Translation in Action: Advancing Public Health and Clinical Care in Diabetes

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Editor’s note: This article is adapted from the address of the American Diabetes Association (ADA) President, Health Care and Education, given in June 2011 at the Association’s 71st Annual Meeting and Scientific Sessions in San Diego, Calif. A Web cast of this speech is available for viewing at the ADA Web site (http://professional.diabetes.org/Webcasts.aspx).

We have many opportunities, as scientists and clinicians and as family and community members, to affect the epidemic of diabetes, both in terms of prevention and in terms of taking care of people with diabetes. Each year, the American Diabetes Association (ADA) President of Health Care and Education gives a speech reflecting on work the individual has done and how this relates to a given theme around diabetes.

I am a bit of a different type of person in this role in that my professional life has been maybe 2% clinical practice in nutrition and 98% diabetes research, plus teaching and mentoring graduate students in epidemiology and nutrition. So I have chosen to reflect on diabetes research from a translational perspective, towards advancing public health and clinical care.

As is the case for many of you, I have functioned in two worlds, or three when you count my family (which is its own world with five kids). It is no accident that my position as a faculty member at the University of North Carolina (UNC) and my volunteer service for ADA are linked by the ADA’s stated mission “to prevent and cure all people affected by diabetes.” In fact, I teach my students that involvement in their professional societies, and particularly the ADA, is, in fact, an important way to ensure that the research we do is translated into public health initiatives and clinical practice.

First, I’ll focus on improving health for children with diabetes. Most of my work during the past 8–10 years has focused primarily on kids.

First and foremost is the SEARCH for Diabetes in Youth study, which is the largest, multicenter epidemiological study of childhood diabetes in the United States. I have been involved with this project for about 10 years now, serving as the principal investigator for the UNC site and as a study co-chairperson.

The central aims of the SEARCH study are as follows:
- Track trends in incidence of type 1 and type 2 diabetes in youth
- Inform the development of public health surveillance systems of childhood diabetes
- Conduct surveillance of mortality in the SEARCH cohort
- Assess the markers of vascular complications of diabetes
- Assess the serious acute complications of diabetes
- Determine the quality of life and barriers to care for youth with diabetes
- Assess the transition from pediatric to adult care

Although SEARCH includes children with all types of diabetes other than gestational diabetes, I will focus here on type 1 diabetes. Figure
1, based on about 5,400 cases ascertained from a denominator of about 3.5 million in 2001, shows a prevalence of type 1 diabetes ranging from < 1 to about 3 per 1,000, depending on age and race/ethnicity.\textsuperscript{1}

SEARCH provides data on a wide range of clinical characteristics from contemporary cohorts of youth with diabetes. For example, we have found that the epidemic of childhood obesity is affecting youth with type 1 diabetes just as much as other youth (Figure 2). In fact, the prevalence of obesity is about the same, and that of overweight is slightly higher than for nondiabetic counterparts.\textsuperscript{2} And, the prevalence of metabolic syndrome is ~ 14% in youth with type 1 diabetes compared to ~ 6% in nondiabetic youth.

Poor glycemic control is also a real problem. For non-Hispanic white youth with type 1 diabetes, the prevalence of poor glycemic control is ~ 12%, but it is much higher for each of the other racial/ethnic groups, exceeding 25% in each group (Table 1).\textsuperscript{3}

Health behaviors in the population of youth with type 1 diabetes are also not as we would like. Across the racial/ethnic groups, ~ 80–90% consume fewer than the recommended number of fruit and vegetable servings, and ~ 40% of youth are inactive. Also of real concern, smoking is reported by ~ 10% of youth, with some variability across racial/ethnic groups.

So what do we do with these kinds of findings? Within SEARCH, we proceed to more detailed observational study related to clinical and pathophysiological markers, and we also study quality of life and processes of health care, including barriers to care.

Observational studies can also inform clinical trials. Motivated directly by what we have found in SEARCH, I worked with colleagues to develop a behavioral intervention we call “Flexible Lifestyles Empowering Change” (FL3X).

The target population of FL3X includes adolescents with type 1 diabetes, primarily those with a low socioeconomic status or who live in single-parent households or who are of minority racial/ethnic groups because these groups have the worst glycemic control and cardiovascular disease (CVD) risk profile. The aims of the study are to improve glycemic control, quality of life, and CVD risk.

The FL3X intervention is based on motivational interviewing (MI) as a counseling strategy, incorporating training to improve problem-solving skills. Within the MI framework, coaches and youth can use current technologies to support problem-solving, including various approaches to cell phone messaging, use of the

\begin{table}[h]
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\begin{tabular}{|c|c|}
\hline
Race/Ethnicity & Type 1 Diabetes (\%) \\
\hline
Non-Hispanic white & 12.3 \\
African American & 35.5 \\
Hispanic & 27.3 \\
Asian/Pacific Islander & 26.0 \\
American Indian & 52.2 \\
\hline
\end{tabular}
\caption{Minority Youth With Poor Glycemic Control (Defined as \textgeq 9.5\%) in the SEARCH for Diabetes in Youth Study\textsuperscript{3}}
\end{table}
We have just begun enrolling subjects into a pilot and feasibility study and hope to present pilot results next year.

