

TYPE 2 DIABETES



in Children and Adolescents



Texas Diabetes Council
TEXAS DEPARTMENT OF HEALTH

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Introduction

Type 2 diabetes is poised to become one of the major public health challenges of the 21st century. Research indicates that promoting healthy nutrition habits and lifelong physical activity will be critical in curbing diabetes in children.

The Texas Diabetes Council and the Texas Department of Health place a high priority on reversing the trends associated with type 2 diabetes in all age groups, especially children. This includes programs targeting high-risk populations, as well as broad-based efforts to reduce obesity and to improve the overall nutrition and exercise habits of Texas children and adolescents. School and community involvement is essential in the effort to reach and teach Texans that diabetes is controllable.

By promoting lifelong physical activity and healthy nutrition, increasing public awareness, supporting solutions that target local problems, advocating early diagnosis and treatment, and supporting effective self-management, communities can play a vital role in reversing the alarming rise of diabetes and obesity in children and reap the benefits of healthier, more productive citizens.

This Type 2 Diabetes in Children and Adolescents Statewide Action Plan is the product of a twelve-month study involving many professionals. It outlines the significant steps that Texas should take to marshal the resources within our state to work together to combat this emerging problem in Texas.

The recommendations contained in this statewide plan are the outgrowth of two key activities. First, the Texas Department of Health and the Juvenile Diabetes Research Foundation International, with the support of Texas Governor George Bush, hosted an international workshop devoted to type 2 diabetes in children on May 14, 1999. Conference participants recommended that strategies be developed to address this emerging epidemic.

Responding to this recommendation, the Texas Department of Health invited interested parties to participate in an organizational meeting of the Type 2 Diabetes in Youth Workgroup in September 1999.

The workgroup adopted guidelines that directed the course of their work over the next several months. The following guidelines for the Workgroup were adopted:

Mission: To prevent Type 2 diabetes among children and adolescents

Activity: The Texas Department of Health, in collaboration with strategic partners, is committed to developing a plan addressing their roles and responsibilities in the prevention and management of Type 2 diabetes and its related co-morbidities among children and adolescents.

In ensuing meetings, the Workgroup divided into specialized workgroups to address six components of the proposed plan:

- (1) diagnosis,
- (2) statistics,
- (3) prevention,
- (4) provider education,
- (5) treatment, and
- (6) collaboration.

The specialized workgroups met individually to review the issues related to their focus areas and develop recommendations. At the Health Commissioner's request these recommendations were refined and organized into "scientific issues" and "specific practical recommendations." The issues and recommendations put forward by each sub-group are included in Appendix 1 of this document.

The recommendations of the various sub-groups were considered by the Type 2 Diabetes in Youth Workgroup as a whole. Ultimately, that group adopted the final recommendations contained in this statewide plan.

Acknowledgements

This statewide plan outlines important steps that we must take in the fight against type 2 diabetes in children and adolescents—joined together in common purpose and committed to helping Texans make choices that will increase their health and productivity in the years to come.

Efforts undertaken at the state level rely in a fundamental way on the work of dedicated professionals in public and private sectors who work together with the single-minded purpose of controlling the devastating effects of diabetes.

Special thanks are due to the many individuals who gave of their time and talents to help develop the state's first plan to combat the troubling rise of type 2 diabetes in children and adolescents in Texas.

Chief among those contributors were local and national representatives of the American Diabetes Association and the Juvenile Diabetes Research Foundation International. Physicians, nurses, dietitians, and other health care educators who specialize in the care and treatment of persons with diabetes contributed generously as well. Staff from various departments and disciplines within the Texas Department of Health cooperated in crafting the recommendations contained herein.

Many of these individuals attended the Type 2 in Children International Conference. From that conference came the impetus for establishing the Type 2 Diabetes in Youth workgroup, which developed the recommendations adopted in this statewide action plan. Key participants are listed in the pages that follow.

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Executive Summary

Type 2 diabetes is one of the major public health challenges of the 21st century. Projections indicate that the number of people with the disease worldwide will double by 2010¹—and a troubling aspect of this disturbing trend is that diabetes is increasingly attacking children.

Type 2 diabetes usually occurs in overweight adults over the age of 45, but the age of onset of type 2 diabetes is occurring in earlier years. Considered uncommon in recent decades, type 2 diabetes in adolescents now represents one of the most rapidly growing forms of diabetes in the United States.²

From 1993 to 1998, the number of youth under 18 years of age with type 2 diabetes tripled.³ Its recent appearance in young people has been called “alarming,” and medical experts caution that the devastating complications of diabetes—heart attacks, blindness, strokes, kidney failure, and amputations—may occur at earlier ages if children with type 2 diabetes are not properly diagnosed and treated.⁴

The Texas Department of Health (TDH) joined with the Juvenile Diabetes Research Foundation International in May 1999 to host an international conference focused on the rising incidence of type 2 diabetes in youth in Texas. Following the conference, TDH convened the Type 2 Diabetes in Youth Workgroup in September 1999 to develop recommendations aimed at prevention and treatment of type 2 diabetes and coexisting conditions in children and adolescents.

Workgroup participants included TDH health experts, medical professionals, health educators, and members of the public who contributed their unique experiences and expertise toward the development of this plan. This Type 2 Diabetes in Children and Adolescents Statewide Action Plan proposes a comprehensive approach to combat this emerging problem in Texas.

