

**Williamson County
Youth Activity, Weight and Nutrition (Y.A.W.N.) Study
2001**

Summary of Countywide Findings

Study Rationale and Design

Rates of obesity among youth and early onset of adult-onset or Type II diabetes have recently become major public health concerns, both nationwide and throughout the State of Texas. The purpose of the Y.A.W.N. study was to gather baseline data on risk of obesity among youth in Williamson County, along with limited data about nutrition and physical activity and an assessment of the physical environment of the county as it might affect physical activity and nutrition. It was hoped that statistical analysis of the relationships between eating patterns, physical activity patterns, and risk of obesity would provide a basis for developing programs designed to reduce rates of overweight and obesity among Williamson County youth and that the environmental assessment would provide an understanding of parameters within which effective programs could be designed. It is anticipated that the Y.A.W.N. study will be repeated in 2006, to determine changes in rates of overweight and obesity, related behavioral factors, and the physical environment.

Additional impetus for the Y.A.W.N. study was provided by the results obtained when the Centers for Disease Control and Prevention administered its Behavioral Risk Factor Surveillance Survey (BRFSS) in Williamson County in 1999. Survey data indicated that, among a sample of 1244 Williamson County residents age 18 and older: (1) over one-third were overweight (BMI between 25 and 30) and another one-fifth were obese (BMI greater than 30), (2) over 56% were classified as at risk due to sedentary lifestyle, and (3) fewer than one in six respondents reported eating the recommended five or more servings of fruit and vegetables the day prior to the survey. The high rates of risk associated with exercise and dietary habits among the county's adults suggested the need to research the nutritional, physical activity, and weight patterns of area youth.

The Y.A.W.N. study consisted of two complementary data gathering efforts. The Y.A.W.N. **survey** was administered to a sample of county youth. The Y.A.W.N. **environmental assessment** used existing data and interviews with community professionals to audit both the built environment and youth-oriented programming in the communities where the survey was conducted. Both are described in greater detail below, beginning with the Y.A.W.N. survey.

Y.A.W.N. Survey

The most important and reliable data collected during the Y.A.W.N. project were the data on risk of overweight. Each research subject was carefully weighed and measured following an established protocol by staff of the Williamson County and Cities Health District, assisted by Southwestern University students. A body mass index (BMI) was

calculated as follows: $BMI = (\text{weight in pounds} \div \text{height in inches} \div \text{height in inches} \times 703)$. While the Centers for Disease Control and Prevention classifies adults as not at risk (BMI less than 25), overweight (BMI between 25 and 30) or obese (BMI greater than 30), youth are classified as not at risk, at risk of becoming overweight, or overweight. BMI scores for youth are fitted to age-and-sex specific growth curves. Young people whose BMI falls between the 85th and 95th percentile for persons of their age and sex are classified as at risk of becoming overweight. Young people whose BMI is above the 95th percentile for persons of their age and sex are classified as overweight.

The research design called for the Y.A.W.N. study to be completed by all 4th grade, 8th grade, and 12th grade students in the Liberty Hill, Georgetown, and Taylor independent school districts whose parents did not object to their participation. In fact, the percentage of students included in the study varied by grade level and school district; participation rates are summarized below.

Georgetown ISD

4th: 576 of 600 students (87%)
8th: 619 of 681 students (91%)
12th: 336 of 542 students (62%)
Total participation rate: 84%

Taylor ISD

4th: 194 of 220 (88%)
8th: 178 of 225 (79%)
12th: 137 of 150 (91%)
Total participation rate: 86%

Liberty Hill ISD

4th: 53 of 132 (40%)
8th: 64 of 124 (52%)
12th: not sampled
Total participation rate: 46%

No effort was made to determine if participating students differed in significant ways from participating students. After cleaning the data, the final sample size was 2012. It should be noted that because the Georgetown ISD sub-sample is much larger than the other two, and because cases are unweighted in the analysis, results from Georgetown have a very heavy impact on the overall results. Fortunately, differences from one sub-sample to another are rarely large, so the influence of the Georgetown sub-sample on overall results should not lead to misinterpretation.

