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## The Bienestar School-Based Program for Preventing Diabetes in Schoolchildren: An Interview With Roberto P. Treviño, MD

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According to the US Centers for Disease Control and Prevention, 65% of people with diabetes die from heart disease or stroke. Bringing down glucose, triglyceride, and LDL cholesterol levels, as well as blood pressure, is held to be the best way of preventing diabetes-related cardiovascular complications. Increasingly, as more children are being diagnosed with diabetes, in-school programs are necessary to teach children about the role of proper diet and exercise in preventing the disease. Roberto P. Treviño, MD, Director of the Social and Health Research Center, San Antonio, Texas, answered some questions about a program he established for children in South Texas elementary schools.

### **When did you first establish these programs? What caused you to start them?**

**Dr. Treviño:** The Bienestar School Health Program was established in 1994 and the Neema School Health Program in 2002. Bienestar and Neema mean "well-being" in Spanish and Swahili, respectively. These

programs try to help children modify unhealthy behaviors associated with type 2 diabetes—high saturated fat intake, high sugar intake, low dietary fiber intake, low physical activity, and overweight. A study from the Harvard School of Public Health, published in the *New England Journal of Medicine* in 2001, reported that 91% of all causes of type 2 diabetes were attributable to these behavioral risk factors.

In 1986, I helped found the San Antonio Institute of Medicine. This office was opened for the practice of primary care in medically underserved areas—2 blocks away from the housing projects where I grew up. Even though we opened 3 other offices in socioeconomically deprived neighborhoods, the incidence of diabetes has increased by 9% per year for the last 8 years in the San Antonio area. Dissatisfied with diabetes outcomes in the medical model, I founded the Social & Health Research Center (S&HRC), a nonprofit center with 11 years experience operating the Bienestar and Neema school-based diabetes prevention programs. Both programs target children in grades K-5 attending schools in socioeconomically deprived neighborhoods. Each

program consists of 4 health curriculums—classroom, parent, school cafeteria, and after-school—to correct unhealthy behaviors in children before they become established as lifetime habits.

***How do Mexican American children in these studies differ from other children in the United States?***

**Dr. Treviño:** Mexican American children are genetically similar to white children, but their risk factor levels are similar to African American children because of their shared socioeconomic environment. The American Community Survey from the US Census showed that Latinos and blacks have similar household incomes—\$34,000 and \$30,000, respectively. The household income for whites, on the other hand, is \$49,000. Health indicators for Latinos and African Americans are also similar. For example, the 2002 NHANES study indicated that the rates of overweight were 27% for Mexican American and African American children—more than twice that of the 12% rate reported for white children. The point is this: environment is a more potent influence than biology in predisposing children to higher levels of diabetes risk factors.

***Approximately how many schools are involved in the program?***

**Dr. Treviño:** The programs operate in 200 elementary schools, with nearly 84,000 at-risk students. Most of these elementary schools are located in socioeconomically deprived neighborhoods in San Antonio and Laredo, Texas. All children in these schools participate in the health programs, regardless of race or ethnic background.

***Please give us a brief overview of the program.***

**Dr. Treviño:** The programs are based on social cognitive and social capital health behavior theories. To mold health behaviors, social cognitive theory considers the interrelationship of individual health beliefs and knowledge, and surrounding social support. Social capital theory considers the interrelationship of financial, individual, and social—or messaging—capitals. The aim of Bienestar and Neema is to provide a minimum of 35 sessions of health programming a year to students, parents, teachers, food service staff, and after-school caretakers living and working in areas deprived of financial and individual capitals. The messages—decrease animal fat; decrease refined sugars; increase fruits, vegetables, and whole-grain products; increase physical activity; monitor weight—are

delivered through colorful, culturally and age-appropriate materials published by Macmillan McGraw-Hill. The systems for delivery are home, health class, physical education, school cafeteria, and after-school.

The Bienestar & Neema Parent Diabetes Education curriculum provides parents with knowledge about diabetes and motivates them to increase physical activity and healthful nutritional practices. Parents are instructed to provide a supportive social environment and be role models for healthful behaviors. The curriculum has 8 lesson plans and includes manuals and take-home activities for both instructors and parents.

