# Connectedness: How Technology and Social Networks Are Advancing Diabetes Nutrition Care

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**Editor's Note:** This article is adapted from the address Ms. Boucher delivered as the recipient of the American Diabetes Association's (ADA's) Outstanding Educator in Diabetes Award for 2018. She delivered the address in June 2018 at the association's 78th Scientific Sessions in Orlando, Fla. A webcast of this speech is available for viewing at the ADA website (professional.diabetes.org/webcast/outstanding-educator-diabetes-award-lecture%E2%80%95connectedness%E2%80%94how-technology-and-social-networks).

I am grateful and somewhat surprised to have received the 2018 Outstanding Educator Award, despite having volunteered with the American Diabetes Association (ADA) in a variety of roles over the past 20 years. Volunteering with the ADA has deeply enriched my professional life and has also served as a spark for a number of friendships I cherish to this day. I have witnessed firsthand the expertise and commitment of every person who works with the ADA to fight this devastating disease and improve the quality of life of the people affected by it. To be recognized among so many distinguished professionals and volunteers is truly an honor.

We all have our areas of expertise and specialized roles in health care, yet I know we all share some common characteristics. We all care about the health of individuals, their families, their communities, and, ultimately, entire populations. We want to see less sickness in the world. We all understand the inherent complexities of trying to move the needle on a challenging global health issue.

Figure 1, from the ADA's current strategic plan (1), depicts the "diabetes ecosystem." It shows how many industry sectors are involved in the work of the ADA, which is represented by the large pink circle that moves through all of them. "People with diabetes" are represented by the red circle in the center—exactly where it should be. This graphic is a useful illustration for any global health issue. We could replace "people with diabetes" with "people with heart disease," for example, and all of the industry sectors would still apply.

## Evaluating Technology: Delivery and Outcomes

One thing I noticed, though, is that "tech industry" is listed as its own category. But we know that, in reality, technology has an impact on every one of the other sectors. Technology has a pivotal role in every aspect of disease management today. We can't escape it, even when we want to. Technology has been intertwined in health care for many decades, and the qualities of health care technology are constantly changing.

I think the trend that has been the most transformative and remarkable, however, relates to who has access to and who is using technology for health care. Early technology growth and adoption used to reside primarily

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*https://doi.org/10.2337/ds18-0079*

