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# Duval County 2009, 2011, and 2013 Fruit and Vegetable Intake by Health Zone: Data from the Youth Risk Behavior Survey

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## ABSTRACT

*The purpose of this study was to compare the results of fruit and vegetable intake data from the 2009, 2011, 2013 Duval County Youth Risk Surveys (YRBS) by health zone. The survey instrument (questionnaire) is administered using a cluster sample design in all ninth grade classes in public schools (except charter schools) every two (odd) years. The surveys are anonymous and there is parental notification. Oversampling is done to allow for sub-county analysis. There were no statistically significant differences across health zones for any of the fruit and vegetable consumption questions for year 2009 however all health zones were below the recommended level of fruit and vegetable intake. For years 2011 and 2013 despite significant statistical differences by health zone in the frequency of consumption for fruits and vegetables, all health zones had a low mean intake of fruits and vegetables for years 2009, 2011 and 2013. Most respondents indicated consuming fruits, green salad, potatoes (not fried), carrots and vegetables “1 to 3 times during the past 7 days.” Overall intake of fruits and vegetables, however, was low for all health zones.*

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## BACKGROUND

The Youth Risk Behavior Survey (YRBS) was developed in 1991 to monitor risk behaviors of adolescents and young adults. The YRBS is a component of the Youth Risk Behavior Surveillance System (YRBSS) developed by the Centers for Disease Control and Prevention (CDC). Many representatives from different organizations (including state and local departments of education and health, federal agencies, and national education and health organizations) collaborated in the development of the YRBS. The YRBSS is focused on assessing health behaviors that lead to major causes of mortality and morbidity among youth and to track how these behaviors change over time.

The YRBS monitors six categories of behavior: sexual risk behaviors; tobacco use; alcohol and substance use; safety, violence, and unintentional injury; diet, nutrition, and weight, including physical activity; and chronic conditions such as obesity and asthma (Brener et al., 2015).

The YRBS can be conducted by states, territories, and urban school districts (Foti et al., 2011). This report summarizes and compares, according to the county’s designated health zones, the results for fruit

and vegetable intake of Duval County high school students for the years 2009, 2011, and 2013.

## Duval County Health Zones

Unlike most analyses of YRBS, which focus on the state or local data, the analysis in this paper is unique in that it is based on the city’s health zones. This type of analysis provides data to support initiatives based on results specific to each health zone. Health zones are used in Duval County for sub-county analysis. Duval County includes 6 health zones that are based on zip code data related to county organization and demographics. These zones were created to “increase the statistical reliability of zip code data and for targeted program planning, and surveillance of health indicators” (Duval.floridahealth.gov, 2015). The six health zones were created from 35 zip codes with similar economic, educational, geographic, political, and social boundaries.

The health behaviors, prevalence of chronic diseases and mortality rates vary among different health zones. Although cancer, CHD and COPD are the major cause of death in Duval County, Health Zone 1, which represents the urban core, has the shortest life expectancy. Other areas have high rates of illnesses.

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For example, Health Zone 6 needs to address mental health and injuries; Health Zone 4, cancer and teen pregnancy; and Health Zone 3, a low level of condom use for those youth engaging in sex (Florida Department of Health, Duval County).

### **Adolescent Overweight and Obesity**

Childhood obesity is a major public health concern. Over the past several decades the prevalence of childhood obesity in the United States has increased dramatically, with nearly 32% of children ages 2-19 being categorized as such. Accordingly, there has been an increased occurrence in the childhood diagnosis of chronic disorders associated with obesity: type II diabetes mellitus, hypertension, and hyperlipidemia. Over time these children are more likely to grow into obese adults and experience further medical complications related to weight. From a public health perspective these statistics are a significant burden for children, families, and communities at large.

Dietary patterns and particularly consumption of fruits and vegetables are important factors in prevention of cancer, heart disease, childhood and adult diabetes and obesity, and are essential for good overall health. The role of consumption of vegetables and fruits in prevention of obesity is not limited to total calorie intake. Higher consumption of fruits and vegetables increases fiber intake and decreases the consumption of high calorie dense foods and snacks. The guideline published by the CDC (2011) to establish strategies to promote consumption of fruits and vegetables increased the presence of, and access to, fruits and vegetables in workplaces and schools. However, it does not address homes and families as sites of change.

