

The Use of Insulin in Diabetes Management: The Next Generation

Susan Cornell, Guest Editor

In 1922, the first insulin was made available for human use. The discovery and use of insulin revolutionized diabetes treatment and improved life for people with diabetes, especially those with type 1 diabetes. Nearly 95 years later, insulin remains the mainstay of treatment for type 1 diabetes and gestational diabetes mellitus and is also used for many people with type 2 diabetes. The evolution of insulin has continued through the years. There are now more than 15 insulin products in the U.S. market, with more in the pipeline. In the past century, new formulations and delivery systems have become available that have improved the pharmacokinetics, pharmacodynamics, and ease of use of insulin for patients. In a recent article in *Diabetes Care*, Cefalu et al. (1) used the analogy of insulin as the “essential black dress,” referring to a standard clothing item in almost every woman’s closet. Similar to the black dress, insulin will never be out of fashion, can go with almost anything (from a pharmacotherapy combination perspective), and, with simple additions or modifications, can be adapted for any occasion (type of diabetes) to help patients reach their treatment goals.

As the expansion of the diabetes pharmacotherapeutic armamentarium progresses, I am honored to serve as the guest editor of this *Diabetes Spectrum* From Research to Practice section focusing on the advancement of contemporary insulin therapy. In the past year alone, new “concentrated” or “low-volume” insulins have

received approval from the U.S. Food and Drug Administration (FDA) and are available as prescription insulin therapy options. Several questions are being asked about these newer insulins, including: What is the difference between traditional insulins and the newer formulations? What is their place in therapy? How will their cost influence their utilization and patient care?

This research section begins with four timely articles focusing on the mechanisms of concentrated basal insulin and its use in various practice settings. First, Nathan A. Painter and Evan Sisson introduce and differentiate the background, pharmacokinetics, and pharmacodynamics of newer basal insulins compared to traditional basal insulin analogs (p. 136). Next, Andrew S. Bzowycy shares experience and tips for using concentrated insulin in outpatient or ambulatory care practice settings (p. 140). Denise M. Kolanczyk and Rachel C. Dobersztyn then discuss the benefits and limitations of concentrated insulin use in the inpatient setting (p. 146). In the fourth article, Sarah L. Anderson and Jennifer M. Trujillo examine the use of combination therapy with basal insulin and glucagon-like peptide 1 receptor agonists in current practice, as well as pipeline development of combination products (p. 152).

Our research section continues with an article by Anne Park Kim and Ross Jason Bindler (p. 161) providing an introduction to biosimilar

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products and specifically the recently FDA-approved biosimilar insulin glargine (Basaglar) and its likely role in insulin therapy in the near future.

Despite all of the advances in knowledge, technology, and new products, many patients still do not take their medications (including insulin) at all or correctly. Many are not aware of the importance of taking medications at the right time of day (e.g., morning vs. evening) and in the right circumstances (e.g., with food vs. without food) to receive the best effects with the least number of side effects. Thus, the final article in this research section, by G. Blair Sarbacker and Elizabeth M. Urteaga (p. 166), provides an overview of common nonadherence concerns from patients' and providers' perspectives, along with strategies to overcome these barriers. Elsewhere in this issue of *Diabetes Spectrum* (p. 130), an editorial by Irl B. Hirsch reviews the practical and concerning impediment of high and increasing

insulin costs. Of noteworthy interest, in the Lifestyle and Behavior department (p. 185), Julio A. Rebolledo and Regina Arellano examine cultural and motivational barriers to insulin therapy in various racial and ethnic populations. Finally, wrapping up this issue in the Pharmacy and Therapeutics department (p. 180), Jacob Oleck, Shahista Kassam, and Jennifer D. Goldman provide an update on the rollercoaster lifecycle (past, present, and future) of inhaled insulin.

Given the nearly 95-year history of insulin, this treatment remains underutilized and is often used inefficiently. Much like the "essential black dress" in many women's closets, insulin remains a basic need in the diabetes pharmacotherapy armamentarium. Health care providers must realize that, for many patients, insulin itself is not the problem; rather, accessing and understanding the importance of insulin is the problem. I hope this From Research to

Practice section and the related articles elsewhere in this issue of *Diabetes Spectrum* will allow practitioners to explore, understand, and use modern insulin therapy effectively and proficiently in practice to provide optimal care and management to their patients with diabetes.

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Duality of Interest

No potential conflicts of interest relevant to this article were reported.

Reference

1. Cefalu WT, Rosenstock J, LeRoith D, Riddle MC. Insulin's role in diabetes management: after 90 years, still considered the essential "black dress." *Diabetes Care* 2015;38:2200–2203