Policy Issue: Risk Assessment for Type 2 Diabetes in Children

Kim Bookout

Texas Woman's University
Policy Issue: Risk Assessment for Type 2 Diabetes in Children

Type 2 diabetes (previously called non-insulin dependent diabetes mellitus or adult-onset diabetes) has reached epidemic proportions in the U.S. and affects more than 20 million people (Kong et al., 2007, p. 202). Multiple risk factors are associated with type 2 diabetes such as obesity, hypertension, sedentary lifestyle, and belonging to certain racial/ethnic groups (Small et al., 2007; Kong et al.; Jones & Ficca, 2007). Acanthosis nigricans is a dermatologic condition associated in some cases with hyperinsulinemia. Despite an association between acanthosis nigricans and the development of type 2 diabetes, the CDC does not recommend routine screening as there is insufficient evidence in current research to conclude its definite presence as a precursor to the development of the disease (Jones & Ficca). Nevertheless Texas’ public schools have screened for acanthosis nigricans since legislation (H.B. 1860, Acanthosis Nigricans: The Education and Screening [ANTES] program) was signed into law during the 1999 legislative session (Texas Department of State Health Services [TDSHS], 2005). Subsequent reports of this program during the two-year period between 1999 and 2000 involved screenings of over 100,000 children in third, fifth, and eighth grades. Of the children screened, more than 14,000 were positive for acanthosis nigricans, however, no correlation was made between the presence of acanthosis nigricans and the incidence of diabetes (Jones & Ficca).

While conclusive data are not available linking childhood obesity to diseases such as hypercholesterolemia, hyperlipidemia, atherosclerosis, cardiovascular disease, and type 2 diabetes during childhood, development of these diseases is well correlated in adults with obesity (Ball, Marshall, & McCargar, 2003). Ball and colleagues (2003) also report that increased central body fat distribution and overall increased adiposity are related to an adverse risk profile for type 2 diabetes in children. Thus, surveillance of body mass index (BMI), acanthosis nigricans, and
blood pressure in children may be beneficial in early identification of children at risk for development of chronic disease such as type 2 diabetes.

In 2005, the University of Texas-Pan American Border Health Office recommended to state legislators that the ANTES program be expanded to utilize BMI as the primary screening tool instead of acanthosis nigricans for type 2 diabetes (Jones & Ficca, 2007). This came largely based on recommendations from the American Diabetes Association (ADA) for screening children considered at-risk for the development of type 2 diabetes. The group recommends that children age 10 years and over with a BMI >85th percentile and two additional risk factors be screened every two years with a fasting plasma glucose test or an oral glucose tolerance test (Rhodes et al.).

Additional risk factors associated with type 2 diabetes include a positive family history of type 2 diabetes, belonging to a certain race/ethnic group (Native Americans, African Americans, Hispanic Americans, Asians/South Pacific Islanders), and signs of insulin resistance such as acanthosis nigricans and dyslipidemia (Jones & Ficca; Rhodes et al.; Kong et al., 2007). In light of these findings, Texas Representative Jim McReynolds (D- District 12) introduced House Bill (H.B.) 1363, relating to a risk assessment program for Type 2 diabetes and the creation of the Type 2 Diabetes Risk Assessment Program Advisory Committee. Enactment of this legislation will utilize current resources to screen Texas school children at routine intervals for elevated BMI, acanthosis nigricans, and hypertension in order to identify those at risk for the development of type 2 diabetes.

The following discussion includes background information related to social factors, economic factors, ethical factors, and political factors related to type 2 diabetes and obesity.
Talking points are provided for review (Appendix A). In addition, a briefing paper is available as a synopsis (Appendix B).