¹ Zimmet P. Diabetes and obesity worldwide — epidemics in full flight. Presented at the 60th Scientific Sessions of the American Diabetes Association; June 10, 2000; San Antonio, Texas.

² Ponder SW, Sullivan S, McBath G, Diabetes Spectrum, Type 2 Diabetes Mellitus in Teens. Vol 13, No 2, 2000.

³ The New York Times. Childhood Obesity Produces “Adult” Diabetes in Kids. Dec 29, 1998.

⁴ Goland, RS, as quoted in, “Adult Type of Diabetes Rising Dramatically in Kids and Teens.” American Diabetes Association press release, June 19, 1999.

The report addresses four important areas:

- ◆ **Why is Type 2 Diabetes in Children on the Rise?** The most likely explanation is the increase in overweight children and corresponding decrease in physical activity.
- ◆ **Current Diabetes State Programs.** The Texas Diabetes Council promotes the use of Minimum Standards of Care for patients who have diabetes and offers a variety of patient education materials in both English and Spanish. The Council also supports local interventions and school-based programs that target high-risk populations. The Texas Department of Health develops epidemiological profiles that guide the development of programs that reach the areas and populations that have the greatest needs.
- ◆ **Type 2 Diabetes in Children—An Emerging Epidemic?** The number of children affected by type 2 diabetes (the prevalence) is very small in relation to the number of adults who have or will develop diabetes. More research is needed to assess the extent of the problem. If type 2 diabetes in children is increasing, as appears to be the case, the costs to society could be enormous, as we may begin to see the complications of diabetes—heart attacks, strokes, blindness, and amputations—in 30-year-olds.
- ◆ **Who Is At Risk?** More than three fourths of children diagnosed with type 2 diabetes have a first- or second-degree relative with type 2 diabetes. Children who have type 2 diabetes also tend to be obese or overweight; of African, Hispanic, Asian, or Native American descent; over 10 years of age; and in middle to late puberty. They typically have low levels of physical activity.

The proposals developed by the workgroup are discussed in greater detail in the recommendations section of this plan (page 16).

Table 1. Recommendations

Type 2 Diabetes in Children and Adolescents Statewide Action Plan

- Implement the Coordinated Approach to Child Health (CATCH) program in eight to 10 schools in each education service center region.
 - Fund a full-time CATCH coordinator in each of the state's 20 education service centers.
 - Establish a pilot program to demonstrate the effectiveness of comprehensive community-based initiatives focusing on obesity and type 2 diabetes in children and adolescents.
 - Increase public and health professional awareness of type 2 diabetes in children and adolescents.
 - Support data collection related to the incidence and prevalence of type 2 diabetes in children and youth.
-

Why is type 2 diabetes in children on the rise?

One possible explanation for the rise of type 2 diabetes is the documented increase in overweight children and corresponding decrease in physical activity. According to the American Diabetes Association (ADA), more than 85 percent of all children and adolescents with type 2 diabetes are seriously overweight at the time of diagnosis.⁵

By 1998, U.S. Surgeon General David Satcher declared the soaring rate of childhood obesity an epidemic. Data collected by the federal Centers for Disease Control and Prevention indicate the prevalence of obesity (defined as being more than 30 percent over ideal body weight) has soared in the last 30 years. Nearly one in five Americans was considered obese in 1998. Although the reasons for the obesity epidemic have not been confirmed, the prevalence of obesity has increased so rapidly, we know its origin is not genetic.⁶

As to the cause of diabetes, certain risk factors have been identified as clear links to the disease. Children who are overweight and have a family history of type 2 diabetes are most at risk. Children of Hispanic, African-American, Native American, and Asian-American backgrounds have a higher risk of diabetes than those of European ancestry.

Of these critical links to diabetes, it is especially important to consider which can be avoided. Former U.S. Surgeon General Dr. C. Everett Koop has said that “except for smoking, obesity is now the number one preventable cause of death in this country.”⁷

“...except for smoking, obesity is now the number one preventable cause of death in this country.”

— Dr. C. Everett Koop
former U.S. Surgeon General

⁵ American Diabetes Association. Type 2 Diabetes in Children and Adults. *Pediatrics*, Vol 105 No 3, March 2000.

⁶ National Center for Chronic Disease Prevention and Health Promotion. *Chronic Disease Notes & Reports*, Preventing Obesity Among Children. Vol 13 No 1, Winter 2000.

⁷ Koop CE, as quoted by CNN. The Global Spread of Obesity, January 12, 2000.

It may also be the number one preventable risk factor associated with type 2 diabetes in children and adolescents. According to the American Medical Association, losing weight is the single most effective way to reduce the risk of developing diabetes and to manage it.⁸

The Texas Department of Health has placed a high priority on developing effective ways to reverse the trends associated with type 2 diabetes in children. This includes programs targeting high-risk populations, as well as broad-based efforts to reduce obesity and improve the nutrition and exercise habits of children.

At a time when the direct and indirect costs of diabetes in Texas exceed \$9 billion annually,⁹ the implications of this emerging trend of diabetes in children are staggering. According to a report issued by the congressionally established Diabetes Research Working Group in March 2000, more than one of every 10 healthcare dollars and about one of every four Medicare dollars are spent on people with diabetes.¹⁰ These costs will rise as the number of people afflicted with diabetes continues to increase.