In addition to being carefully weighed and measured, research subjects were asked to complete a brief survey instrument containing fixed-response questions about nutritional

habits and physical activity and other after school behaviors. Two parallel versions of the survey – one for 4th graders and another for 8th and 12th graders – were designed to accommodate variations in the reading abilities of the subjects. Nevertheless, for a variety of reasons, answers to the survey questions are considered to be less reliable than the height and weight measures.

Key Findings

The most important finding of the Y.A.W.N. study is that there is a very high rate of risk for overweight among Williamson County youth. Approximately 16% of subjects are classified as at risk of becoming overweight, and an additional 17% are already overweight (see Table 1). These rates are much higher than those reported by the Centers for Disease Control and Prevention for youth between the ages of 6 and 19 nationwide.

Risk of overweight varies considerably by race-ethnicity. Latinos and African Americans are slightly more likely to be categorized as at risk of becoming overweight, compared to Anglos. More importantly, Hispanic and African American youth are much more likely than Anglo youth to be classified as already overweight. In fact, Hispanic youth are two and one-half times more likely to be already overweight, compared to Anglos (30% to 12%), and African Americans are twice as likely as Anglos to be already overweight (24% to 12%) (see Table 2). These findings are consistent with existing literature. It should also be noted that the literature indicates a strong association between poverty and risk of obesity. The Y.A.W.N. study contains no indicators of socio-economic status. It is likely that the racial-ethnic differences found in the study reflect at least in part socio-economic differences.

Interestingly, there is minimal variation in rates of risk by grade level. Contrary to the expectation that risk would increase by grade level, risk actually declines slightly from 4th to 8th grade, and again from 8th to 12th grade. The pattern is clearest among those classified as already overweight, which declines from 18% in 4th grade to 16% in 8th grade to 14% in 12th grade (see Table 3). This suggests that whatever factors are implicated in the onset of youth obesity begin early in childhood and need to be addressed before the 4th grade.

Girls are slightly more likely to be at risk or overweight than boys (see Table 4). (Can be elaborated after Table 4 is produced.)

There are minor variations across the school districts in risk for overweight. Liberty Hill students are least likely to be at risk, while Taylor students are most likely to be at risk, with Georgetown students falling in between (see Tables 5-8). Keep in mind that since 12th graders were not surveyed in Liberty Hill and since 12th graders show the lowest rates of risk, the difference between Liberty Hill and the other two districts may actually be slightly greater than it appears (that is, Liberty Hill's risk rate may actually be a bit lower than it appears). Still, given the differences in racial-ethnic composition, built environment (for example, easy access to fast food franchises), and behavior patterns (for example, parents commuting to work in Austin), differences in risk across the districts

are remarkably small. In fact, it is likely that differences in racial-ethnic composition of the student bodies would account for all of the variation in risk across districts.

Other Findings

Physical Activity and Sedentary Activities

Three survey items asked students about their physical activity. The first asked if they had participated on a sports team, either in or outside of school, in the past two years. The results of this item are presented in Tables 9-12. Table 9 shows that for all grade levels combined, Liberty Hill and Georgetown subjects each report 80% participation on a sports team, while in Taylor the reported rate drops to 68%. Examining Tables 10 through 12, one discovers that the pattern holds for each grade level. In 4th grade, Liberty Hill and Georgetown subjects report 80% participation, compared to Taylor's 66% (see Table 10); in 8th grade, Liberty Hill and Georgetown each show an 87% participation rate, compared to Taylor's 78% (see Table 11); in 12th grade, Georgetown's rate of 60% is higher than Taylor's 54% (see Table 12; Liberty Hill 12th graders not surveyed). Moreover, one finds a common pattern in all districts where participation is fairly high in the 4th grade, increases to its highest level in the 8th grade, and then drops in the 12th grade. This may be due to competing interests, such as part-time jobs, among the 12th graders, or it may be that 12th graders who are not elite varsity athletes no longer have a place to participate. Finally, it should be noted that, while participation in a team sport is not a strong predictor of whether an individual student will avoid risk of overweight, at an ecological level the association is in the predicted direction; that is, Taylor, which has the highest rate of risk also has the lowest rate of team sports participation.

