

Diabetes on a Rampage: Texas Physicians Mount a Prevention Effort

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When Dan Hale, MD, began sounding the alarm in 1995 that type 2 diabetes was appearing in children and adolescents, he was met with skepticism, to say the least. "Everybody looked at me like I was nuts. The powers that be in the pediatric and endocrinology worlds kept telling me I was stupid and ignorant until I showed them the data on 150 kids," he said.

Dr. Hale, pediatric endocrinology director of the Children's Center at the Texas Diabetes Institute in San Antonio, the state's largest diabetes research, education, management, and treatment center, has seen the disease show up in children as young as 5 years old. In fact, he has as many newly diagnosed children with what used to be called "adult-onset diabetes" as he does patients with type 1. And he believes the type 2 anomaly reaches far beyond the medical world. "How we eat, our levels of physical activity, how we show people we love them, and how we use food are deeply ingrained in our culture and society."

According to the Centers for Disease Control and Prevention (CDC), nearly 40 million American adults were obese (body mass index greater than 30) in 2000. In addition, 19.8 percent of the population is obese, up from 12 percent in 1991. In 1998 in Texas, 54 percent of whites, 68 percent of African-Americans, and 63 percent of Hispanics were obese.

There were 16 million diagnosed cases of diabetes in 2000 versus 9 million in 1991. By recent estimates, the prevalence of diabetes in the United States is predicted to be 8.9 percent of the population by 2025.

While the numbers and outlook are dire today, impressive prevention efforts are under way to crush the disease before it manifests in either youngsters or adults, and to control established cases in a way that avoids the devastating consequences of diabetes.

Impact on Texas

But for now, diabetes is on a rampage in Texas. The landmark San Antonio Heart Study showed a tripling of the incidence of type 2 diabetes among adults in the barrios of San Antonio from 1987 to 1996.

The Texas Diabetes Council and the Texas Department of Health (TDH) estimate that 6.2 percent of the state's population currently suffers from either type 1 or type 2 diabetes. Another 3.6 percent don't know they're living with diabetes. Among high-risk ethnic groups, the numbers are even harsher. Slightly more than 9 percent of African-Americans are afflicted, and nearly 6.5 percent of Hispanics either produce no insulin or can't fully use the amounts they do produce.

How widespread the disease is among children is not understood because no broad-based pediatric population studies have been conducted.

The direct and indirect costs of diabetes in Texas exceed \$9 billion annually. "This is an incredibly important disease that accounts for a tremendous burden on the health care system in terms of economic costs, morbidity, and mortality. There's still much we must do to improve the medical and self-management of diabetes patients," said Philip Huang, MD, MPH, bureau chief of the TDH Bureau for Chronic Disease and Tobacco Prevention.

The Different Types

The major forms of diabetes are type 2, most often seen in obese men and women over age 40, and type 1, typically diagnosed in white children. Gestational diabetes occurs in 2 to 5 percent of pregnant women, 50 percent of whom develop type 2 diabetes within 20 years of the pregnancy. Type 2 accounts for 90 to 95 percent of all diagnosed cases.

A slightly different form of the disease appears in young, obese African-American men. It's now known as "idiopathic type 1" diabetes. A five-year study conducted at The University of Texas Southwestern Medical Center at Dallas concluded that it's likely related to "insulin resistance and transient beta cell dysfunction perhaps because of glucose desensitization" (*Diabetes Care*, vol. 24, no. 6, June 2001). The research found that insulin offers the best glycemic control for this form of diabetes.

Risk Assessment and Management

Type 2 diabetes is particularly insidious. Hundreds of thousands of Texans are walking around with it and don't know it, and endocrinologists lament the fact that about half of all newly diagnosed type 2 cases present with some form of diabetic complication of the nervous system, kidneys, eyes, or cardiovascular system.

Obesity is the most controllable risk factor for type 2 diabetes. Recent findings from the 3,234-participant Diabetes Prevention Program (DPP) showed that regular physical activity (30 minutes per day) and losing 5 to 7 percent of body weight (an average of 15 pounds) reduced the risk of developing type 2 diabetes by 58 percent.

Jeffrey A. Jackson, MD, CDE, an endocrinologist with Scott & White Clinic in Temple, says a recently defined condition known as the "metabolic syndrome" is a profile of increased risks not only for type 2 diabetes but also for cardiovascular disease. "These people have abdominal obesity as defined by waist size, hypertension, insulin resistance or impaired fasting glucose, elevated triglycerides, and low HDL cholesterol. Those people are not being recognized as having major risks for diabetes, heart attacks, and cardiovascular disease that need to be aggressively modified," he said.

"Our plea to our colleagues in Texas is if they have patients who have any of these factors, to screen them for insulin resistance, either with a fasting blood sugar or two hours after a meal. And if these numbers are beyond normal, then they should test them for diabetes," said Surendra Varma, MD, vice chair of pediatrics and the residency program director with Texas Tech University Health Sciences Center in Lubbock.