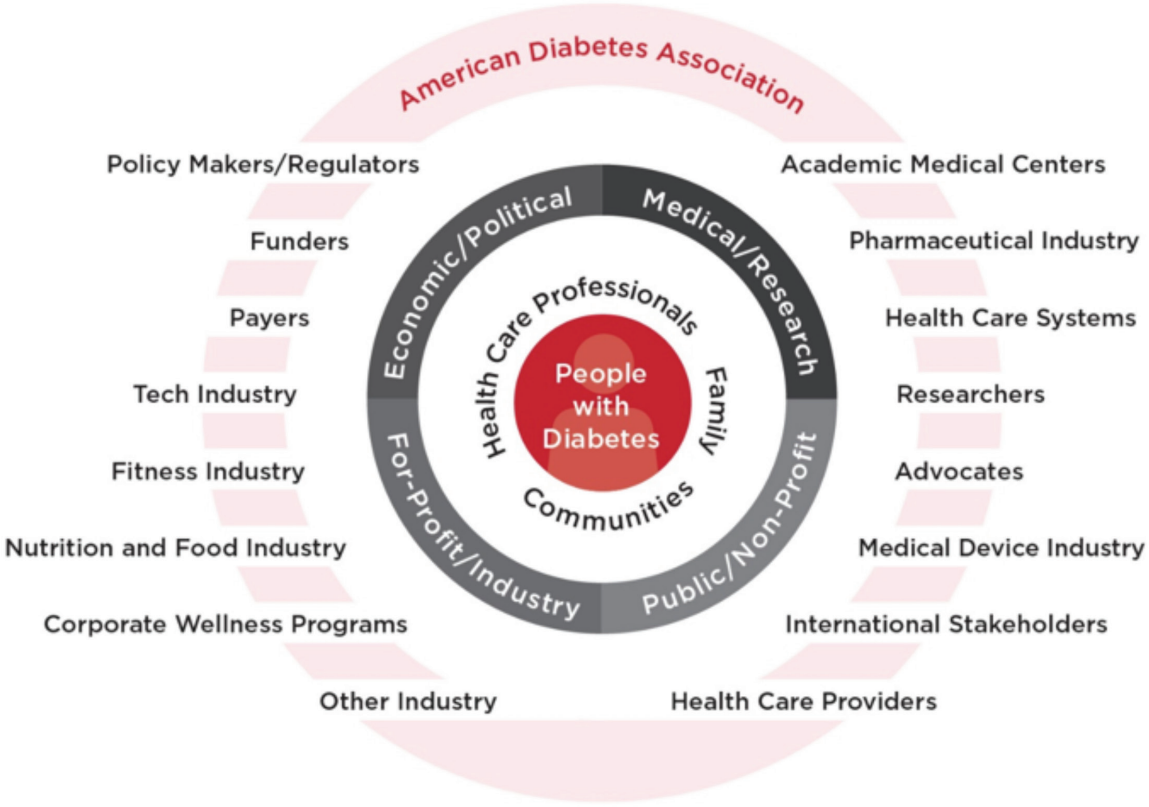


**FIGURE 1**. The diabetes ecosystem.

in the hands of health care providers. Now, the digital age has expanded patients' access to technology. They have wearable devices, home monitors, mobile apps, and greater access to electronic health records (EHRs) and health care information online. These are just some of the major growth areas that have put more health care technology, and thereby health care management, into the hands of patients.

Innovators are rolling out new technologies at an ever-increasing pace, and providers are overwhelmed trying to figure out which technologies to research, purchase, and adopt for their practices. There are many shiny objects out there, demanding attention. Trying to keep up with all of them is time-consuming, and over-adoption of new technologies can cause needless expense and frustration.

I suggest there is one critical filter that should be used when considering any new technology. It's the question: Will this technology improve the delivery of health care and outcomes for our patients? Delivery and outcomes. Does it add complexity to or simplify care? Does it add or remove barriers?

Through the years, I have come to realize that identifying barriers facing our patients is a necessary and often underrated skill for any health care provider. I assume we share the belief that the best patient outcomes occur when we use a multidisciplinary and holistic team approach to health care delivery. This is especially true with complex, chronic diseases such as diabetes.

## Technology Alone ≠ Holistic Health Care

And that's the thing about technology. No matter how sophisticated it becomes, it is still a tool. It will never be a multidisciplinary team. It will never be a holistic approach—at least, not in our lifetime. Technology may offer remarkable tools, but its value is only realized through the experts that employ those tools strategically.

When people talk about innovations in medicine, new devices and new drugs are often what come to mind. But when I reflect back to the beginning of my career and how I viewed my role with patients, I realize that how we work together as teams and how we relate to patients has evolved over the decades for the better. We should recognize these changes as innovations as well.

I didn't enter my profession as a dietitian with a very deep understanding of the concepts "multidisciplinary" or "holistic" as they relate to health care. I am not even sure those ideas were addressed in my professional training. My career plan seemed pretty straightforward: I would learn about nutrition. I'd get a professional degree that would prove that I'm the expert. Then I'd have

patients assigned to me. I'd prescribe the perfect diet for them, and they would follow it. Done!

Like doctors and nurses, my training was structured through a framework that taught me that it was my role to be prescriptive. It was my job to tell other people what to eat and when to eat it, based on my expertise. But now, after decades of practice and research in diverse environments with a variety of populations, I realize that the most universal and evergreen factor for improving patient outcomes is the concept of access or, conversely, lack of access. I have learned that access is a crucial factor that must be addressed in the equation whether one is working with an individual patient or an entire population. We can have all the expertise and technology in the world, but if we don't make sure patients can easily connect to it, understand it, and adopt it, it has little value to them.

What is access really? It is a connection without interference or blockages. So, it stands to reason that improving access means removing barriers. Through experience, I have learned that the first step is having the will and the ability to identify barriers. It sounds obvious, but in our haste to be prescriptive, we too often skip the step that is necessary for identifying and removing barriers, which is employing the skill of informed curiosity.

## Developing Informed Curiosity: A Personal Journey

The term "informed curiosity" implies both knowledge and a sort of targeted inquisitiveness. It is intentional. Although practicing informed curiosity does not come easily for everyone, it is a skill that can be honed and nurtured. And we humans can still execute curiosity better than any technology. Deploying curiosity as a skill requires patience and a small dollop of hesitation—not rushing in to fix something, but rather taking time first to listen and learn.