The Bienestar & Neema Health Class and Physical Education curriculum comprises 3 main units: nutrition, wellness, and noncommunicable disease. The nutrition section teaches healthy eating, and the positive and negative consequences associated with particular eating habits. The wellness section includes lessons on self-esteem, weight management, and exercise; it relates each to current and future cognitive, physical, and social success. The noncommunicable disease unit includes instruction on diabetes, hypertension, and heart disease etiology and prevention. The curriculum is made up of 18 ready-to-use lessons, including review lessons and tests; it includes a teacher's manual, children's workbook, test instruments with respective keys, and extensions for thematic instruction.

The Bienestar & Neema School Food Service curriculum is designed to improve the nutrition knowledge of food service staff and to persuade students to choose and eat more fruits and vegetables and less fatty foods. Six lessons deal with a food guide pyramid, carbohydrates and diabetes, fats and diabetes, and methods to persuade students to eat more fruits and vegetables.

The Bienestar & Neema Health Club component involves after-school learning activities aimed at rehearsing and reinforcing classroom learning and promoting leisure-time physical activity that is moderate to vigorous. This curriculum consists of 32 lesson plans and includes instructors' manuals and student workbooks.

***What outcomes, or end points, do you evaluate?***

**Dr. Treviño:** Data from the evaluation of the 4 program components are categorized into 2 groups: Evaluation of Program Implementation and Program Outcome Evaluation. Evaluation of Program Implementation consists of forms to measure level of fidelity to the program, participants' satisfaction and enthusiasm, and participants' attendance. Program Outcome

Evaluation consists of behavior and biological outcomes. Behavioral factors are dietary intake, as established by 3-day, 24-hour dietary recalls, and fitness test—Harvard step test, 20-meter shuttle runs. Biological factors are fasting capillary glucose by finger stick, percent body fat by bioelectric impedance, and body mass index. A recent randomized controlled trial, reported in *Archives of Pediatric and Adolescent Medicine*, showed that Bienestar students decreased blood glucose, increased dietary fiber intake, and increased fitness levels. Control students, on the other hand, showed the reverse trend: increased blood glucose, decreased dietary fiber intake, and decreased fitness levels. These differences were significant.

***Did you receive assistance in preparing program materials?***

**Dr. Treviño:** Health professionals from the S&HRC, the University of Texas Health Science Center at San Antonio, the University of Texas at San Antonio, and the participating school districts assisted with the development of these curriculums. Funding is provided by private foundations, the school districts, the city of San Antonio, the county of Bexar, and the National Institutes of Health. The state of Texas provides no support for the programs.

***What about consent from the school districts or parents?***

**Dr. Treviño:** Research protocols are approved by the University of Texas Health Science Center Institutional Review Board, and education protocols are approved by school district board members, school health advisory councils, teachers, and parents. All schools participate in implementing and evaluating the program, but only students with parental consent participate in behavioral and biological outcome evaluation.

***Did you encounter any resistance from teachers or school administrators?***

**Dr. Treviño:** School staff are promoted and demoted according to state accountability test results, not health indicators. This puts health education in the back seat. In 1994, when we first entered the schools, teachers were concerned that our health programs would take away time from tutoring of students for the state accountability test. What opened the door was a report we provided showing high levels of unhealthy behavioral and biological values in their students. This study showed that 20% of students were overweight, 87% were physically unfit, and 60% had family members with

diabetes. Furthermore, 6% of students had blood glucose levels above 100 mg/dL. When we told parents and school administrators about the high levels of diabetes risk factors in their children, they gave us the approval and support to operate the programs in their schools.

The school cafeterias were another barrier. Since the school cafeteria is a profit center, there is a lot of pressure to increase revenues. But the major products that sell are laden with fats and sugars. Even worse are multimillion dollar agreements between school districts and beverage companies. Constraining the supply without curbing the demand for such products would be financially counterproductive for these poverty-stricken school districts. What the programs do is switch student demand to fresh fruits, vegetables, and whole grain products so that food service centers continue with their sales and profits.