Evidence is mounting that type 2 diabetes may be preventable through proper nutrition and exercise. This statewide action plan heralds a way for Texas to curb the personal and economic costs of diabetes for current and future generations. By promoting lifelong physical activity and healthy nutrition, increasing public awareness, supporting community-based solutions, advocating early diagnosis and treatment, and supporting effective self-management, Texas can reverse the alarming rise of diabetes and obesity in children and reap the benefits of healthier, more productive citizens.

⁸ American Medical Association. *Diabetes Type 2: Reducing your risk*, 1998, as adapted from *Type II Diabetes: Reducing Your Risk*, 1996.

⁹ Texas Diabetes Council/Texas Diabetes Program. *Listening and Responding to Communities: A Plan to Control Diabetes in Texas*, 1999.

¹⁰ National Institutes of Health, U.S. Department of Health and Human Services. *Conquering Diabetes—A Strategic Plan for the 21st Century* (NIH Publication No 99-4398). 1999.

Current State Diabetes Programs

Since its creation by the state legislature in 1983, the Texas Diabetes Council has become a recognized national leader in efforts to prevent and control the devastating effects of diabetes. With members appointed by the governor and confirmed by the Texas Senate, the council serves as a base for a broad coalition of healthcare providers. Fulfilling its primary charge, the council has developed a comprehensive and coordinated state plan for diabetes control. Key projects are aimed at delaying or avoiding the personal and economic costs of what is now the sixth leading cause of death in Texas.¹¹

Estimates indicate that almost 900,000 Texans over the age of 18 have been diagnosed with type 2 diabetes. In contrast, 9,497 Texans under age 18 had type 1 diabetes in 1999.¹² Type 1, characterized by the body's inability to produce insulin, and type 2, a condition in which the body does not effectively use or produce adequate amounts of insulin, are the two most common forms of diabetes. The onset of type 1 diabetes is typically experienced in childhood. Type 2 diabetes is found most often in persons age 45 and older.

In addition to the 900,000 Texans over age 18 who have been diagnosed, it is estimated that more than 400,000 Texas adults 20 years or older have diabetes, but have not been diagnosed.¹³ The direct and indirect costs of diabetes in Texas exceed \$9 billion annually.¹⁴

Successes of the Texas Diabetes Council include:

- ◆ defining and promulgating minimum standards for diabetes care in Texas and gaining their acceptance by healthcare providers and health payment industries;

¹¹ Bureau of Vital Statistics, Texas Department of Health. Texas Vital Statistics 1996.

¹² LaPorte RE, Matsushima M, Chang Y-F. Prevalence and incidence of insulin-dependent diabetes, in Diabetes in America, ed 2. National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases.

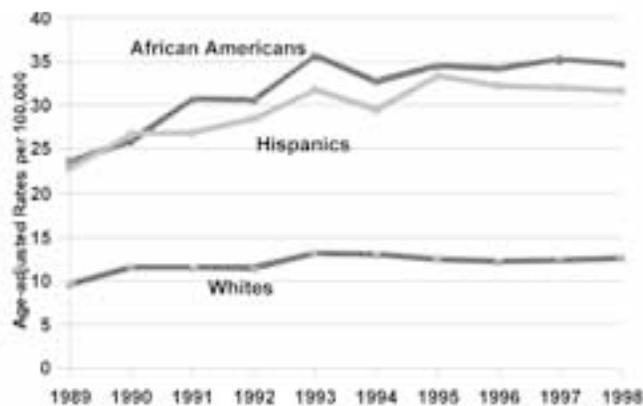
¹³ Texas Department of Health, Texas Diabetes Program/Texas Diabetes Council, Bureau of Disease, Injury and Tobacco Prevention, Texas Diabetes Council. State Data Report and Information. December 2000.

¹⁴ Unpublished data. Division of Diabetes Translation, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, November 1995.

- ◆ establishing data systems to identify diabetes throughout the state;
- ◆ implementing community interventions and school-based programs targeting high-risk populations;
- ◆ educating healthcare professionals, patients, employers, and others about diabetes management; and
- ◆ increasing public awareness about diabetes and the critical need for a healthy lifestyle.

Despite the program’s success, Texas continues to wage an uphill battle against diabetes. Mortality rates for diabetes mellitus have increased substantially since 1988. Among racial/ethnic groups, diabetes mortality rates for African-Americans increased by more than 47.6 percent since 1989. Similarly, rates for Hispanics increased by 38.6 percent, while rates for Anglos increased by 31.2 percent during the study period.¹⁵

**Diabetes Mellitus
Ten-Year Mortality Trends by Race, Texas 1989-1999**



* Mortality trends are based on death certificate data that list diabetes as a cause of death. Although diabetes may not have been the immediate cause of death, the condition may have been listed as an underlying, or contributing, cause of death.

¹⁵ Texas Department of Health, Texas Diabetes Program/Texas Diabetes Council, Bureau of Disease, Injury and Tobacco Prevention, Texas Diabetes Council. State Data Report and Information. July 2000.