Throughout my life, there have been a few key moments that taught me the value of curiosity and ultimately affected my professional work and my perspective on the importance of access in health care.

I grew up on a farm in Crookston, Minn. Like many farm kids, I was involved in 4H, and through it, I had an opportunity to live with a family on a farm in Norway. It was there that I first saw up close what living with type 1 diabetes was like. Both the father and son in my host family had the disease. Although I never witnessed anything dire, there was a palpable level of concern and general anxiety among the family related to the presence of diabetes.

Diabetes touched my own family as well. All of my grandmother's siblings died in their 60s due to complications from type 2 diabetes. Her father had also had diabetes. I lived with her my senior year of high school and saw how much effort she put into trying to avoid the same fate. She ate nutritious foods, exercised every day, and did what she could to stay healthy. Even with her efforts, she was diagnosed with type 2 diabetes at the age of 80. Still, her efforts allowed her to hold it off much longer than her siblings had.

In 1999, I co-authored a cookbook titled *No-Fuss Diabetes Recipes for 1 or 2* (2), in honor of my grandmother. Looking back, I recognize it as an early example of my efforts to improve access to health information. The recipes were designed for seniors living in small households. They were simple to prepare, required fewer than 10 ingredients, and were printed with easy-to-read large type. If I hadn't had the personal experience of living with my grandmother, and more notably, paid attention to her lifestyle and needs, I may never have thought of such things as a young practitioner.

My college internship was another experience that had a profound impact on me. Because of my curiosity and interest, I intentionally sought a placement that would give me exposure to an environment different from what I had known so far. I interned at Harper Hospital in inner-city Detroit, Mich. Our team of interns spent time in various hospitals on the campus and within various units, and when I worked at the pediatric hospital, I cried every day. There were babies with HIV, babies with syndromes and addictions, and babies who did not have a good home to return to. This experience opened my eyes to how access, or lack of it, affects health care delivery. Most of the patients treated at Harper were low-income people of color, and most of the medical staff were white or from other countries. I had never experienced living and working with racial tensions before. I learned that trust was not to be assumed, but rather had to be earned.

As a nutritionist, this was the first time I heard, "OK, lady, you don't know enough about what we like to eat here." And it was true. I didn't. I learned that it's hard to talk to people about eating healthier when they are scared they might die tomorrow because of violence in their neighborhood. Note to self: survival issues always rank above counting fruit and vegetable servings.

I learned that my starting point with any patient had to be one of informed curiosity. How far is the grocery store from you? What can you afford to buy? I didn't really know these terms at the time, but I was learning about food deserts and food insecurity. It was so foreign to me, coming from a farm background, but it was an invaluable education. Before, I thought barriers to eating healthfully were all related to lack of information, bad choices, and bad habits. But now, I understood that barriers come in many forms, and many are not easily seen.

In the early 1990s, my first real job as a hospital dietitian in Grand Rapids, Minn., involved the Itasca Heart Project. This was a county-wide program developed with Blue Cross Blue Shield because Itasca County had the highest death rates from

heart disease in all of Minnesota. Part of my job involved working with grocery stores in an initiative called "Shop Smart for Your Heart" that was part of the larger National Institutes of Health–funded Minnesota Heart Health Program and with restaurants as part of the American Heart Association's "Dining a la Heart" program. Back in farm country, I was no longer in a food desert, and access to food was not the barrier. Rather, the barrier to be addressed was poor access to healthful foods and lack of knowledge about healthful food choices. This experience, and several other jobs that came after it, taught me the importance of patiently investing my time and energy to gain patients' trust and to help even reluctant patients begin to improve their diet, lifestyle, and health. I moved through a series of professional positions working in the fields of cardiology, oncology, Alzheimer's disease, eating disorders, and, of course, diabetes. These were opportunities to hone the practice of informed curiosity.

In 1995, I began another milestone period in my career, moving to HealthPartners in Minneapolis, Minn. The positions I held during my 12 years there taught me even more about how technology can improve both access to health care and patient outcomes.