The second item asked subjects if they had participated in any sports lessons or other organized physical activity in the past two years. The results of this item are presented in Tables 13 through 16. Table 13 shows that subjects in Georgetown are more likely to report such participation (58%) than are students in Liberty Hill (51%) or Taylor (49%). This is likely true because most such activities are commercially organized, and Georgetown, a larger community on the I-35 corridor, has more access to such opportunities. (Can discuss variations by grade level after I see Tables 14-16). Once again, while non-participation in organized physical activity does not predict well which individuals will be at risk of overweight, Taylor has the lowest rate of participation and the highest rate of risk.

A third item asked subjects how much time they spent in informal physical activity after school. Results for this item are presented in Tables 17 through 20, and follow the same pattern as for the other physical activity items. Liberty Hill and Georgetown both have 46% of subjects reporting that they engage in informal after school physical activity three or more times per week, which might be expected to confer a fitness benefit; the corresponding figure for Taylor subjects is 35%. (Can complete this section after Tables 18-20 are re-done.)

Students were also asked how much time they spent on homework and how much time they spent watching television or playing video games. Results for the homework item

are displayed in Tables 25 through 28. A clear majority of students at all grade levels and in all districts spend less than one hour per day on homework. The percentage spending more than one hour per day on homework is highest in Taylor (45%), compared to Georgetown and Liberty Hill (37%) each. Amount of time spent on homework drops between 8th and 12th grade (Tables 27 and 28). (I'll fill in the details after Tables 26-28 are re-done.)

(We should add a paragraph based on tables about TV and video, if possible, since that is a "cause" that occurs to everyone.)

Nutrition

Subjects were asked to answer a series of questions about how many servings of different foods they ate in a "typical school day." Because variation in responses to some items was limited and because answers to these questions were for the most part not correlated with risk of being overweight, only the highlights of this section of the study are presented.

The Centers for Disease Control and Prevention defines a healthy diet as one containing at least five servings of fruits and vegetables per day. Subject reports on consumption of fruit are presented in Tables 29 through 32. Table 29 shows that only 39% of subjects countywide report eating 2 or more servings of fruit per day. The percentage eating 2 or more servings per day is slightly higher in Georgetown (43%) than in Liberty Hill (40%) or Taylor (38%), but these differences seem insignificant. Tables 30 through 32 show that there is considerable change from 4th to 12th grade. Countywide, the percentage eating 2 or more servings of fruit declines from 53% among 4th graders to 40% among 8th graders to only 24% among 12th graders. The pattern is exactly the same in Georgetown (where the decline is from 56% to 41% to 26%) and in Taylor (where the decline is from 46% to 37% to 19%). In Liberty Hill, where 12th graders were not surveyed, the percentage eating 2 or more servings of fruit daily increases modestly from 39% in 4th grade to 43% in 8th grade.

A similarly disturbing pattern is observed in Tables 33 through 36, showing self-reported consumption of vegetables. The percentage of subjects countywide who report eating 2 or more servings of vegetables daily is only 32%, and rates for each district are very similar – 28% in Liberty Hill, 29% in Taylor, and 33% in Georgetown (see Table 33). Whereas fruit consumption dropped steadily from 4th to 8th to 12th grades in Georgetown and Taylor, vegetable consumption remained almost constant from 4th to 8th grade, but dropped from 8th to 12th grade (from 34% to 30% in Georgetown, and from 30% to 24% in Taylor) (see Tables 35 and 36). As with fruit consumption, vegetable consumption increased from 4th to 8th grade in Liberty Hill (see Tables 34 and 35).