The disproportionate effect of diabetes on minorities, combined with the rapid growth of minorities as a percentage of the Texas population, means the impact of this disease will be doubly harsh in the years to come. During the decade of the 1990s, the population of Texas reached 20 million, pushing it to second in the nation behind California. Approximately half of that growth was recorded in families of Hispanic origin.¹⁶

The state's overall growth rate, combined with disproportionate increases in younger, at-risk populations, presents a looming threat to health resources and systems in Texas. New evidence of the development of a downward creep in the age at which people are diagnosed with type 2 diabetes promises to intensify this public health challenge in the years ahead.

¹⁶ U.S. Census Bureau, State Population Estimates, 1990-1999.

Type 2 Diabetes in Children—An Emerging Epidemic?

Type 2 diabetes in children is itself a disease in its infancy. The first reports of a high frequency of type 2 diabetes in adolescents appeared just 20 years ago, and much of the research that points to greater numbers of children and adolescents being diagnosed with type 2 diabetes has emerged only in the past 10 years.¹⁷

Recent studies indicate somewhere between eight and 45 percent of children with newly diagnosed diabetes have nonimmune-mediated diabetes, the majority of which are type 2 cases. In a Cincinnati study, for example, type 2 diabetes comprised only two to four percent of all childhood diabetes before 1992. By 1994, type 2 diabetes accounted for 16 percent of all new cases in children. Among Mexican-American children studied in Ventura, California, 31 percent of those newly diagnosed with diabetes have type 2 diabetes. Information from a study in San Antonio suggests that 40 percent of newly diagnosed children with diabetes are type 2.¹⁸ Differences in sampling methods and populations account for the varying results.¹⁹

To be sure, the number of children affected by type 2 diabetes (the prevalence) is very small in relation to the number of adults who have or will develop diabetes. Although Texas does not have statistical data for a prevalence rate, epidemiological studies and data collection are underway to identify the current impact of diabetes and to project the future effect of type 2 diabetes among children.

However, case study reports may underestimate the true magnitude of the problem since they describe diagnosed cases only, according to the American Diabetes Association. And due to the relatively recent recognition of type 2 diabetes in this age group, many children still may be misdiagnosed as having type 1 diabetes.²⁰

¹⁷ American Diabetes Association. Type 2 Diabetes in Children and Adults. *Pediatrics*, Vol 105 No 3, March 2000.

¹⁸ Hale D. Oral presentation. National Institutes of Health-sponsored Type 2 Diabetes in Children Conference. Washington, D.C., July 20, 1999.

¹⁹ American Diabetes Association. Type 2 Diabetes in Children and Adults. *Pediatrics*, Vol 105 No 3, March 2000.

²⁰ *ibid.*

The truly alarming aspect of the situation is the frequency with which these cases reportedly are being diagnosed (the incidence). This growing rate of diabetes in children foretells an escalating public health crisis.

While limited studies and anecdotal reports are emerging about startlingly high rates of type 2 diabetes in children, more research is needed to assess the extent of the problem in the population as a whole. If the incidence and prevalence of diabetes in children are increasing, as appears to be the case, the costs to society could be enormous. Should increasing numbers of children develop type 2 diabetes, we may begin to see heart attacks, strokes, blindness, and amputations in 30-year-olds. And, as people live longer, we face the prospect of a population increasingly debilitated by the ravages of this disease.

Who Is at Risk?

A family history of diabetes is strongly associated with type 2 diabetes in children. More than three fourths of children diagnosed with type 2 diabetes have a first- or second-degree relative with type 2 diabetes. In contrast, only five percent of children with type 1 diabetes have a first- or second-degree relative with the same disease.

Type 2 diabetes is diagnosed in girls more often than boys, and most often in children over 10 years of age in middle to late puberty. It is thought that hormonal changes during puberty may be linked to a documented resistance to insulin that occurs during this phase of development.

Children who have type 2 diabetes typically:

- ▶ Are overweight or obese
- ▶ Have a family history of Type 2 diabetes
- ▶ Are of non-European descent—African, Hispanic, Asian, Native American
- ▶ Are more than 10 years of age and in middle to late puberty
- ▶ Have low levels of physical activity

American children of non-European ancestry (African, Hispanic, Asian, and American Indian) are disproportionately affected by this disease. Some studies have revealed that insulin sensitivity, the first step in the development of type 2 diabetes, was 30 percent lower in African-American children than white children of the same age group. Such studies raise the question of whether minority children have a genetic predisposition to insulin resistance.²¹

Researchers also are studying the presence of acanthosis nigricans, a dark thickening of the skin, to determine the extent to which this physical marker may serve as a possible indicator of the presence of diabetes. Acanthosis nigricans has recently been associated with high insulin levels. The widespread presence of this condition in children with diabetes led the Texas Legislature in 1999 to authorize a screening program in nine border counties deemed at greatest risk for diabetes. The University of Texas Health Science Center is coordinating this effort.

²¹ *ibid.*

Aside from genetic factors, researchers are looking at changes in the living environment to help explain the surprising rise in type 2 diabetes in youth. Physicians have noticed a definite trend in recent years: as children and teens have become less physically active and have gained weight, the number of children with type 2 diabetes has increased.

Most children with type 2 diabetes—up to 85 percent—are overweight, and virtually all studies suggest that obesity in children and adolescents plays a key role in early development of the disease.²² A lack of physical activity also is associated with type 2 diabetes. According to the Centers for Disease Control and Prevention, only one in four high school students participates in daily physical education classes.²³

²² American Diabetes Association. Adult Type of Diabetes Rising Dramatically in Kids and Teens (press release). June 19, 1999.