Then–Chief Executive Officer George Halvorson wanted to give patients easy access to a dietitian to answer nutrition questions. He provided funding to establish a call center, and it was my job to make it work and to integrate the health plan–level program with primary care clinics. Although it seems quaint now to think of this use of telephones as an innovative technology, at the time, it was indeed an innovative approach designed to remove barriers and meet patients where they were, which was in their homes.

I worked with a team of dietitians, health educators, and pharmacists to develop a program called "A Call to Change . . . " that offered educational courses based on the calls we received. The key components included a structured curriculum that was mailed to participants, along with course tools such as a pedometer, a food log, or a clinic visit checklist. We also developed a call tracking system that integrated with the EHR system and provided between-visit care to help patients achieve positive health outcomes. Early on, we developed a caller screening system to identify callers with diabetes for triage to a certified diabetes educator dietitian. Later, we integrated our telephonic program with our ADA-recognized diabetes education program.

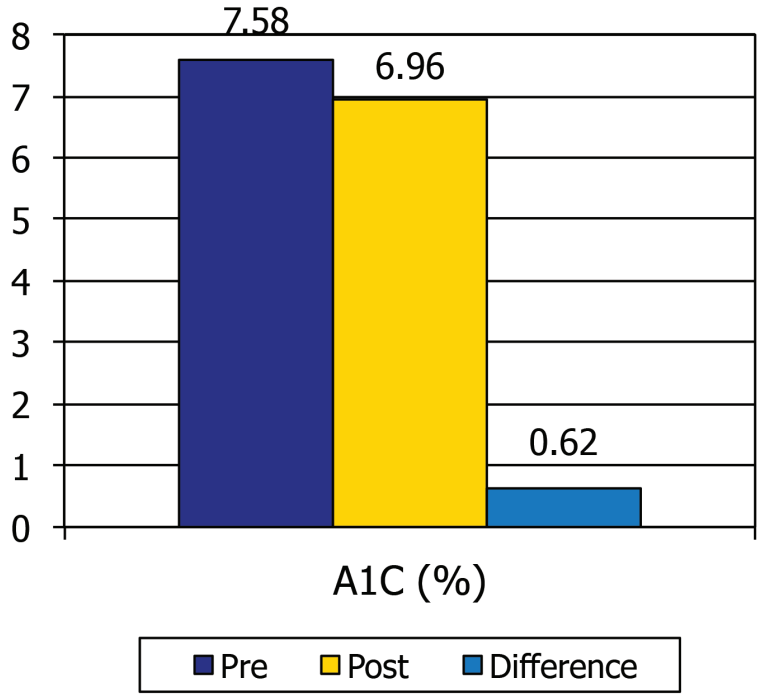


**FIGURE 2.** A1C reduction achieved by the HealthPartners diabetes management telephone course. A1C change equated to a reduction of ~20% in risk for microvascular complications (1).

Our pilot outcomes demonstrated statistically significant improvements in glycemic control (Figure 2) (3). We were also able to demonstrate that the program led to frequent referrals back to providers for medication changes, improvements in participants' diabetes knowledge, increased participant comfort in discussing their diabetes management with their primary care providers, and participant satisfaction with the care they received by phone.

### Bringing It All Together: The Heart of New Ulm Project

My curiosity was challenged further when I became Vice President of Education at the Minneapolis Heart Institute Foundation (MHIF) in 2007. This position allowed me to bring all of my previous professional experiences to bear on a population-level effort to prevent heart attacks. The vision was bold: to eliminate heart attacks in an entire community. And the proposed project made sense: shouldn't health care systems be moving upstream to prevent disease before they treat it? We quickly wrote a grant proposal and were awarded $10 million from Allina Health, and Hearts Beat Back: The Heart of New Ulm (HONU) Project was born.

The project took place in New Ulm, Minn., a rural community southwest of Minneapolis. This town was chosen because there was one health care system in New Ulm, and >90% of the town's population had an active EHR. Our goal was to reduce the number of heart attacks over 10 years among residents 40–70

years of age. We focused on traditional risk factors for coronary heart disease (CHD).

Something important to know about this project—especially from a nutrition perspective—is that New Ulmites identify as German, and I discerned from interviewing community members before the project began that, for these cultural Germans, beer, brats, butter, and cheese were considered the four essential food groups.