Background

Social Factors

Overweight or obesity is considered the most important risk factor for the development of type 2 diabetes. Thus, the growing rate of childhood obesity is associated with an increasing prevalence of type 2 diabetes in children. Overweight is defined as BMI > or equal to 85th percentile but < 95th percentile. Obesity is defined as BMI > or equal to 95th percentile. Type 2 diabetes is reported to account for as many as 50% of newly diagnosed cases of diabetes in children and almost always is associated with a BMI > 85th percentile (Hannon et al.; Schwartz & Chadha, 2008). Causality of childhood obesity is multi-factorial and includes reasons such as lower socioeconomic status, genetics, parental eating patterns, decreased physical activity, and consumption of nutritionally poor foods (Hodges, 2003; Eliakim, Nemet, Balakirski, & Epstein, 2007; Rice, Thombs, Leach, & Rehm, 2008). Emerging evidence supports that early identification and treatment of both obesity and type 2 diabetes yields superior outcomes to those following delayed treatment (Engelgau, Narayan, & Herman, 2000).

Economic Factors

Medical costs associated with type 2 diabetes as well as overweight and obesity must include both direct and indirect costs (American Diabetes Association [ADA], 2008; Centers for Disease Control [CDC], 2007). Direct costs may include prevention, diagnosis, and treatment of the disease whereas indirect costs are associated with increased absenteeism, unemployment disability, restricted activity and the loss of future income related to premature death.
Approximately $174 billion spent in the U.S. in 2007 for direct and indirect costs associated with diabetes with $12 billion spent in Texas in the same year (Texas Diabetes Council, 2009).

Conversely the cost of screening for diseases such as obesity and type 2 diabetes is minimal when compared to the cost of treating the chronicity of each condition. Limited information exists related to the specific cost associated with type 2 diabetes screening although selective screening within a specific population allows a large number of potential cases to be identifies with relatively little additional expense to the organization providing the service (Engelgau et al., 2000). Researchers from the University of Texas Health Science Center at Houston examined the cost of screening for overweight in school children in the urban area of Houston, Texas. Screening cost for overweight and hypertension were approximately $28 per person (Brosnan et al., 2008, p. 240).

**Ethical Factors**

Two ethical factors are of concern related to screening for type 2 diabetes. First, there is some fear by the CDC that children identified to have the risk factor acanthosis nigricans, may have problems receiving insurance benefits in the future (Jones & Ficca, 2007). Second, Rhodes et al (2006) reported discrepancies in screening tests ordered among pediatric clinicians. Preferences for tests were influenced by whether or not patients were able to return for subsequent testing. This phenomenon has the potential to recur in the school setting as school nurses begin to identify children who are positive for multiple risk factors but may be under-insured thus unable to follow up with medical providers for further testing.

**Political and Legal Factors**

Screening for type 2 diabetes in schools is not new in the state of Texas. Legislation related to diabetes has been in process since 1983 (Texas Diabetes Council, 2009). In 1993,
legislators appropriated $3.75 million per year to support the Council’s Plan to Prevent and Control Diabetes. Thus, a logical part of prevention and control of diabetes is the implementation of a comprehensive risk assessment program for type 2 diabetes. Much of previous legislation is centered on expansion of the screening program. Currently almost three-fourths of the state is included in the screening program accounting for more than 700,000 students (Jones & Ficca, 2007, p. 250).

Issue Statement

How should the state government administer programs for type 2 diabetes screening in Texas school children?

Stakeholders

Several stakeholders exist that include school age children, parents of school-age children, school nurses and administrators, Texas Diabetes Council members, pediatricians, endocrinologists, cardiologists, insurers, and hospitals. Children stand to benefit from screening programs in two ways. The first is indirect and related to the likelihood of identification of obesity and early implementation of lifestyle changes that have the potential reduce other chronic disease. The second benefit to children is early identification of type 2 diabetes and aggressive management (Hannon et al., 2005). Comprehensive programs are recommended for children who are identified has overweight or obese (Ball et al., 2003; Hodges, 2003; Nemet et al., 2005). Thus, parents and siblings of these children will be recruited to become active participants in the child’s lifestyle modification. Healthcare providers are stakeholders as risk assessment identifies children who require further work up and management.