Nutritionists generally agree that eating a healthy breakfast is an important component of good dietary practice. Subjects were asked whether on a school day they ate breakfast, with "sometimes" as an intermediate option between "yes" and "no." Results for this question are reported in Tables 37 through 40. Countywide, 53% of subjects reported eating breakfast regularly; there is considerable variation across districts on this item,

from 60% in Liberty Hill to 54% in Georgetown to 46% in Taylor (see Table 37). Perhaps this helps to explain why, when nutrition questions are used to help predict individual risk of being overweight, not eating breakfast regularly is the strongest predictor of risk. As with consumption of fruits and vegetables, the percentage reporting that they regularly eat breakfast declines significantly with grade level; the decline countywide is from 64% among 4th graders to 48% of 8th graders to only 37% of 12th graders (see Tables 38-40). The pattern is consistent across all three districts, and only 32% of Taylor 12th graders report eating breakfast regularly (see Table 40).

While questions on fruits, vegetables and breakfast focused on healthy eating, two other items asked subjects if they ate salty or sweet snacks. Results suggest that unhealthy snacking is ubiquitous among the youth of the county and in each district. Nearly 4 out of 5 county youth eat sweets on most days (see Table 41), and about five out of six eat salty snacks on most days (see Table 42). Because almost all youth eat these snacks, knowledge of snacking behavior does not predict who is at risk of being overweight.

Body Image

Subjects were asked a short series of questions about their perceptions of their own weight and about attempts at weight management. (I'll wait until the additional tables are produced and the existing ones are corrected before I write this section. In general, it shows that most students who are at risk know they are overweight, and many of them either have tried to diet in the past or are doing so now.)

Conclusions

The most important conclusion to be drawn from the 2002 Y.A.W.N. survey is that there is a high rate of risk for overweight among the youth of Williamson County. The risk is considerably greater than that experienced by youth nationwide. Risk is highest among Hispanic youth, slightly lower among African American youth, and lowest among Anglo youth. There are only small variations in risk from the western to central to eastern sections of the county, and these variations are almost certainly explained by the greater presence of racial-ethnic minorities in eastern Williamson County, rather than by differences in the environment. The risk is highest among 4th graders, though it declines only very slightly in the 8th and 12th grades. This suggests the need to intervene very early.

Unfortunately, knowledge of individual subjects' eating habits and physical activity patterns is not very helpful in predicting who will be at risk. This is probably due to the rather crude measures of physical activity used in the survey, and to the fact that the overwhelming majority of subjects, whether at risk or not, engage in unhealthy eating habits – few servings of fruit and vegetables, and frequent consumption of sweet and salty snacks.

When viewed at the ecological level (comparing districts) rather than the individual level, expected relationships between risk, physical activity, and eating habits do emerge. Taylor subjects, who are most likely to be at risk, also report the lowest levels of

participation in organized physical activity and informal physical activity after school. Taylor subjects also are the least likely to report eating breakfast regularly.

An interesting statistical puzzle emerges when the three major topics examined in the Y.A.W.N. survey – physical activity, nutrition, and weight – are viewed as trends from 4th to 12th grades. As mentioned previously, rates of risk for overweight are highest in 4th grade, though they decline only very slightly thereafter. Physical activity peaks in 8th grade and declines significantly among 12th graders. In general, nutrition habits become increasingly

poor as one moves from 4th to 8th to 12th grade. Given the documented changes in physical activity and nutrition habits, one would expect 12th graders to be most at risk of overweight; however, this is not the case. Given this puzzle, it might make sense to concentrate statistical analysis on the 4th graders, where risk is highest and where poor eating habits are least ubiquitous. It might also be useful to concentrate statistical analysis on the Taylor sub-sample, where risk is highest and where physical activity and eating patterns are most problematic.