***Were any economic incentives provided for the children or their parents?***

**Dr. Treviño:** Parents and students who participate in program activities receive “Bienestar bucks” denominated in dollar amounts. At the end of each semester, a *tiendita*, or little store, is held at each school. Participants purchase merchandise—donated clothes, sporting goods, school supplies, toys, and gift certificates—with their Bienestar bucks.

***What screening was preformed at the beginning of the program?***

**Dr. Treviño:** Fasting capillary glucose levels obtained by finger stick are collected by trained staff under aseptic conditions and handled according to Occupational Safety and Health Administration (OSHA) regulations. Students with glucose levels greater than 100 mg/dL are given Parent Health Awareness notices advising their parents that, while the reported glucose levels may not have any health significance, the children must still be examined by a physician. All students given a Parent Health Awareness notice must return a Physician Report that indicates that they were seen by a physician.

***Are there also social and cultural considerations you have to address?***

**Dr. Treviño:** Type 2 diabetes in youth is a collision of biological, social, and cultural factors. The biological stages of puberty mimic a diabetes state. To sustain growth and development during puberty, children between the ages of 8 and 13 have an increase in insulin, glucose, and body fat. But if this biology evolves

within a context of social and economic deprivation, then the biological changes become abnormal and the disease manifested. The mean age for type 2 diabetes in youth is reported to be 13 years of age.

We confront poverty and social deprivation with social capital—the exchange of messages among individuals and organizations. Each school receives a minimum of 32 sessions of either Bienestar or Neema programming. The programs are used to transmit the same five messages: eat less animal fat, eat less refined sugar, eat more dietary fiber, be more physically active, and keep weight in check.

### **What changes were made to reduce fat and increase fiber?**

**Dr. Treviño:** Limit french fries and nachos to once a week. Serve baked chips, 1% fat or nonfat milk, and fresh fruits and raw vegetables weekly. And serve more whole-grain breads and cereals. Four in-school parent activities and 9 newsletters mailed to homes of students promote these dietary changes.

### **Tell us about the fitness component programs.**

**Dr. Treviño:** The National Institutes of Health Diabetes Prevention Program showed that individuals walking 150 minutes per week could reduce their weight by 7% and their chances of developing diabetes by 58%. This activity was more effective and less expensive than taking the drug metformin, which reduced the chances of developing diabetes by only 31%. In addition, moderate to vigorous physical activity increases heart rates to 140 beats per minute. It is at this intensity that insulin levels have been shown to decrease. So, Bienestar and Neema are designed to provide students with moderate to vigorous physical activity 30 minutes a day, 5 days a week.

### **Did any anticipated changes not occur? If so, what do you think might have been the cause?**

**Dr. Treviño:** Parents need to be more involved in school activities. Attendance rates for parent-teacher meetings are 7%. The percentage for Bienestar and Neema activities is similar. Now we have adopted a tactic from large commercial retailers. We produce and mail a colorful and culturally appropriate newsletter to parents once a month. We ask parents to start practicing

simple healthful behaviors with their children, like walking 150 minutes a week, eating 2 or more vegetables a day, and limiting TV viewing to 1 hour a day. These messages are based more on behavior than knowledge. We also ask for parental feedback on a return envelope to measure their behavior changes.

### **Do you have any plans for long-term follow-up studies?**

**Dr. Treviño:** We implemented Bienestar programs for 1 year in the fourth grade and re-measured the same students in the sixth grade. We found that intervention students, when compared with control, had lower blood glucose levels (90 vs 91 mg/dL, respectively), fewer with abnormal glucose levels ( $>100\text{mg/dL}$ , 14% vs 18%, respectively), and fewer overweight (49% vs 50%). These differences, however, were not significant. It may be that starting our evaluation with the fourth grade might be too late, and 1 year might not be enough. That's why we have designed a new Bienestar program to perform longitudinal studies for all grades K-5. We have applied for a new NIH grant and hope to test this new model in Laredo, Texas.

*Readers interested in adapting the Bienestar program in their own communities can purchase materials from Macmillan McGraw-Hill. Dr. Treviño's organization, the Social & Health Research Center, can provide training for implementation and evaluation of the program to school district staff. To access materials and services, visit [www.sahrc.org](http://www.sahrc.org) on the Internet, or call Stephanie Sosa at 1-866-676-7472.*

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