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# Diabetes management today: Issues in achieving glycemic goals

In the years since the discovery of insulin in 1921, our understanding of diabetes and the development of treatments have greatly improved the lives of patients with diabetes. These advances have not yet led us to a cure. In fact, the percentage of the US population diagnosed with diabetes continues to rise.

In 2001, it was projected that nearly 20 million Americans would have diabetes by 2025.<sup>1</sup> But in 2015, 29 million Americans had been diagnosed with diabetes, exceeding the 2001 projection by 9 million. Newer projections are sobering—the prevalence of diabetes is estimated to increase from 9.3% of the population in 2012 to between 21% and 30% by 2050.<sup>2</sup>

As a result, most healthcare providers will face patients with diabetes or at risk for diabetes. Patients with diabetes today differ from those in the past in that increasing numbers of them are insulin resistant with impaired insulin secretion. Elements of metabolic syndrome including obesity, hypertension, high triglyceride levels, and low high-density lipoprotein levels increase the risk of diabetes and cardiovascular disease.

With the medications and treatments available today, how well are we practitioners doing in managing hyperglycemia? National Health and Nutrition Examination Survey data from 2005 to 2010 show that among patients taking diabetes medication, only 55% had controlled hemoglobin A1c (HbA1c) levels.<sup>3</sup> The role of HbA1c in the assessment and management of patients with diabetes is discussed in this supplement by Marie E. McDonnell, MD, and

Courtney Nagel Sandler, MD. Though an essential tool in blood glucose control, appropriate HbA1c target levels and reliability vary among patients. Interpretation of HbA1c may be difficult in some patients, and HbA1c levels should be tailored by balancing risks and benefits.

Diabetes management is complicated by the existence of comorbid cardiovascular disease. While a number of studies link intense glycemic control to improved cardiovascular outcomes in patients with diabetes, other studies have demonstrated higher morbidity and mortality associated with antihyperglycemic drugs. Om P. Ganda, MD, reviews the sometimes perplexing and confusing research on the effect of glucose-lowering drugs on cardiovascular outcomes, including results from a recently completed trial evaluating empagliflozin.

Further reflecting the complexity of the biologic mechanisms associated with treating diabetes, today we have 12 classes of drugs approved by the US Food and Drug Administration (FDA) for diabetes compared with the two classes (insulin and sulfonylureas) available in the 1980s. In the last decade, the FDA approved 14 noninsulin drugs in 5 classes. In this supplement, Kathie L. Hermayer, MD, MS, and Andrew Dake, MD, discuss the various noninsulin therapies and their use in achieving the balance of blood glucose control and reduced adverse events and hypoglycemia in patients with type 2 diabetes.

For patients with profound insulin deficiency, insulin remains the most important therapeutic option. Insulin is available in four general classes: rapid-, short-, intermediate-, and long-acting (and in premixed variations). The latest in insulin formulations include ultra-long-act-

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Dr. Lansang reported that she has no financial interests or relationships that pose a potential conflict of interest with this article.

doi:10.3949/cjcm.83.s1.01

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ing insulin, new concentrated insulin (glargine U-300 and lispro U-200), and inhaled insulin. A primer on these new insulin preparations and how they fit into clinical practice is provided by Luigi Meneghini, MD, MBA.

Finally, despite the availability of new medications for outpatient management of patients with diabetes, inpatient care represents the largest proportion of healthcare dollars spent on these patients. In inpatients, hyperglycemia is associated with a higher risk of complications, higher utilization of healthcare resources, and increased mortality rates. Guillermo E. Umpierrez, MD, CDE, and I outline best practices to achieve glycemic control and avoid hypoglycemia in critically and noncritically ill inpatients.

The growing number of patients with diabetes and the variety of therapeutic options available present physicians with many considerations in achieving glycemic goals. With great enthu-

siasm, I invite you to read this supplement on diabetes and hope you find it worthwhile and useful in elucidating issues in the management of diabetes today.

#### ■ REFERENCES

1. Boyle JP, Honeycutt AA, Narayan KM, et al. Projection of diabetes burden through 2050: impact of changing demography and disease prevalence in the U.S. *Diabetes Care* 2001; 24:1936–1940.
2. Boyle JP, Thompson TJ, Gregg EW, Baker LE, Williamson DF. Projection of the year 2050 burden of diabetes in the US adult population: dynamic modeling of incidence, mortality, and prediabetes prevalence. *Popul Health Metr* 2010; 8:29.
3. Selvin E, Parrinello CM, Sacks DB, Coresh J. Trends in prevalence and control of diabetes in the United States, 1988-1994 and 1999-2010. *Ann Intern Med* 2014; 160:517–525.



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