Y.A.W.N. Environmental Assessment

Staff of the Williamson County and Cities Health District conducted an environmental assessment of the three communities in which research subjects were surveyed – Liberty Hill, Georgetown, and Taylor. This assessment was based on existing data sources and interviews with key individuals in each community. The purpose of the assessment was to identify each community's assets for youth age 18 and under that could be used to support physical activity and good nutrition. The categories of resources audited were: (1) schools, (2) commercial eating establishments, (3) churches, (4) day care centers, (5) recreation centers, (6) community centers, (7) parks and recreation facilities, (8) other youth programs, and (9) community government and communication. Detailed results of the assessment are reported by community in a later section of the report. Below are reported the major themes that emerge when all three community environmental assessments are considered together.

Findings

Schools

1. Extracurricular activities, including athletics, are available at no extra cost in all three districts.
2. While regular physical education and free play (recess) are common at the lower grades, high school students may satisfy their physical education requirement before reaching 11th grade.
3. With the exception of a few neighborhood schools in Georgetown, it is neither safe nor convenient for students to bicycle to school; a majority of students in all three districts ride the bus to school.
4. Each district offers a breakfast and lunch available to all students, including free or reduced price meals for eligible students.

5. Vending machines are available to middle and high school students, with healthy options included.

Food Establishments

1. The number, type and location of food establishments varies greatly among the three communities but does not seem to be a predictor of eating habits or risk of overweight.

Churches

1. Churches are among the most prominent social organizations in each of the three communities.
2. A minority of churches offer after school programs; a majority offer youth programs that meet in the evenings or on weekends and which may include indoor or outdoor physical activity.
3. Access to vending machines and unhealthy snacks is common during church youth programs.

Daycare Centers

1. There is a shortage of affordable licensed day care throughout Williamson County.
2. Not all daycare centers provide after school care for grades K-8; however, those that do provide after school care include physical activity and healthy snacks.

Recreation Centers and Parks/Recreation Facilities

1. Only Georgetown has a recreation center; it offers a variety of youth programs, including after school programs.
2. Georgetown also has more extensive parks and ball fields than the other communities; however, Georgetown's facilities are concentrated east of I-35, distant from the neighborhoods where most children live.
3. Both organized and informal physical activity take place in community parks in all three communities.

Community Centers

1. Only Georgetown has a community center, and it has two. Both offer youth programs with physical activity and healthy snacks.

Other Youth Programs

1. Multiple youth sports leagues are available in each community.
2. Youth sports leagues require fees for participation; a few offer sliding scale fees or scholarships (although this is not advertised or widely known).
3. Youth organizations such as Boy Scouts, Girl Scouts and 4-H are available in Georgetown and Taylor, but not in Liberty Hill.

Community Government and Communication

Refer to the individual community sections of the report for information on city government and for contact information on youth-oriented organizations.

Conclusions

The environmental assessment provides valuable information about the context in which programs aimed at reducing the risk of overweight among youth in the three communities can be carried out.

By and large, the risk of overweight among area youth appears not to be significantly increased by school district policies. All three school districts offer breakfast and lunch programs, require physical education for younger students, and provide extracurricular activities without additional fees. Administrators in each district met with WCCHD staff to discuss results of the Y.A.W.N. study, and all seemed interested in cooperating to address the issue. Within the schools, reducing access to vending machines, closing campuses to reduce access to fast foods for lunch, and promoting and enabling physical activity by high school students are potentially effective changes.

Anecdotal evidence suggests that it is what happens after school that is increasing risk of overweight. In many cases, it appears that when both parents commute to work outside the home, children's after school eating is unsupervised, and children are discouraged from playing outside after school because of safety concerns. Church after school programs and day care after school programs do provide physical activity and healthy snacks for some students, and these could be a basis for cooperation.

Although youth sports programs are prominent in all three communities, there is a general lack of accessible parks and recreation space, including biking and jogging trails. Moreover, it is not clear from the survey results that participating on a youth sports team results in a higher level of fitness translating to reduced risk.