We focused on interventions that would help lower blood pressure levels, manage blood lipids and glucose levels, reduce overweight and obesity levels, address tobacco use, increase physical activity levels, increase daily servings of fruits and vegetables, help manage stress, and increase medication adherence. Some of the innovative features of the HONU Project, which is now in its 10th year, focused on social and environmental conditions to achieve a sustained change and also on using EHRs as our primary surveillance tool to save money (4).

Our data collection strategy included community needs assessments, environmental assessments, and screening data. We did community-based screening and entered all of the information into the EHRs. We combined screening data with our EHR data and looked at national and state data to measure the impact of our project (4).

The project's first year focused on escalating awareness. We strove to penetrate all levels of the community with healthy lifestyle messages. We wanted to propel a total cultural shift to make health the new norm. Working on culture change is a marathon not a sprint. The project aimed for media coverage two times per month in addition to e-communications. By the end of the first year, >90% of the residents in New Ulm were aware of the HONU Project, and this rate has been sustained for a decade.

Through our screenings, we did a baseline assessment to create our community diagnosis (5). Baseline screening reached 40% of our entire population and revealed that the community had higher than national rates of some health factors. In 2009, the national obesity rate was 35%, whereas, in New Ulm, it was 41%. New Ulm had a metabolic syndrome rate of 38%, which was 10% higher than the national rate. Only 17% of the New Ulm population reported getting at least five daily servings of fruits and vegetables, and 64% met minimum recommendations for physical activity. There was also significant underutilization of preventive medical therapies such as aspirin, statins, and blood pressure drugs among those at risk.

These findings guided our decisions about interventions, which focused on the food environment and medical management of those at high cardiometabolic risk. We used the social-ecological model for designing interventions based on feedback from a community steering committee to target people where they lived, ate, played, and worked.

We found that positive changes were measurable at 5 years in terms of improvement in blood pressure, LDL cholesterol, total cholesterol, and triglycerides. There were few differences by sex, except for large improvements in blood pressure among women. When we compared HONU Project data to national data such as from the National Health and Nutrition Examination Survey (NHANES), we found that we were making improvements in some areas, such as blood pressure, better than national averages (Table 1) (6).

Between the 2009 and 2014–2015 HONU Project screenings, although we did not significantly affect the incidence of smoking (reduction from 7.9 to 5.5%), we did see significant improvements in physical activity (from 63.9 to 96.2%) and eating at least five daily servings of fruits and vegetables (from 16.3 to 30.2%) (7).

Much of our work was focused on improving the food environment to create access to healthful foods. We knew that only one in five people in our population were eating the recommended number of fruit and vegetable servings and that people ate an average of two meals in restaurants each week. So, in 2012, we assessed 34 local restaurants, offering incentives for restaurants to participate that included consulting support, recipe analysis, and training. We helped them develop decision prompts in their menus and various healthy promotions. As a result, between 2011 and 2014, there were significant increases in the availability of non-fried vegetables and fruits on menus (from 63 to 84%), as well as smaller portions (from 31 to 72%), whole-grain breads (from 25 to 38%), and salads listed as default side items instead of French fries (from 23 to 35%) (8).

As part of our mission to change the New Ulm environment and to increase access to programs and tools to support health behavior change throughout the community, we developed a lower-intensity intervention integrating EHR information, social media, community-based weighing kiosks, and incentives. Through the LOSE IT to WIN IT challenge, nearly 2,000 participating residents lost a mean 2% of their body weight over 1 year, earning small individual prizes such as gift cards, T-shirts, and gasoline discounts and a large community reward designed to benefit everyone—more than $59,000 for exercise equipment in local parks (9). Although the program yielded weight loss that, while statistically significant, was of limited clinical significance, it did give people opportunities to connect, share, and support each other and generated enthusiasm within the community.

