

# Diabetes Has Gotten Pretty Darn Complicated

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In the United States, 8% of our population has been diagnosed with diabetes, and 4% has diabetes that remains undiagnosed. Current projections suggest that the prevalence of diabetes will increase to 20–30% of the population by 2050 (1). Diabetes is, and will remain, a primary care medical issue, with >80% of patients with type 2 diabetes being managed by primary care providers (PCPs).

Although diabetes is common, PCPs have found it to be one of the most challenging problems for which they provide care (2). In the past decade, there have been 18 new medications approved for glycemic control in the United States and six new classes of antihyperglycemic medicines (3). Two of these classes of medicines, incretin mimetics and the sodium–glucose cotransporter 2 (SGLT2) inhibitors, work through mechanisms that not only were unknown to any clinician who graduated >10 years ago, but were actually not well appreciated even when our current third-year residents in training were in medical school. That is how fast knowledge of diabetes and glycemic control has evolved. Add to that another 100 medicines for diabetes in the pipeline (4), and you can see how PCPs might feel a bit overwhelmed.

Primary care residents have also found that keeping up with changes in diabetes management has become more challenging. This is, in part, because of changes in how medical students obtain knowledge about new

medications and about the difficulties of being able to use those medications with patients.

Most medical students' education about drugs begins in the classroom during the first 2 years. During this time, more emphasis is placed on medications' mechanisms of action and less on when they are appropriate to use for a given patient. In the third and fourth years, students are often bystanders, as they watch PCPs prescribe a select group of diabetes medications, often influenced by the socioeconomic and insurance status of the patients they are seeing. In many residency settings, we take care of the poorest members of the community, and it is more common to see patients on metformin, insulin, and sulfonylureas than on dipeptidyl peptidase-4 (DPP-4) inhibitors, glucagon-like peptide-1 (GLP-1) receptor agonists, or SGLT2 inhibitors.

In addition, many university hospitals no longer allow drug representatives to have access to students, residents, or faculty to discuss the latest medications. Although critics have described the way these marketing interactions might negatively influence prescribing habits, such interactions also had potential benefits. They provided concise updates on new medications and may have heightened awareness of the importance of treating many diseases, with a positive effect on patient care (5). The disappearance of these conferences has not been systematically

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replaced by equivalent educational activities.

Residents live in a world where they learn about a wide variety of highly effective diabetes medications but have a hard time gaining experience using these agents because the patient populations they see have limited economic resources and restrictive insurance plans. Because residents must assimilate a great deal of scientific knowledge across a large number of primary care topics, they naturally focus on what is relevant to their patients, which is not the newer medications that may offer benefit for patients. Prescribing habits that are developed in residency continue for many years after residents enter practice (6).

Our educational programs have not evolved at quite the same rate as the complexity of our medical treatment for diabetes. For the most part, our educational approach remains haphazard, with enormous local variation, without a well-thought-out curricular plan, and delivered through standard unidirectional formats. This state of affairs presents both a challenge and opportunity. The challenge to those of us who are interested in diabetes education is to figure out how to deliver the best possible programs to the largest number of both clinicians in practice and residents in training. We must also determine how to do this in a manner that is interesting and engaging and that facilitates the information being understood and remembered.

We need to leave behind preconceived notions of what type of educational programs work best and what are the best institutions

to deliver those programs and work together with our national organizations, local organizations, and industry to develop educational activities that address the emergent learning needs of residents and attending clinicians. These programs should include more active problem-based learning, which generally requires more effort to develop and deliver, but which has been shown to have better outcomes for both learning and behavioral change (7). We live in a multi-channel world with different people accessing information in different ways at different times of the day and night. We need to develop both traditional and creative programs that give people access to educational information in person, through the Internet, and on their mobile devices.

The opportunity we are presented with, as we move into this age of new medicines and new ways of organizing medical care, is to improve the quality of care of our patients. We are reminded of a line from John F. Kennedy's inaugural address (8), "I do not believe that any of us would exchange places with any other people or any other generation." We feel that way about diabetes care. We would not change places with any other people or work in any other time. We live in an exciting age with regard to learning about and educating our fellow clinicians about diabetes. The increasing prevalence of diabetes, along with the growth of evidence supporting new, effective medical treatments, presents us, as PCPs, with perhaps our greatest opportunity to help patients. Finally, we reflect on a later line from Kennedy's inspiring

address: "I don't shrink from this responsibility, I welcome it." Working together, we can develop programs to help us keep up with this incredible explosion of knowledge and resources. Our patients are waiting.

## Duality of Interest

N.S. has served on advisory boards for AstraZeneca, Eli Lilly and Company, and Sanofi. No other potential conflicts of interest relevant to this article were reported.

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