Healthcare insurers may view type 2 diabetes identification as a positive or negative. A positive perspective is ideal in that insurers will see the benefit of early identification and the
potential to thwart further development of chronic disease. Early identification may produce a negative perspective from insurers in terms of an increase in claims and financial outlay. Hospitals may also see early identification as positive or negative. Children who are at risk for type 2 diabetes are often obese as well and may be under insured. Researchers in Colorado found that condition-specific hospitalization and charges for children with public or no insurance was higher than children with private insurance (Todd, Armon, Griggs, Poole, & Berman, 2006). This is significant since causality of childhood obesity includes lower socioeconomic status among multiple factors (Hodges, 2003; Eliakim, Nemet, Balakirski, & Epstein, 2007)

Policy Goals and Objectives

The primary goal of H.B. 1363 is to administer a risk assessment program for early identification of type 2 diabetes in Texas school children (public and private) during routine vision/hearing screenings or spinal screenings. A secondary goal of the policy is to establish a screening program consistent with recommendations of the CDC. In addition, enactment of the policy will establish a coordinated reporting mechanism by which outcomes will be collated and submitted for evaluation by researchers and state agencies (Jones & Ficca, 2007). Specific objectives of the policy include:

1. Determine students’ BMI as the initial measurement instead of the current measure of acanthosis nigricans in screening programs congruent with recommendations of the Centers for Disease Control
2. Evaluate students with elevated BMI for further risk by assessing for acanthosis nigricans and elevated blood pressure.
3. Coordinate activities between public and private schools, state agencies, volunteer organizations, and other entities to prevent overlapping efforts.
4. Utilize current state and federal funds to administer risk assessment screening without need for additional funds (H.B. 1363, 2007).

Policy Options and Alternatives

Policy related to type 2 diabetes risk assessment is currently in place in the state of Texas. Current policy, however, is incongruent with national recommendations of the Centers for Disease Control, the ADA, and the American Academy of Pediatrics. Thus policy alternatives for resolution include (a) Do Nothing Option, (b) Incremental Change Option, and (c) Major Change Option. Each of the three options will be evaluated based on criteria of (a) likelihood of ongoing funding, (b) ability to meet current and future demand, and (c) political feasibility.

Analysis of Policy Alternatives

Analysis of Option A

The Do Nothing Option allows for continuation of screening school children for acanthosis nigricans as an initial marker for risk of type 2 diabetes instead of the recommended BMI as the initial marker.

Criterion 1: Likelihood of Ongoing Funding

PRO

If the current system of risk assessment continues, no additional funding for training of staff will be necessary. Screening for acanthosis nigricans is incorporated into current vision/hearing and scoliosis screens and requires no equipment. Therefore, there is little risk of depleting the current funding stream as allotted per the state.
CON

It is reasonable to expect that funding restrictions could be imposed upon entities choosing not to follow recommended guidelines of utilization of BMI as a primary marker for increased risk of type 2 diabetes.

Criterion 2: Ability to meet current and future demand

PRO

Type 2 diabetes risk assessment screening is in place in Texas schools and screens more than 700,000 children in more than three fourths of the state (Jones & Ficca, 2007). The Texas Department of Health reports approximately 14% of children screened between 1999 and 2000 had acanthosis nigricans (Jones & Ficca). The University of Texas-Pan American Border Health Office has administered type 2 diabetes risk assessment since 1999 and is positioned to continue administration of the current policy.

CON

No data have been reported correlating presence of acanthosis nigricans with follow-up diagnosis of type 2 diabetes. Thus, effectiveness of the current screening program is unknown. As written, current policy does not allow for coordination of data elements precluding assurance that duplication of efforts is avoided.

Criterion 3: Political Feasibility

PRO

If current policy continues without change, the political impact is mild and would not jeopardize future advancement of agenda items related to risk assessment screening. The current program is funded via state monies as well as local government.
CON

Doing nothing to change current policy does not advance the mission of the Texas Diabetes Council—“to effectively reduce the health and economic burdens of diabetes in Texas” (Texas Diabetes Council, 2009, p. 1). The Texas Diabetes Council has invested time, effort, and resources (paid, voluntary, political, and administrative) the development of strong programs to improve the lives of current and future voters in Texas. The Council would be forced to re-group and draft new legislation in order to advance its agenda.

*Analysis of Option B: Incremental Change Option*

The Incremental Change Option allows for implementation of a pilot program for risk assessment screening for Type 2 diabetes to include nine Texas counties using BMI as the primary risk factor. This pilot launch closely resembles that of the initial program for acanthosis nigricans screening. It is felt that data from this program will compel lawmakers to expand the program to allow for screening of all Texas school children.