More Aggressive Screening

In an effort to more rigorously identify and diagnose type 2 cases, several organizations, including the American College of Endocrinology (ACE), urge physicians to begin screening high-risk groups at age 30 to diagnose impaired fasting glucose or impaired glucose tolerance.

Jan Ozias, PhD, RN, director of the Texas Diabetes Council and the TDH Diabetes Program, wants physicians to steer away from old ways of thinking, such as "telling patients 'You have a little bit of sugar -- that's okay -- you don't have diabetes.' We've seen in recent studies that addressing glucose ranges of 110-126 mg/dL by deliberate focus on weight reduction (even as little as 10 pounds) can make a very positive difference in reducing risk of onset. It's not a matter of waiting until someone develops a diagnosed case, it's a matter of being aggressive about the risk," Dr. Ozias said.

She added that if risk isn't being addressed, the next focus needs to be on reducing the lag time in diagnosis. "We need to address impaired glucose tolerance. Where we're aware of it, we can aggressively manage it and then reduce the lag time so we're not faced with an average of six to 10 years from true onset of type 2 diabetes to formal diagnosis."

Helping to Improve Standards of Care

The complications of diabetes can begin when blood glucose levels are just above normal, at hemoglobin A1c (Hb A1c) values equal to or greater than 6.5 percent. Just as important as glucose control is the maintenance of a healthy blood pressure and blood lipid profile to avoid cardiovascular disease. For this reason, standards of care are changing.

Dr. Jackson is the chair of the Standards of Care Development and Update Advisory Subcommittee of the Texas Diabetes Council. His workgroup has revised existing algorithms and created new ones to reflect the latest research findings to help primary care providers implement minimum standards of care. "These are flow sheets that primary care physicians can follow in managing diabetes that outline step by step what should be done."

The council currently has five algorithms available -- pharmacologic, hypertension, lipid treatment, exercise, and diet. All five can be downloaded from the council's Web site at www.tdh.state.tx.us/diabetes/tdc.htm. (See "[Educational Tools](#).")

Tight Control Reaps Huge Dividends

Recent research has shown that once diagnosed, patients who maintain their blood glucose levels as close to normal (Hb A1c, 4-6 percent) as possible reduce their risk of complications. The 10-year Diabetes Control and Complications Trial (DCCT) showed that intensive management could ward off the complications of type 1 diabetes. The United Kingdom Prospective Diabetes Study completed in 1998 showed that tight control of blood glucose and blood pressure reduces the risk of blindness, kidney disease, stroke, and heart attack in people with type 2 diabetes. These studies showed reductions of 30 to 35 percent in microvascular complications and 14 percent in macrovascular complications for every 1-percent reduction in Hb A1c values.

For years, the standard to shoot for has been an Hb A1c reading of 7 percent. The latest recommendations from ACE have lowered the management goal to 6.5 percent. "The practice is to come to as normal as possible," said Dr. Ozias. "Just knowing that wherever you start with a patient, you set a goal, and for every 1-point percentage that you can reduce, you're going to make a considerable reduction in that patient's risk of complications. Set aggressive targets, and it gets you moving in that direction, but you look for improvement," she said.

Dr. Jackson says the council's latest algorithms are aggressive. "We alter therapy to attain the goals. In American Diabetes Association [ADA] position papers, it's not recommended that therapies be changed unless A1c is more than 8 percent, whereas we keep modifying therapy in order to obtain the A1c goal of 7 percent," he said. "I think if primary care physicians follow, for instance, the pharmacologic algorithm that we've just revised, they are going to be able to markedly improve their patients' blood sugars."

But controlling blood sugars isn't the only goal, according to Dr. Jackson. The new Diabetes Council algorithm targets maintaining blood pressure readings at less than or equal to 130/80 mm Hg. "This is really strict and often requires therapy with three or four drugs in patients with major hypertension or renal insufficiency," he said. "But it's been shown to have a dramatic impact on diabetes, cardiovascular disease, and also microvascular complications -- retinopathy and kidney disease. If we can control their lipids and their blood pressure, we can markedly improve their future. Doctors need to be very aggressive about lipid and blood pressure goals, and they may help people almost as much as controlling their sugars, although we strive to control all three, of course," Dr. Jackson said.

School-Based Prevention Efforts

"Everybody thinks when we talk about treatment, we talk about throwing some medications at something," said Dr. Hale.

"In my view, we have to teach people to change their lives, and that's a much more complicated issue. What we work on is not just telling people what to do, which is sort of a no-brainer, but how to do it in a way that works within the context of how they live. I have mothers who say, 'I know my child needs to get more physical activity, but there are gang problems in my neighborhood, and I won't let him go outside.' That's real world," said Dr. Hale.

The key, experts believe, is showing young children how to adopt and maintain healthy habits. A critical place to do that is in the schools as well as the home.

"There is an epidemic of obesity and physical inactivity in the children of our state," said TMA President Tom B. Hancher, MD, as he addressed members of the State Board of Education in early September. Dr. Hancher was urging the statewide implementation of recently passed legislation that authorizes the requirement of daily physical activity in elementary grades (kindergarten through sixth grade).