²³ U.S. Department of Health and Human Services. Physical activity and health. In *A Report of the Surgeon General*. U.S. Centers for Disease Control and Prevention, 1996. (As cited in Type 2 Diabetes in Children and Adolescents, American Diabetes Association, *Pediatrics*, Vol 105 No 3, March 2000.)

Diabetes Type 2 in Youth Workgroup

In response to growing indications of an impending public health threat, the Texas Department of Health convened the Type 2 Diabetes in Youth Workgroup in September 1999.²⁴ This group was charged with developing recommendations aimed at prevention and treatment of type 2 diabetes and coexisting conditions in children and adolescents.

The workgroup divided into six specialized subgroups to address specific components of the proposed plan. Members of these six subcommittees tackled issues in the areas of diagnosis, treatment, prevention, provider education, collaboration, and statistics. The groups identified barriers and opportunities related to effective treatment and prevention efforts.

After months of comprehensive review, the Type 2 Diabetes in Youth Workgroup adopted the following broad objectives. Specific recommendations were crafted and are included in the Recommendations section that follows on page 16.

- ◆ **Diagnosis.** Until recently, the overwhelming majority of children with diabetes were victims of the type 1 form of this disease. With the recognition of type 2 diabetes in children, and as the number of these children increases, the need to correctly classify their diabetes is of paramount importance. To assure that physicians and healthcare professionals are able to respond to this newly recognized pediatric disease, greater awareness of its growing prevalence in children should be promoted among medical professionals. Children age 10 and up who have identified risk factors of obesity, a positive family history, or signs of insulin resistance, should be screened for diabetes every two years. The Texas Diabetes Council/Program should take a leading role in efforts to implement these changes.

- ◆ **Treatment.** To improve the health of children and adolescents with type 2 diabetes, development of a standard definition of clinical indicators should be adopted. The recently adopted ADA recommendations on type 2 diabetes

²⁴ A complete list of workgroup participants is included in the acknowledgements section at the beginning of this document.

in children should be incorporated into the existing minimum standards for diabetes care in Texas. These standards of care should be promoted and supported throughout the medical community. Increased public awareness programs must be launched, including educational activities aimed at providers, parents, children, and adolescents. Best treatment practices and preventive programs promoting healthy lifestyles to reduce risk factors should be emphasized.

- ◆ **Prevention.** Until additional studies identify other means of preventing type 2 diabetes in children, the single-most effective way to avoid diabetes in children is to fight the spreading obesity epidemic. To do this, Texans must overcome poor dietary habits—especially the greater intake of high-fat, high-calorie foods—and become more physically active.

The overarching importance of these changes is due to the underlying fact that weight loss can reduce insulin resistance, which then allows the body to use blood glucose more efficiently. Exercise can also decrease insulin resistance and is an important part of any weight management program.

Promoting healthy nutrition habits and lifelong physical activity through school and community partnerships will be critical in curbing the related trends of increased diabetes and overweight children. Current science suggests that diabetes prevention efforts should begin in schools—institutions that regularly touch children’s lives and have the existing structure to immediately begin implementation.

One highly effective example of a program that promotes healthy nutrition and physical activity for the general population is the Coordinated Approach to Child Health (CATCH). Begun at the National Heart, Lung, and Blood Institute, the CATCH program was approved by the State Board of Education as an optional program for Texas school districts after legislative authorization in 1999.

Effective prevention strategies will emphasize solutions that meet local needs and involve family members in efforts to make lasting changes in children’s living environment. School health advisory councils are required in all schools, according to Texas Education Code 28.004. These councils work in tandem with the local community.

When effectively implemented, these groups assess health program needs, plan coordinated health and nutrition activities, and develop important community policies. School health advisory councils provide built-in opportunities to develop support for and participation in diabetes prevention efforts.

- ◆ **Provider Education.** Most of the information about type 2 diabetes in children is new. Significant effort should be made to disseminate materials and educate health care providers about this issue. The Texas Diabetes Council/Program must play a key role as a clearinghouse for information about type 2 diabetes in children and related professional education opportunities. In so doing, it will be important to maintain and strengthen collaborative relationships with other agencies and professional associations.
- ◆ **Collaboration.** The Texas Department of Health has developed a list of potential partners for recruitment in an education and information campaign. These public and private organizations and individuals will be contacted to invite their help and participation in efforts to reverse the trend of type 2 diabetes in children. Individuals and organizations will be included in future mailings, invitations to special conferences, and offers to participate in ongoing data collection and innovative prevention and treatment projects.
- ◆ **Statistics.** Texas does not have a mandate to screen children for type 2 diabetes and to report findings—there is no mechanism to report or collect this information. Working with independent endocrinology group practices and relevant health projects may provide an opportunity to develop data that may be used to estimate the prevalence of type 2 diabetes in children in these programs.

In the long term, additional research is needed to determine the incidence and prevalence of pediatric diabetes and its risk factors, as well as other diseases that appear concurrently with diabetes. A pilot project to track diabetes in six to eight high-risk school districts would help determine the prevalence of diabetes over time. This project would establish the experience of pediatric diabetes, in comparison to several studies in South Texas that showed the prevalence in adults almost tripled within nine years.