Although nationally the prevalence of overweight and obesity (a body mass index or BMI at or above the 95th percentile of the sex-specific CDC BMI-for-age growth charts) has decreased in children 2- 5 years of age, it has not changed for older children and continues to be high overall, especially among Hispanic and non-Hispanic black youth. Nationally the prevalence of obesity among persons 2-19 years of age is approximately 17%, about 12.7 million children and adolescents (CDC.gov – Obesity and Overweight for Professionals: Childhood: Data). In comparison, approximately 29% of Duval County high school students consider themselves overweight or obese (Duval.floridahealth.gov, 2015). For Duval County, the prevalence of childhood obesity, which is one of the major risk factors for many chronic diseases including diabetes mellitus, cardiovascular disease (CVD) and certain types of cancers, varies among health zones.

An inconsistency in the level of education and poverty may help explain the current health zones' variation in prevalence of obesity and chronic diseases. For example, the death rate was higher in health zones with a higher rate of poverty. The rate of poverty was significantly higher in blacks (27.2%) than whites (11.2%) and Hispanics (18.6%) and the rates were highest in Health Zone 1 (29.6) compared to Health Zone 3 (9.5%). Although the rate of poverty for the county (25.5%) is similar to the state's (25.1%), the percent of children in Health Zone 1 is 43%. Many of these diseases are associated with obesity, poor nutrition, lack of physical activity and sedentary lifestyle. Poor nutrition consists of consumption of high calorie dense foods and beverages and low consumption of fruits and vegetables (Geller, et al., 2009).

The purpose of this study was to analyze Youth Risk Behavior Survey data regarding fruit and vegetable consumption in Duval County high school adolescents by health zones.

### **Literature Review**

**YRBS.** Several studies related to YRBS data have been published. Zullig et al. (2006) looked at weight perceptions, dieting behavior, and eating breakfast with a sample size of 4597 public high school students from the YRBS (Zullig et al., 2006). An earlier study examined the associations between fruit and vegetable intake and common weight management behaviors and concluded that only 21.3% of females and 24.7% of males ate sufficient fruits and vegetables. The authors concluded that promoting fruit and vegetable intake as part of weight management may be more effective if they are part of nutrition and physical activity strategies (Foti et al., 2011).

**Dietary behaviors.** Longitudinal and cross-sectional data that show the reduction in fruit and vegetable consumption of children ages 0-17 (Geller et al., 2009). Inadequate fruit and vegetable consumption is correlated to a calorie-dense diet.

### **METHODS**

The YRBS is a school-based and self-administered survey implemented every two years, in odd years, to monitor specific health indicators for middle and high school students. For this paper the dietary habit data collected during 2009, 2011 and 2013 YRBS from a representative sample of high school students (9th-12th grades) in Duval County, Florida were analyzed. Parental notification was utilized and the surveys were anonymous and confidential. Oversampling was done in the Duval County Public Schools to allow for sub-county analysis. Weighting was performed by CDC at

the county level and by the Florida Department of Health in Duval County at the health zone level based on CDC guidelines for weighting.

### Sampling

The YRBS used a two-stage, cluster design for a representative sample. For Duval County, all 21 public high schools (100%) participated, which allowed attainment of weighted data (charter schools were excluded). Intact 2nd-period classes were then randomly selected from the schools. All students in the selected classes were eligible to take the survey. Institutional Review Board approvals were obtained for student assent and passive parental permission (a letter sent to parents/guardians informing them of the study, its potential risks, and information on the method used to obtain student permission). Students completed the voluntary and self-administered survey on optical scan sheets during one class period.

### Survey Instrument

The survey instrument (questionnaire) “which is a cluster sample design with the unit of measurement as the classroom” has been tested twice (1992, 2000) for reliability by the CDC. Although the instrument has not been tested for validity of the self-reported behaviors, the CDC has determined that although the behaviors are affected by cognitive and situational factors, individually, they do not threaten the validity of the self-reported data (Brenner et al., 2015). The students completed a self-administered, anonymous, 54-item questionnaire but only the questions related to diet, nutrition, and weight are analyzed here.

Fruit and vegetable consumptions were measured during the past seven days using 5 questions: *During the past 7 days, how many times did you eat: (1) fruit? (2) green salad? (3) potatoes? (4) carrots? and (5) other vegetables?* Response choices for all questions used a 7-point scale from (1) “I did not eat (*specific fruit or vegetable*) during the past 7 days,” (2) “1-3 times during the past 7 days,” (3) “4 to 6 times during the past 7 days,” (4) “1 time per day,” (5) “2 times per day,” (6) “3 times per day,” and (7) “4 or more times per day.”