*Criterion 1: Likelihood of Ongoing Funding*

PRO

Funding for risk assessment screening is in place related to prior legislation and requires no significant financial outlay. Risk assessments are carried out by school nurses at the time of screening for vision, hearing and scoliosis. There is no foreseeable decrease in funding for these programs.

CON

If data are inconclusive related to the identification of increased BMI during the pilot program, it is less likely that the program will expand to include a larger population. In this case, funding may be regulated based on outcomes.
**Criterion 2: Ability to meet current and future demand**

**PRO**

A change in risk assessment screening criteria for only 9 counties will produce minimal strain to the current system administered by The University of Texas-Pan American Border Health Office.

**CON**

Implementation of a partial program may lead to complacency. Thus, the urgency felt by those in healthcare and community programs may disintegrate as time passes and the potential for expansion of the program is reduced.

**Criterion 3: Political Feasibility**

**PRO**

The potential positive impact of outcome data to the children and families of Texas is vast. Implementation of the pilot for utilization of BMI as a primary marker has the potential to affect not only those identified but also those who benefit from future screening. In 2007, more than 6.6 million children under 18 years of age resided in Texas comprising almost 28% of the total population. Those children who are identified with increased BMI and are referred for management have the potential to escape the more serious complications of obesity as well as diabetes (Eliakim et al., 2007).

**CON**

Initially legislators may feel political backlash from voters in counties that are not included in the pilot areas. Subsequently, there may be further backlash should the pilot fail or not be expanded throughout the state.

*Analysis of Option C: Major Change Option*
**Criterion 1: Likelihood of Ongoing Funding**

**PRO**

The state provides funding to local schools for type 2 diabetes risk assessment screening at present. Implementation of H.B. 1363 would have no significant fiscal impact to the State (J. S. O’Brien, personal communication, April 16, 2007). The University of Texas-Pan American Border Health Office plans to absorb costs of the program into existing resources since risk screening is already in place. This bill also allows for the acceptance of gifts, grants and donations for program administration.

**CON**

There are anticipated costs to local school districts for recording and reporting of screening data. This cost may vary according to the size of the school district as well as recommended risk assessment activities. In addition, training of school employees conducting the examinations will be necessary. Thus, a further cost may be incurred (J. S. O’Brien).

**Criterion 2: Ability to meet current and future demand**

**PRO**

Currently, more than three-fourths of the state provides type 2 diabetes risk assessment in children in 3rd-, 5th-, and 8th-grades. The University of Texas-Pan American Border Health Office continues to expand and refine its program. Moving forward, however, Texas legislators must facilitate the expansion of the program to identify children who are overweight and obese. More than 32 percent of Texas high school students were considered overweight or obese in 2007 (TDSHS, 2008, p. 1). According to TDSHS (2008), if current trends continue, more than 75% of Texas adults will be overweight or obese by the year 2040 costing the state as much as
$39 billion. Implementation of H.B. 1363 has the potential to identify those children and adolescents who will be adults in 2040 and prevent the long-term cascade of chronic illness.

**CON**

The prevalence of childhood obesity in Texas was higher than that of the national average in 2004-2005 according to NHANES data (CDC, 2008). It is reasonable, therefore, to expect cost associated with screening may increase as the future demand for type 2 diabetes screening increases. Healthcare expenditures may increase subsequent to positive screening for BMI. Brosnan et al., (2008) report an increased use of healthcare services by individuals with higher BMI (overweight and obese).

**Criterion 3: Political Feasibility**

**PRO**

It is estimated that healthcare expenditures related to overweight and obesity average approximately $65 billion annually (Brosnan et al., 2008). Thus with the growing population of youth and adults who are overweight and obese, it is incumbent on legislators to seek and implement options for prevention. Brosnan et al., (2008) screened over 2,300 students between 7th and 12th grades in an urban school district in Texas for BMI and hypertension. The cost of which was approximately $66,000. Based on the growing numbers of adolescents and adults who are overweight or obese, it is advisable to work to prevent the adverse affects (physical and financial) of obesity and type 2 diabetes. Since programs are already in place, there is little need for the creation of infrastructure within state organizations as well as administrative entities.