Let’s now turn to efforts to improve the health of adults with diabetes. A few years ago, we conducted a clinical trial called Pounds Off With Empowerment (POWER), the target population for which was adults with type 2 diabetes living in rural, medically underserved communities. The study’s aims were to develop, implement, and evaluate a 1-year primary care–based lifestyle intervention for weight management and improved metabolic control.

The POWER study included three groups:
- Usual care, which received a 1-hour session with a nutritionist
- Intensive lifestyle intervention, which was modeled on the Diabetes Prevention Program, included frequent contact with a nutritionist (about 26 sessions), and had a goal of moderate weight loss that involved limiting dietary fat to 25% of calories and incorporating 150 minutes/week of physical activity
- Reimbursable lifestyle intervention, which was delivered in the amount of time covered under Medicare for diabetes education related to nutrition and physical activity (four sessions)4

Figure 3 shows that, compared to usual care, the intensive lifestyle intervention group experienced better results in terms of the primary outcome of weight loss, but there was no significant difference between usual care and a second intervention designed to be reimbursable under Medicare.

Diabetes TeleCare (DTC)5 was a study that followed on POWER, motivated by the fact that many rural or otherwise medically underserved communities do not have sufficient health care providers, including certified diabetes educators, to meet the needs of patients with diabetes. I served as co-principal investigator of this study, with my husband, Rich Davis, as principal investigator.
The aim of DTC was to improve glycemic control and cardiovascular risk factors in rural, medically underserved adult populations with type 2 diabetes through diabetes self-management education delivered via telehealth systems.

The DTC intervention was an extension of the POWER intervention, adding additional material related to diabetes care. Intervention sessions were delivered primarily via interactive video conferencing led by interventionists located ~100 miles away from the primary care setting where the patients came to participate in the study. We also added retinal screening, in which a digital, nonmydriatic retinal camera was placed in the primary care setting, with photos forwarded for review by an ophthalmologist also located ~100 miles away who could discuss the findings via video conferencing.

Figures 4 and 5 show that A1C, our primary outcome, improved significantly more for the intervention group than for the group receiving usual care and that LDL cholesterol also improved significantly more in the intervention group than in the usual care group.

So, how do all of these studies relate to the notion that volunteering with the ADA can facilitate the translation of research to clinical and public health practice? Well, for some years, I have been aware of and involved in a number of ADA activities, including ADA-funded research, the development of clinical practice guidelines and position statements, professional education programs, the diabetes education recognition program, and the association’s professional journals. I have been very pleased that, in recent years, ADA has increased the proportion of grants funded that involve clinical and translational research to complement the traditional basic research it has funded. Through all of these activities, research can move toward prevention and better care for people with diabetes.

What I did not know about until fairly recently were ADA’s efforts in the areas of legislative and legal advocacy and community programs and public awareness. A key priority is to advocate for improving the availability of accessible, adequate, and affordable health care, including strong support of federal health care reform.

ADA is active in advocacy to increase federal and state funding for diabetes prevention, treatment, and research, including funding for the National Institutes of Health and the Centers for Disease Control and Prevention. For example, ADA has specifically pushed for funding through the Special Diabetes Program and for funding of the National Diabetes Prevention Program.

ADA has also supported the recently passed child nutrition reauthorization and has worked to support nutrition and physical activity programs in schools. The association has had a strong hand in employment discrimination and in efforts to ensure that schools are safe places to be for children with diabetes. It also offers a number of programs that target youth with diabetes and address communities at high risk for diabetes. In addition, there is a new program called “Living With Type 2 Diabetes,” which is a collaboration with primary care providers through which information is provided to individuals shortly after the diagnosis of type 2 diabetes and continuing through the year thereafter. All of these activities represent ways in which research can be translated into action to prevent diabetes or improve lives of those living with diabetes.

So how can you get involved? In many local communities, the delivery of ADA programs relies on collaboration between ADA staff and local volunteers. You can also participate in local fundraising special events, including STEP Out, which is the ADA walk, and Tour de Cure, a biking event that has been growing in popularity (and in dollars raised) in recent years. You can find out about what is going on in your area for these events, as well as potential participation in local community leadership or legal advocacy, by going to the Web site diabetes.org/volunteerism.

If you prefer, or if there is not an ADA field office near you, there are many national committees in which you can participate. You can nominate yourself or someone else; the Web site diabetes.org/committees provides more information on each committee and the nomination process.

I invite you to join me in volunteer service for the ADA. It is a great way to advance the effort to realize the vision recently crafted by ADA staff and volunteers for “Life Free of Diabetes and Its Burdens.”

References

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