Weight status, attitude and weight management behaviors were measured using 7 questions: (1) How do you describe your weight? (2) What are you trying to do about weight? and, During the past 30 days, did you: (3) fast to lose weight? (4) take pills to lose weight? (5) exercise to lose weight? (6) eat less to lose weight? and/or (7) vomit to lose weight?

Response choices for question 1 used a 5-point scale from (1) “very underweight” to (5) “very overweight” with (3) as “about the right weight.” Response choices

for question two used a 4-point scale from (1) “lose weight,” (2) “gain weight,” (3) “stay the same” to (4) “not trying to do anything.” Responses for questions 3-7 were (1) “yes” and (2) “no.”

### RESULTS

For 2009, 2011, and 2013 the samples consisted of 21 high schools in the Duval County School District in Florida for a school response rate of 100%. This is over the CDC required 60% response rates for weighting. Surveys yielded a representative sample based on age, grade, sex, and race/ethnicity. Students reported which zip code group (health zone) they lived in most of the time. Because many students did not attend school at their neighborhood school, information on where a student lives cannot be assumed to represent school location.

#### In 2009

The 2009 Youth Risk Behavior Survey (YRBS-M) was completed by 2513 students in 21 public high schools in Duval County, Florida during the spring of 2009. The school response rate was 100% and student response rate was 76%. The weighted demographic characteristics of the sample are as follows: female 50.9%, male 49.1%, black 44.5%, Hispanic/ Latino 6.7%, white 41.9%, all other races 4.5%, and multiple races 2.5%.

#### In 2011

The 2011 Youth Risk Behavior Survey (YRBS-M) was completed by 3336 students in 21 public high schools in Duval County, Florida during the spring of 2011. The school rate was 100% and student response rate was 71%. The weighted demographic characteristics of the sample are as follows: female 50.2%, male 49.8%, black 46.1%, Hispanic/ Latino 7.5%, white 41.1%, all other races 1.5%, and multiple races 2.0%.

#### In 2013

The 2013 Youth Risk Behavior Survey (YRBS-M) was completed by 3558 students in 21 public high schools in Duval County, Florida during the spring of 2013. The school rate was 100% and student response rate was 77%. The weighted demographic characteristics of the sample are as follows: female 51.5%, male 48.5%, black 43.8%, Hispanic/ Latino 8.6%, white 39.1%, all other races 4.9%, and multiple races 3.6%.

### Fruit and Vegetable Consumption Questions

The questions analyzed and compared by health zone for years 2009, 2011 and 2013 were:

- During the past 7 days, how many times did you eat fruit?
- During the past 7 days, how many times did you eat green salad?
- During the past 7 days, how many times did you eat potatoes?
- During the past 7 days, how many times did you eat other vegetables?

### 2009 Health Zone Data Comparison

In 2009, there were no significant differences by health zone for most of the questions. In terms of frequency of fruit consumption (“Ate fruit in the past 7 days”) the range was 2.63-2.82. In terms of frequency of green salad consumption (“Ate green salad in the past 7 days”) the range was 1.87 – 2.04. For frequency of potato consumption (“Ate potato in the past 7 days”) the range was 2.01 – 2.08. For frequency of carrot consumption (“Ate carrots in the past 7 days”) the range was 1.60 – 1.74. For overall vegetable consumption (“Ate vegetables in the past 7 days”) the range was 2.53-2.71.

### 2011 Health Zone Data Comparison

For 2011, in terms of frequency of fruit consumption (“Ate fruit in the past 7 days”) HZ1 (2.64) and HZ5 (2.69) differ significantly from HZ2 (2.88). For frequency of green salad consumption (“Ate green salad in the past 7 days”) there was a significant difference between HZ1 (1.85) and HZ3 (2.11). In terms of potatoes, there was a significant difference between HZ4 (1.90) and HZ6 (2.12).

For frequency of carrot consumption (“Ate carrots in the past 7 days”) there were some significant differences among several health zones, particularly HZ1 (1.47), which differed from HZ2 (1.68), HZ3 (1.65), and HZ6 (1.79). There were also significant differences between HZ5 (1.53) and HZ2 (1.68) and HZ6 (1.79). HZ6 (1.79) also differed significantly from HZ4 (1.57).