**CON**

Expansion of type 2 diabetes risk assessment to include BMI will increase the challenges faced by school nurses, parents of children identified as overweight and obese, community
organizations, and healthcare providers in Texas. Identification of obesity, overweight, and type 2 diabetes in children and adolescents may lead to the identification of further government funded programs for management and prevention strategies such as after school programs to encourage activity, school lunch program expansion, and healthcare incentives for children insured through state Medicaid funding.

Recommended Solution

A comparison of the analysis conducted on the policy options was carried out (Appendix C). While results of the scorecard are positive for each of the three alternatives, criteria were highly positive for Option C (Major Change Option). The likelihood of ongoing funding scored positively in all three of the alternatives. Since funding is currently in place and the program is administered within the context of other screening tests (vision, hearing, and scoliosis), the likelihood of continuation exists. Implementation of H.B. 1363 would, however, provide for compliance with national recommendations at the state level. Thus, the potential for expansion of funding exists through federal programs.

Similar to the previous criterion, the ability to meet current/future demands also scored positively across each alternative with a stronger result within the third alternative. Again, since the risk assessment for type 2 diabetes screening is in place via the current Acanthosis Nigricans screening program, few adjustments are required by the state government, the Texas Education Agency, and local school districts. The administration of the actual risk assessment requires no increase in staff over that which is already in place for vision, hearing and scoliosis screens. The population increase in Texas from the year 2000 to 2007 was approximately 14% which is almost double the rate for the U.S. (U.S. Census Bureau, 2009, p. 1). Therefore, it is imperative that type 2 diabetes risk assessment expand to include BMI as the primary indicator for
continued evaluation. Inclusion of BMI has the potential to identify an additional population of overweight and obese children in addition to those who are at risk for type 2 diabetes.

Lastly, the criterion for political feasibility had the widest range of scores. The option to do nothing or continue with the current program, although not ideal, does provide for a screening mechanism. It is expected that children identified with the current assessment of acanthosis nigricans are referred to healthcare providers for further work up. It is hoped that those children would then be evaluated for overweight and obesity as well as hypertension and appropriate care initiated. This, however, leaves room for error as children without acanthosis but increased BMI are not referred for appropriate management increasing the likelihood of many chronic illnesses (Ball et al., 2003; Hodges, 2003). Therefore, the third alternative or major change option is again the best choice since increased BMI, acanthosis nigricans, and hypertension will all be included in the screening process.
References


Relating to a risk assessment program for Type 2 diabetes and the creation of the Type 2 Diabetes Risk Assessment Program Advisory Committee, H.B. 1363, 80th Cong. (2007).


Appendix A

Talking Points
Fast Facts for Texans

Type 2 Diabetes Prevalence
☆ In 1999-2000, 7% of U.S. adolescents (12-17 years) had impaired fasting glucose or prediabetes.++
☆ Type 2 diabetes accounts for 90-95% of all diabetes cases.++
☆ Incidence of type 2 diabetes in children under age 18 years is increasing.++

Associated Cost
☆ Texans incurred $12 billion in direct and indirect cost of diabetes in 2007.++
☆ One of every five healthcare dollars is spent caring for someone with diabetes.*

Overweight and Obesity Prevalence
☆ The prevalence of childhood obesity in Texas during 2004-2005 was higher at 42% for fourth graders, 39% for eighth graders and 36% for eleventh graders than a prevalence of 31% for U.S. children (ages 6-19 years).**
☆ Twenty-one percent of 2-5 year olds enrolled in WIC were overweight or obese in 2007.**

Associated Cost
☆ Overweight- and obesity-associated costs for adults in Texas were approximately $10.5 billion in 2007.+
☆ Medicaid and Medicare expenditures in Texas in 2000 for overweight and obesity related healthcare topped $6.5 billion.**

Prevention is KEY!
✓ Early identification of overweight and obesity (BMI screening) may induce lifestyle changes (e.g., improved eating habits, increased exercise, and weight loss).++
✓ Reduction of excess body weight lowers risk of developing type 2 diabetes by 58%.++
✓ Risk assessment screening for type 2 diabetes using BMI costs Texans less than $30 per student. ∨