This would be "the new physical education that has to do with lifetime health and wellness. It's not the old sports model, just playing volleyball or basketball. It deals with all types of lifelong skills and concepts," said Diane Farr, physical education curriculum specialist with the Austin Independent School District.

Implementing Proven Programs

To address the growing public health concern of childhood obesity and inactivity, TMA spearheaded the formation of the Texas Coordinated School Health and Physical Education Coalition, an alliance of statewide groups that understand the vital short- and long-term consequences of improving child and adolescent health in this state. TMA's Project WATCH, which stands for the five preventable risk factors that cause cardiovascular disease (weight, activity, tobacco, cholesterol, and high blood pressure) also is focusing on physical inactivity in schoolchildren.

The coalition, along with the Texas Education Agency and now the State Board of Education, has endorsed the Coordinated Approach To Child Health (CATCH), a comprehensive school health program designed for elementary schoolchildren, which aims to help schools, children, and families adopt healthy eating and physical activity behaviors.

To date, more than 811 elementary schools in Texas are using CATCH and providing the curriculum to approximately 450,000 children, or 21 percent of elementary schools in Texas. The program will now be established throughout the state.

"Although cardiovascular disease, type 2 diabetes, obesity, and other chronic diseases are increasing at alarming rates, they can be prevented by reaching out to children before unhealthy habits have formed," said Peter Cribb, the CATCH program coordinator with the Center for Health Promotion and Prevention Research at The University of Texas-Houston School of Public Health.

Education Changes Outcomes and Systems

Education is also the key to managing the disease in adult patients. "While educating physicians is important, my feeling is that there's going to be more bang for the buck with education of patients. A full-scale public education campaign is going to pay off more than CME programs for physicians," said Dr. Jackson. "If you have a patient with diabetes who comes in with a checklist and asks you when the A1c was checked last, what it was, when their microalbumin was checked, and when their last dilated eye exam was, that's going to have quite an impact on that physician's practice. Educating the patient leads to improved control."

Dr. Jackson urges his colleagues to send newly diagnosed patients to local diabetes education programs. For rural physicians, he suggests that physicians' nurses receive training to provide necessary education.

"I never give up on a patient. I always keep trying. When you see a patient who hasn't been controlled somehow get it, improve the control, and see how much better he feels, it's really a fulfilling thing."

Diabetes Research

Identifying genetic variation, gene profiling, and the interaction between genetic and environmental factors for type 1 and type 2 diabetes is a major emphasis of current research.

The Diabetes Prevention Trial-Type 1 identifies relatives at risk for developing type 1 diabetes and treats them with low doses of insulin or insulin-like agents to prevent the disease from

manifesting. At this point, transplantation of the pancreas or insulin-producing beta cells is the major frontier of hope in finding a cure for type 1 diabetes.

The Study of Health Outcomes of Weight-Loss is a multicenter trial, involving both Baylor College of Medicine and The University of Texas Health Science Center at San Antonio, which will examine the effect of weight loss on people with type 2 diabetes. The Texas Tech University School of Pharmacy recently received CDC funding to conduct research into clinical outcomes and cost effectiveness of collaborative care between physicians and pharmacists for patients with type 2 diabetes. The 77th Legislature authorized a new Texas Pediatric Research Advisory Committee to outline a research plan.

The University of Texas at Austin is preparing to begin clinical trials on the effectiveness of using an inhaler to deliver insulin. Ongoing research is looking also at insulin pills and patches as possible vehicles to do away with needles. Work is also under way to find alternatives for finger pricks in glucose self-monitoring systems.

The Texas Diabetes Institute, a collaborative effort of the University Health System and UT San Antonio, is zeroing in on the cardiovascular elements of diabetes and how to prolong life. "About 80 percent of patients are dying with good vision, good kidneys, and good legs, but are dying of heart attacks and strokes," said Eugenio Cersosimo, MD, PhD, the institute's medical director for clinical research. "There is a shift in research that would prevent, delay, and treat cardiovascular disease. We're having to bridge beyond endocrinology and diabetes and work with cardiologists and vascular biologists to determine why diabetics are having the vascular disease and how can we change it."

The Bigger Picture

Diabetes isn't just a disease. The majority of cases result from the way people live.

"My view is that until we are willing to recognize that type 2 diabetes is fundamentally a reflection of enormous social, cultural, political, and economic forces that are far beyond the doctor's office, we're going to see type 2 diabetes get worse and worse and worse, and the number of people who have the disease will increase in the coming years," Dr. Hale said.

Prevention efforts, such as CATCH and increasing the amount of physical activity in schools, along with broad-based public awareness campaigns and more aggressive professional risk management, screening, and disease care, are needed to overwhelm this overwhelming disease. And those efforts already have begun.

Sidebars:

[U.S. and Texas Standards of Care](#)

[Type 2 Diabetes: Risk Factors and Screening Recommendations](#)

[Criteria for Diagnosing Diabetes](#)

[Recommendations for Screening Children for Diabetes](#)

Educational Tools