For overall vegetable consumption (“Ate vegetables in the past 7 days”) HZ1 (2.38) differed significantly from all other health zones, which were HZ2 (2.67), HZ3 (2.81), HZ4 (2.62), HZ5 (2.61), and HZ6 (2.71). HZ3 (2.81) also differed significantly from HZ5 (2.61).

### 2013 Health Zone Data Comparison

In terms of frequency of fruit consumption (“Ate fruit in the past 7 days”) HZ1 (2.66) differed significantly from HZ2 (2.89), HZ3 (3.14), and HZ6 (3.06). HZ5 (2.60) differed significantly from HZ2

(2.89), HZ3 (3.14), and HZ6 (3.06). HZ2 (2.89) differed significantly from HZ3 (3.14) and HZ5 (2.60). HZ3 (3.14) differed significantly from HZ4 (2.84) and HZ5 (2.60). HZ4 (2.84) differed significantly from HZ5 (2.60) and HZ6 (3.06). HZ5 (2.60) also differed significantly from HZ6 (3.06).

For frequency of green salad consumption (“Ate green salad in the past 7 days”) HZ1 (1.62) differed significantly from HZ2 (1.90), HZ3 (1.98), and HZ6 (2.04). HZ2 (1.90), differed significantly from HZ4 (1.75), HZ5 (1.73), and HZ6 (2.04). HZ3 (1.98) differed significantly from HZ4 (1.75), and HZ5 (1.73) and HZ6 (2.04) differed significantly from HZ4 (1.75), and HZ5 (1.73).

There were no significant differences in potato consumption with means ranging from 1.87 to 1.99. For frequency of carrot consumption (“Ate carrots in the past 7 days”) the most significant differences were for HZ5 (1.49) and HZ2 (1.64), HZ3 (1.72), HZ4 (1.66), and HZ6 (1.70). HZ1 (1.52) also differed significantly from HZ3 (1.72), and HZ6 (1.70).

For overall vegetable consumption (“Ate vegetables in the past 7 days”) HZ1 (2.38) differed significantly from HZ2 (2.67), HZ3 (2.83), and HZ6 (2.72). HZ2 (2.67) differed significantly from HZ4 (2.51) and HZ5 (2.46). HZ3 (2.83) differed significantly from HZ2 (2.67) HZ4 (2.51) and HZ5 (2.46). HZ6 (2.72) differed significantly from HZ4 (2.51) and HZ5 (2.46).

The 2013 data indicates that Health Zone 1 had the most significant differences from other health zones.

## DISCUSSION

By weighting each questionnaire with the likelihood of sampling each student, bias is reduced by compensating for differing patterns of nonresponse. This weighting indicates that the survey is representative of the entire county’s high school students and using weighted results can be used to make inferences about the health risk behaviors of public high school students in this county.

Although there were some statistical differences by year and health zone, the data indicated that overall intake of fruits and vegetables by teenagers is below the recommended amounts for all health zones in the county. The general range of response indicated that consumption was within the “1 to 3 times during the past seven days” but the United States’ Department of Agriculture recommends two cups of fruit and three cups of vegetables daily (Choosemyplate.gov, 2015). This is also less than the 2010 mean consumption of 1.2 times per day for fruits and vegetables reported in 2010 and aligned with the quadratic decreasing trend

**Table 1**  
2009 Duval County Youth Risk Behavior Survey

Question	HZ1	HZ2	HZ3	HZ 4	HZ 5	HZ 6	All HZs	p value
Ate fruit in the past 7 days	2.64±1.54 N = 568	2.82±1.64 N = 542	2.80±1.56 N = 362	2.63±1.49 N = 471	2.70±1.56 N = 247	2.74±1.62 N = 145	2.72±1.57 N = 2335	0.30
Ate green salad in the past 7 days	2.01±1.22 N = 568	1.97±1.22 N = 542	2.03±1.23 N = 362	1.87±1.06 N = 471	1.87±1.13 N = 247	2.04±1.39 N = 145	1.96±1.19 N = 2335	0.23
Ate potatoes in past 7 days	2.03±1.16 N = 568	2.04±1.18 N = 542	2.04±1.22 N = 362	2.01±1.07 N = 471	2.08±1.17 N = 247	2.03±1.21 N=145	2.03±1.16 N = 2335	0.99
Ate carrots in past 7 days	1.63±1.05 N = 568	1.61±.95 N = 542	1.67±1.09 N = 362	1.60±0.98 N = 471	1.62±1.00 N = 247	1.74±1.23 N = 145	1.63±1.03 N = 2335	0.72
Ate vegetables in past 7 days	2.59±1.36 N = 568	2.65±1.39 N = 542	2.68±1.46 N = 362	2.53±1.28 N = 471	2.69±1.38 N = 247	2.71±1.40 N = 145	2.62±1.37 N = 2335	0.49