## Improving Access and Outcomes: the ENHANCED Study

Another project we undertook at MHIF was aimed at easing the burden of diabetes care delivery in the prima-

**TABLE 1. Comparison of HONU Project and NHANES Data (6)**

| | NHANES 2009–2010, %* | NHANES 2011–2012, %* | NHANES Change, % | HONU Project 2008–2009, % | HONU Project 2012–2013, % | HONU Project Change, % |
|---|---|---|---|---|---|---|
| Blood pressure at goal (<140/90 mmHg) | 83.1 | 82.5 | −0.6 | 79.3 | 86.0 | +6.7 |
| On blood pressure medication | 35.2 | 36.8 | +1.6 | 38.3 | 47.6 | +9.3 |
| LDL cholesterol at goal (<130 mg/dL) | 64.3 | 63.7 | −0.6 | 68.0 | 72.0 | +4.0 |
| Total cholesterol at goal (<200 mg/dL) | 47.5 | 46.9 | −0.6 | 58.3 | 65.1 | +6.8 |
| Not obese (BMI <30 kg/m$^2$) | 62.5 | 62.3 | −0.2 | 55.9 | 55.2 | −0.7 |

**NHANES data selected for non-Hispanic white participants aged 40–79 years to provide a comparison group similar to New Ulm resident demographics.*

ry care setting. The ENHANCED (diEtitiaNs Helping pAtieNts CarE for Diabetes) trial, funded by the Diabetes Care & Education Practice Group of the Academy of Nutrition and Dietetics, focused on expanding the role of registered dietitians (RDs) in caring for individuals with diabetes. This recently reported trial (10) investigated the effectiveness of a telemedicine program through which RDs used provider-approved medication therapy protocols to start and adjust patients' medications for lipids, blood pressure, and glucose, in addition to providing medical nutrition therapy. At 1 year, patients who received the monthly telemedicine intervention in addition to their usual care from a rural primary care clinic had a modest, but significantly greater, improvement in the number of optimal care measures met compared to a control group receiving only usual clinic care (3.7 vs. 3.2, $P = 0.017$). The intervention group also had a significantly greater increase in medication use compared to the control group, with 2.5 and 2.2 higher odds of taking a statin and aspirin as appropriate, respectively.

### Acting Globally: Children's HeartLink

I recently switched professional gears again, and yet my new responsibilities are a logical extension of everything I have done before. I am now president of Children's HeartLink, a nonprofit organization headquartered in Minneapolis whose mission is to increase access to high-quality medical care for children with heart disease in underserved parts of the world. We partner with 16 hospitals in five countries: Brazil, China, India, Malaysia, and Vietnam.

Although congenital heart disease is the most common birth defect in the world, only one in 10 children born with a heart defect has access to the health care they need (11). One in 100 babies are born with CHD (11). One in four will need surgery or other intervention within the first year of life just to survive (12). The burden of this disease and the unmet need worldwide are tremendous; 90% of children born with a heart defect don't have access to the care they deserve. So, once again, I am working to improve access to quality health care.

Practicing informed curiosity is absolutely crucial when working in different countries with different cultures, languages, and even medical protocols. Helping expert volunteer medical teams share the best of what we know in the western world with underserved parts of the world, and learning from the back-and-forth exchange of information, is central to the work I do. Our partnerships go deep, with significant investment. It is crucial to our success to begin every partnership with intense curiosity and pliable assumptions. We listen first, to learn how we can best support our partner sites to increase their capacity and improve patient outcomes as efficiently as possible.

Now that I am working in the global health care arena with diverse populations, my awareness of the complexity of barriers in treating a globally significant disease has been exponentially amplified. But that awareness also amplifies the universal bonds we have across all of humanity. We all want the best care for our loved ones. We all want to reduce sickness and suffering in the world. We all want everyone to have access to the health care they deserve.

These shared goals bring us back to where we began: technology. If we can use technology to increase access and remove whatever barriers our patients are facing, we can improve patient outcomes. Technology is all around us and all around our patients. It is easy to become overwhelmed by the sheer volume and complexity of it all. It is impossible for us all to be experts on all of the choices available to our industry. Therefore, we have to be strategic in our use of technology.

Our decisions should always be patient-centered. If we keep our patients at the center and we never stop practicing informed curiosity to identify and overcome barriers, we will improve quality of life and outcomes for people with diabetes, children with heart disease, or any population we are serving as health care professionals.

## Acknowledgments

I want to thank my family, friends, colleagues, and patients who inspire me to learn and think differently and who encourage me daily. I also want to thank the ADA, the Diabetes Care & Education Practice Group of the Academy of Nutrition and Dietetics, and the American Association of Diabetes Educators for all of the volunteer opportunities that helped me increase my curiosity and have allowed me to learn, experience, do, and connect with numerous colleagues. And thanks to Susan Bordson for helping me write this speech.

## Duality of Interest

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

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