Benefits for Texans
* Healthy Children
* Healthy Families
* Healthy Economy

References:
Appendix B
Talking Points
To: Members of the 81st Legislative Session, Texas Legislature

From: Kim Bookout, MSN, RN, CPNP

RE: Implementation of Risk Assessment for Type 2 Diabetes in Texas Public Schools

The Issue:
Type 2 diabetes (T2D) has reached epidemic proportions in the U.S. affecting more than 20 million people. Multiple risk factors are associated with T2D such as obesity, hypertension, and acanthosis nigricans (AN). The CDC, American Diabetes Association, and the American Academy of Pediatrics agree that AN should not be used as recommended screening for T2D. Studies show that increased central body fat distribution and overall increased adiposity are related to an adverse risk profile for type 2 diabetes in children. Thus, surveillance of body mass index (BMI), acanthosis nigricans, and blood pressure in children may be beneficial in early identification of children at risk for development of chronic disease such as type 2 diabetes.

Background:
Overweight or obesity is considered the most important risk factor for the development of type 2 diabetes. Thus, the growing rate of childhood obesity is associated with an increasing prevalence of T2D in children. Approximately $174 billion spent in the U.S. in 2007 for direct and indirect costs associated with diabetes with $12 billion spent in Texas in the same year. Conversely the cost of screening for diseases such as obesity and T2D is minimal when compared to the cost of treating the chronicity of each condition. Screening for type 2 diabetes in schools is not new in the state of Texas. Legislation related to diabetes has been in process since 1983. A logical part of prevention and control of diabetes is the implementation of a comprehensive risk assessment program for type 2 diabetes. Texas Representative Jim McReynolds (D- District 12) introduced House Bill (H.B.) 1363, relating to a risk assessment program for Type 2 diabetes and the creation of the Type 2 Diabetes Risk Assessment Program Advisory Committee. Enactment of this legislation will utilize current resources to screen Texas school children at routine intervals for elevated BMI, acanthosis nigricans, and hypertension in order to identify those at risk for the development of type 2 diabetes.

Alternatives:
1. Do Nothing (Continue current risk assessment screening activities using acanthosis nigricans as the primary indicator of type 2 diabetes):
2. Incremental Change (Launch Pilot Project of Risk Assessment with BMI as a primary indicator of type 2 diabetes):
3. Major Change (Implement Risk Assessment with BMI as primary indicator for risk of type 2 diabetes)

Recommendation:
Implementation of H.B. 1363 would provide for compliance with national recommendations by the state education agency. Thus, the potential for expansion of funding exists through federal programs. It is imperative that type 2 diabetes risk assessment expand to include BMI as the primary indicator for continued evaluation. Inclusion of BMI has the potential to identify an additional population of overweight and obese children in addition to those who are at risk for type 2 diabetes. This minor change has the potential to yield major improvement in the health of all Texans.
Appendix C

Comparison of Policy Options and Alternatives
### Policy Options

<table>
<thead>
<tr>
<th>Policy Issue: Risk</th>
<th>Option A: Continue</th>
<th>Option B: Pilot Program for</th>
<th>Option C: Implement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current Screening for</td>
<td>Acanthosis Nigricans</td>
<td>BMI Screening</td>
<td>Full Program for Type</td>
</tr>
</tbody>
</table>

#### Criteria

1. **Likelihood of Ongoing Funding**
   - Option A: +
   - Option B: +
   - Option C: ++

2. **Ability to meet current and future demands**
   - Option A: +
   - Option B: +
   - Option C: ++

3. **Political Feasibility**
   - Option A: +
   - Option B: –
   - Option C: ++

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Option A</th>
<th>Option B</th>
<th>Option C</th>
</tr>
</thead>
<tbody>
<tr>
<td>Likelihood of Ongoing Funding</td>
<td>3+</td>
<td>2+/1-</td>
<td>6+</td>
</tr>
<tr>
<td>Ability to meet current and future demands</td>
<td>3</td>
<td>1</td>
<td>6</td>
</tr>
</tbody>
</table>

Scores for Each Option:

- Option A: 3
- Option B: 1
- Option C: 6