Recommendations to Improve the Health of Texas Youth and Reduce the Rise of Type 2 Diabetes in Children and Adolescents

Based on information compiled by the Type 2 Diabetes in Youth Workgroup, the Texas Department of Health issues the following recommendations aimed at prevention and treatment of type 2 diabetes and coexisting conditions in children and adolescents. Through these practical steps, the state of Texas can embark on a program designed to counter the mutual trends of increasing diabetes and obesity in children and adolescents.

Recommendation 1

Implement CATCH in eight to ten schools in each education service center region.

The Coordinated Approach to Child Health (CATCH) program should be expanded to serve Texas schools statewide. The CATCH program already has trained hundreds of Texas teachers and food service staff, many of whom have implemented CATCH on a voluntary basis.

The most successful weight management programs focus on behavior change and de-emphasize weight loss as an outcome.²⁵ CATCH teaches elementary school students the elements of a healthy diet and a physically active lifestyle and is designed to benefit the student population as a whole, while reducing the risk factors associated with diabetes and cardiovascular disease.

CATCH was developed to help students increase physical activity and improve food choices. CATCH students eat school lunches that average no more than 30 percent of calories from fat and spend 50 percent of their time during physical education classes in moderate to vigorous physical activity. As a result of their training, students also eat healthier foods and are more physically active away from school. The Texas Education Agency and the Texas Department of Health will provide technical assistance to schools for the purpose of fully implementing CATCH.

²⁵ Ponder SW, Sullivan S, McBath G. Type 2 Diabetes Mellitus in Teens. *Diabetes Spectrum*, Vol 13 No 2, 2000.

Recommendation 2

Fund one full-time CATCH coordinator in each of the state's 20 education service centers.

To effectively support statewide implementation of the CATCH program, one full-time CATCH coordinator should be funded at the Texas Education Agency and within each education service center.

Recommendation 3

Establish a pilot program to demonstrate the effectiveness of comprehensive community-based initiatives focusing on obesity and type 2 diabetes in children and adolescents.

A pilot program to develop community childhood obesity interventions that enhance and supplement school-based programs should be funded. To be effective, community-based initiatives should include input from a broad base of local stakeholders including representatives of the medical profession, media, insurance industry, urban planners, restaurants, schools, parents, and government.

Recommendation 4

Increase public health professional awareness of type 2 diabetes in children and adolescents.

The Texas Diabetes Council/Program should extend its campaign to educate the public and health professionals about diabetes to include updated information about type 2 diabetes in children and adolescents. Efforts should build on the group's highly successful statewide media campaign as well as professional education programs that already have provided training to more than 1,500 medical professionals.

Recommendation 5

Support data collection related to the incidence and prevalence of type 2 diabetes in children and adolescents.

There currently is no mechanism to report or collect information related to the incidence and prevalence of type 2 diabetes in children and adolescents. The state's efforts to monitor diabetes in Texas should be expanded to track data related to type 2 diabetes in children and youth.

Fiscal Implications

It is estimated that activities associated with the Type 2 Diabetes in Children and Adolescents Statewide Action Plan will cost \$8 million in the next biennium.

Appendix 1

Scientific issues and specific practical recommendations developed by the Type 2 Diabetes in Youth Workgroup, listed according to the six specialized groups.

In September 1999, the Texas Department of Health established the Type 2 Diabetes in Youth Workgroup, following recommendations that emanated from an international workshop on type 2 diabetes in children hosted by the Texas Department of Health and the Juvenile Diabetes Research Foundation International in May 1999.

The following guidelines for the workgroup were adopted:

Mission: To prevent type 2 diabetes among children and adolescents

Activity: The Texas Department of Health, in collaboration with strategic partners, is committed to developing a plan addressing their roles and responsibilities in the prevention and management of type 2 diabetes and its related co-morbidities among children and adolescents.

This plan was delivered to Dr. Reyn Archer, Commissioner of the Texas Department of Health, for approval and presentation to the Texas Legislature for funding and development of new legislation.

In ensuing meetings, the Workgroup divided into specialized workgroups to address six components of the proposed plan:

- (1) diagnosis,
- (2) statistics,
- (3) prevention,
- (4) provider education,
- (5) treatment, and
- (6) collaboration.

The specialized workgroups met individually to review the issues related to their focus areas and develop recommendations. At Dr. Archer's request these recommendations were refined and organized into "scientific issues" and "specific practical recommendations." These recommendations are included in this section of this report.

Ultimately, these recommendations were reviewed by the Type 2 Diabetes in Youth Workgroup as a whole, and the final recommendations contained in this statewide plan were approved.

Diagnosis Workgroup

◆ Scientific Issues

An eight-member panel of experts, convened by the American Diabetes Association, has issued the following recommendations published in the March issues of *Pediatrics* and the *American Journal of Diabetes Care*. A summary of the recommendations follows:

1. Overweight (BMI>85th percentile for age and sex, weight for height >85th percentile, or weight>120% of ideal weight) children should be tested for diabetes every two years starting at age 10 or at the onset of puberty if they also have two of the following risk factors: a family history of type 2 diabetes, ethnic groups, or signs of insulin resistance or associated conditions, such as high blood pressure or high blood fat levels.
2. All children with type 2 diabetes should be educated about how to manage their disease.
3. Children with type 2 should maintain a normal weight by eating a healthy diet and getting regular exercise.
4. All children with type 2 diabetes should be monitored.

