cases per year) are estimated at another \$40.8 billion. Based on conservative estimates of future diabetes prevalence (ie, not incorporating long-term projections such as those cited above²), the CDC estimates that the national costs of diabetes will rise to \$192 billion over the next 15 years (Figure).³

Typical health plans find that members with diabetes have annual medical costs (adjusted) that are about 2.4 times higher than those without the disease (\$13 243 vs \$5642) (Table).³ This cost differential emerges as soon as the first year after diagnosis of type 2 diabetes and then remains in place for at least 8 years.⁴ For those individ-

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Figure. Projected Costs of Diabetes in the United States (in 2002 Billions of Dollars)



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Table. The Diabetes Cost Factor: Per-Person Per-Year Healthcare Expenditures, 2002

Cost Component	Without Diabetes,* \$	With Diabetes, \$	Diabetes Cost Factor
Hospital inpatient	2971	6309	2.1X
Nursing home	991	2140	2.2X
Physician's office	695	1525	2.2X
Hospital outpatient	215	489	2.3X
Emergency	187	366	2.0X
Home health	190	516	2.7X
Hospice	39	84	2.1X
Ambulance	11	23	2.1X
Outpatient medication	341	797	2.3X
Insulin, oral agents, etc	NA	414	NA
Total	5642	13 243	2.4X

NA indicates data not available.

*Adjusted to reflect demographic composition (the unadjusted annual costs of those without diabetes were \$2560, with a diabetes cost factor of 5.2X). Adapted with permission from Hogan P, et al. *Diabetes Care*. 2003;26:917-932.

uals with additional risk factors, the cost differential is even higher. For example, a recent prospective multivariate analysis of healthcare costs among adults with diabetes showed that those with concomitant coronary heart disease and hypertension had

3-year per-patient costs that were triple those with diabetes alone (\$46 879 vs \$14 233, $P < .05$).⁵ The same group of authors (one of whom, Dr O'Connor, coauthored a paper in this supplement) had previously shown how medical care charges increased progressively with each 1% increase in A_{1C} levels >6%.⁶ Clearly, treatment of health plan members with diabetes—especially those with high A_{1C} levels and with concomitant hypertension or dyslipidemia—is expensive.

Fortunately, numerous landmark clinical trials clearly demonstrate that controlling glycemia can reduce development and progression of costly microvascular diseases,⁷⁻¹⁰ and there is increasing evidence that it will reduce macrovascular risk.¹⁰ Several studies document that more coordinated efforts to improve glycemic control (including disease management programs) can significantly reduce total healthcare costs¹¹⁻¹⁴ and improve patient quality of life.¹⁵ Clinical and economic benefits of controlling dyslipidemia and blood pressure in patients with diabetes have also been demonstrated^{19,16,17} as have the benefits of packaging the key elements of diabetes care into consistent, high-quality disease management programs using a coordinated team approach to care.^{18,19}

These classic studies and initiatives and a recent Consensus Conference on the Implementation of Ambulatory Diabetes Care conducted by the American College of Endocrinology and the American Association of Clinical Endocrinologists (www.aace.com/pub/odimplimentation/index.php) have created a road map for proper management of diabetes. The use of that map, however, varies widely from health system to health system, and the most recent national data on diabetes control indicate that increasing numbers of diabetic patients are left far short of their intended therapeutic destinations. For example, glycemic control rates in patients with type 2 diabetes (A_{1C} <7%) declined from 45% in 1988-1994 to 36% in 1999-2000.²⁰ Further, only about 36% of diabetic patients attained a blood pressure goal of <130/80 mm Hg, and 52% still had total cholesterol levels ≥200 mg/dL.²¹ All told, fewer than 1 in 10 adults with diabetes (7.3%; 95% confidence interval: 2.8%-11.9%)

achieved recommended control of the “ABCs of diabetes” (ie, treatment goals for A_{1C}, Blood pressure, and Cholesterol).^{21,22}

The 2 papers that follow should provide insights for managed care organizations seeking to improve their own diabetes management strategies. Although the perspectives vary—Dr Mahoney has a national employer’s focus whereas Drs Sperl-Hillen and O’Connor take the view of a regional multispecialty group—they share the goal of measurable improvements in diabetes outcomes and an approach focused on strategic investments. Dr Mahoney describes the rationale and results of a rather bold initiative at Pitney Bowes to boost employee treatment rates with upgrades in disease management and drug benefit design. The HealthPartners clinicians, meanwhile, look back over a decade of diabetes quality improvement programs aimed at lowering A_{1C} and improving control of dyslipidemia—an all-too-rare long-term retrospective analysis of what works best in getting patients to goal. I will comment on each report in the Conclusion.

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