◆ Specific Practical Recommendations

The Diagnosis workgroup supports the ADA recommendations on diagnoses and recommends active efforts to disseminate and increase knowledge of these recommendations.

1. TDH/TDC should collaborate with the Texas Diabetes Health Care Professionals to modify the minimum care standards to include recommendations for type 2 in children.

Contact: Diabetes Program, Texas Department of Health, (512) 458-7490

Prevention Workgroup

◆ Scientific Issues

1. The prevention workgroup supports CDC recommendations for coordinated school health. CDC has identified the following eight interactive components of a coordinated school health program: 1) health education, 2) physical education, 3) health services, 4) nutrition services, 5) health promotion for staff, 6) counseling and psychological services, 7) healthy school environment, and 8) parent/community involvement.
2. The prevention workgroup supports CDC Guidelines for Promoting Lifelong Physical Activity. TDH should aggressively pursue active community and school partnerships. CDC has identified 10 recommendations for ensuring quality physical activity programs. The guidelines address the following areas: 1) policy, 2) environment, 3) physical education curricula and instruction, 4) health education curricula and instruction, 5) extracurricular activities, 6) family involvement, 7) training, 8) health services, 9) community programs, and 10) evaluation.
3. Additional studies are needed to effectively prevent type 2 diabetes and obesity in children via community-based and school-based interventions.

◆ Specific Practical Recommendations:

Prevention strategies need to be community driven with an emphasis on local solutions. Current science suggests the starting focal point should be schools and then work toward establishing community linkages and strategies. Schools are the primary institution to reach children, and the infrastructure is in place to immediately begin implementation.

1. Local Community Interventions

Underlying Community Obesity Factors. Fund a pilot program to develop community childhood obesity interventions to enhance and supplement school-based interventions with input from a broad base of stakeholders including medical, mass media, insurance, urban planners, restaurants, schools, parents, and government. The intervention will address underlying factors of childhood obesity and type 2 diabetes in children.

Community Connections and Infrastructure. Assist in funding a Center for Educator Development (CED) designed to provide a statewide coordinated system of ongoing education and professional development in physical education and health education for educators at all grade levels. The CED will include a university pre-service component and, through involvement with locally developed Health Education Advisory Councils, build community connections to the schools that will foster development of health-related programs that are considered important at the local level.

2. Local Policy Development

Policy Development. The Texas Education Code 28.004 requires all districts to establish a School Health Advisory Council. These councils need to be strengthened and developed. Strong Health Education Advisory Councils: 1) represent the community; 2) assess health programs/environment; 3) plan coordinated physical education, health, and nutrition education/programs; 4) develop policies that are deemed important to the community (vending machines, fund raising activities, and curricula); and 5) develop linkages with the community. The Texas Education Agency and Texas Department of Health will assist school districts in creating and implementing effective Health Education Advisory Councils.

3. School Population-Based Risk Factor Behavior Reduction

Risk Factor Behavior. The Coordinated Approach to Child Health (CATCH) program should be implemented. CATCH was previously approved by the State Board of Education in 1999 as an optional program that districts could choose to use. The Texas Education Agency and the Texas Department of Health will provide technical assistance to schools for the purpose of full implementation of CATCH.

Program Evaluation. Fund an evaluation of the CATCH program, with implementation to be conducted by TEA and TDH.

Program Staffing. Fund one full-time CATCH coordinator at TEA and each education service center.

4. Targeted School Obesity Interventions

Targeted Obesity Interventions. TEA and TDH will develop recommended school obesity interventions drawn from the input of a broad base of stakeholders, including parents, teachers, school administrators, physicians, and other health care providers.

Contact: Texas Diabetes Council/(512) 458-7490

Treatment Workgroup

◆ Scientific Issues

A literature search reveals many research studies conducted on diabetes mellitus, type 2, (DM2) in the adult population. Studies focused on children/adolescents with DM2 are limited. There are demonstration projects, such as the acanthosis nigricans recognition project in Laredo, but no formal research projects. The American Diabetes Association (ADA) has recently released a consensus statement on the treatment of DM2 in children/adolescents. To improve the health of children/adolescents with DM2/insulin resistance, the treatment group recommends the following:

1. Support development of a standard definition/parameters of clinical indicators for DM2/insulin resistance in children/adolescents.

Standardization and consensus from the health care community promotes early identification and uniformity of treatment.

2. Support/promote research into treatment options for children/adolescents with DM2/insulin resistance.

Compare/contrast pharmacological vs. non-pharmacological modalities to attain desired outcomes – decreased blood glucose, decreased insulin resistance, decreased co-morbidities. Research in the use of oral treatment modalities is not available.

3. Support research/development of minimum standards of care in children/adolescents with DM2/insulin resistance.

Standards promote uniformity of treatment.

◆ Specific Practical Recommendations

DM2 has traditionally been considered a disease of adults > 40 years of age. It is only recently that DM2 has been identified as a problem of children/adolescents. Because the incidence of DM2 in children/adolescents is not widely recognized/diagnosed by the health care community, the treatment group recommends the following:

1. Increase public awareness of the problem of DM2/insulin resistance in children/adolescents.

Public awareness of the existence of the problem promotes/supports research and early identification.

2. Promote healthy lifestyles (preventive action to modify/reduce risk factors).

Recognize best practices and existing health promotion activities.

3. Support/promote educational activities directed at providers, parents, children, and adolescents.

Knowledge helps improve all aspects of health and health care.

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◆ Scientific Issues

1. Additional research is needed to determine the incidence and prevalence of pediatric diabetes, diabetes risk factors, and co-morbidities in the pediatric population at the present time. Risk factors currently identified include ethnicity, family history, and obesity. Co-morbidities include hypertension, hyperlipidemia, hyperinsulinemia, precocious puberty (hirsutism, polycystic ovarian syndrome), sleep apnea (breathing disorders), orthopedic problems (slipped capital femoral epiphyses), and overgrowth syndromes (pseudoacromegaly).
2. Additional research is needed to examine the temporal change in the prevalence of diabetes and diabetes-related risk factors over time.
3. Additional research is needed to examine the natural history of the development of type 2 diabetes in childhood.

◆ Specific Practical Recommendations

1. Six to eight high-risk communities (or school districts) should be chosen for pediatric population-based screening for diabetes and related co-morbidities. Communities should be targeted to include poor and middle class, urban and rural, Mexican-American and African-American. A subset of possible targets can be developed from the information on schools collected by the Texas Education Agency. Approximate number of children to be screened in each school system should be ~10,000 based on an estimated prevalence of diabetes mellitus (DM) in the range of 1/100 to 1/1000. Initial screening should target children age 9 years and above. Specific strategies should be developed to further characterize and treat children identified with diabetes and related risk factors. (*E.g.*, children with glucose levels >125 mg/dl should be formally evaluated by a pediatric diabetes specialist. To further characterize the diabetes, an oral glucose tolerance test, anti-islet cell antibodies, or molecular screening for maturity-onset diabetes of the young [MODY] genes might be undertaken.)

2. The prevalence of diabetes in the same target community should be reassessed after three to four years. In several studies in South Texas in adults, the prevalence almost tripled within nine years and there has been a similar dramatic increase in the prevalence of obesity.
3. Establish a central registry of all individuals <19 years of age diagnosed with type 2 diabetes and develop protocols for initial evaluation and subsequent follow-up. The protocols can be developed by the Texas Pediatric Endocrine Consultants and applied statewide.
4. Collaborate with agencies/communities on use of the Youth Behavioral Risk Factor Survey (YBRFS) to identify behaviors/risk factors associated with type 2 diabetes.

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Provider Education Workgroup

Materials about type 2 diabetes in children from the Diagnosis, Prevention, Treatment, and Statistics workgroups represent new information. Significant effort needs to be made to disseminate information and educate health care providers about this issue.

◆ Specific Practical Recommendations

1. Develop an information clearing house that includes:

Referral services (other medical professionals [especially other specialists], community-based organizations)

A directory and schedule of continuing professional education opportunities in Texas

Distribution of information through the Internet, a telephone hotline, periodicals and research articles, and/or newsletters

2. Collaborate with other agencies and professional associations

Partner with the TDH Put Prevention into Practice program to further goals and projects

Identify other agencies inside and outside TDH

3. Assess educational needs

Identify areas needing improvement

Determine what methods of information dissemination providers prefer

Review medical school curricula

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Collaboration Workgroup

◆ Specific Practical Recommendations

The Collaboration Workgroup has identified the following list of potential collaborators that might share an interest in addressing type 2 diabetes in children. The workgroup recommends that a letter be sent to representatives of these groups informing them of the activities of the project and inviting their help and participation.

American Cancer Society
American Diabetes Association
American Heart Association
Association of Texas Colleges and Universities
Association of Texas Professional Educators
Austin NAACP
Center for Public Policy Priorities
Children's Hospital Association of Texas
Head Start
Juvenile Diabetes Research Foundation International
LULAC
Migrant Clinicians Network
Mr. Wendell Mayes, Jr.
National Association of Social Workers
National Center for Farmworker Health
National Kidney Foundation of Texas
U.S.-Mexico Border Health Committee
Senate Research Center
South Texas Hospital
TDH Border Health
TDH Chronic Disease
TDH Communications
TDH Medicaid
TDH Public Health Professional Education
TDH Regional Offices
TDH School Health Clinics
Texas Association for Health, Physical Education, Recreation & Dance
Texas Association for Supervision and Curriculum Development
Texas Association of Business and Chambers of Commerce
Texas Association of Community Health Centers
Texas Association of Community Schools
Texas Association of Health Plans
Texas Association of Local WIC Directors
Texas Association of Public and Non-Profit Hospitals
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Texas Association of School Administrators
Texas Association of School Boards
Texas Association of School Nurses, Inc.
Texas Association of Secondary School Principals
Texas Classroom Teachers Association
Texas Diabetes Institute
Texas Dietetic Association
Texas Elementary Principals and Supervisors Association
Texas Federation of Teachers
Texas High School Coaches Association
Texas Hospital Association
Texas Medical Association
Texas Medical Foundation
Texas Nurses Association
Texas Osteopathic Medical Association
Texas Pediatric Society
Texas PTA
Texas Public Health Association
Texas Restaurant Association
Texas School Food Service Association
Texas School Health Association
Texas State Teachers Association
University Interscholastic League
University of Texas System
University of Texas-Houston School of Public Health
Vocational Agricultural Teachers Association of Texas
Vocational Home Economics Teachers Association of Texas

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