**Table 2**  
2011 Duval County Youth Risk Behavior Survey

Question	HZ 1	HZ2	HZ3	HZ4	HZ5	HZ6	All HZs	p value
Ate fruit in the past 7 days	2.64±1.77 N = 368	2.88±1.58 N = 743	2.85±1.50 N = 402	2.72±1.61 N = 473	2.69±1.55 N = 423	2.89±1.65 N = 225	2.78±1.60 N = 2634	.08
Ate green salad in the past 7 days	1.85±1.30 N = 368	1.95±1.16 N = 743	2.11±1.22 N = 402	1.92±1.23 N = 473	1.87±1.18 N = 423	2.03±1.32 N = 225	1.95±1.22 N = 2634	.03
Ate potatoes in past 7 days	2.02±1.35 N = 368	2.01±1.18 N = 743	1.98±1.10 N = 402	1.90±1.15 N = 743	1.96±1.16 N = 423	2.12±1.42 N = 225	1.99±1.21 N = 2634	.31
Ate carrots in past 7 days	1.47±0.95 N = 368	1.68±1.04 N = 743	1.65±0.99 N = 402	1.57±1.06 N = 473	1.53±0.89 N = 423	1.79±1.25 N = 225	1.61±1.02 N = 2634	.001
Ate vegetables in past 7 days	2.38±1.30 N = 368	2.67±1.41 N = 743	2.81±1.37 N = 402	2.62±1.43 N = 473	2.61±1.34 N = 423	2.71±1.45 N = 225	2.64±1.39 N = 2634	.001

**Table 3**  
2013 All Years by Health Zone

Question	HZ1	HZ2	HZ3	HZ4	HZ5	HZ6	All HZs	p value
Ate fruit in the past 7 days	2.66±1.57 N = 320	2.89±1.61 N = 818	3.14±1.71 N = 447	2.84±1.65 N = 449	2.60±1.47 N = 434	3.06±1.52 N = 382	2.87±1.60 N = 2850	<.001
Ate green salad in the past 7 days	1.62±1.05 N = 320	1.90±1.14 N = 818	1.98±1.13 N = 447	1.75±1.05 N = 449	1.73±0.98 N = 434	2.04±1.14 N = 382	1.85±1.10 N = 2850	<.001
Ate potatoes in the past 7 days	1.89±1.06 N = 320	1.88±1.04 N = 818	1.89±1.02 N = 447	1.99±1.19 N = 449	1.87±0.98 N = 434	1.87±0.89 N = 382	1.90±1.04 N = 2850	.517
Ate carrots in the past 7 days	1.52±1.09 N = 320	1.64±1.00 N = 818	1.72±1.05 N = 447	1.66±1.17 N = 449	1.49±0.94 N = 434	1.70±0.94 N = 382	1.63±1.03 N = 2850	<.003
Ate vegetables in the past 7 days	2.38±1.33 N = 320	2.67±1.40 N = 818	2.83±1.49 N = 447	2.51±1.43 N = 449	2.46±1.27 N = 434	2.72±1.35 N = 382	2.61±1.39 N = 2850	<.001

of fruit juice consumption identified in the 2013 national YRBS analysis (Kann et al., 2014).

The goal of this study was to offer a detailed account of high school students' diet, nutrition, weight loss and physical activity behaviors based on a city's health zones. Duval County's Department of Public Health is unique in that it has developed these health zones based on the city's zip codes and the county's demographics and organization. This facilitates community based planning and more effective reach of target populations with specific needs. Other studies that have used the YRBS data, on the other hand, analyzed state and local results. To our knowledge, this is the only study that has examined data of a city in this way, which can add to the literature and be a model for other cities to take a similar approach.

The data indicated that irrespective of the health zones, high school students' overall intake of fruits and vegetables was below the daily recommended amounts. However, Health Zone 1 appears to need greater emphasis on overall vegetable and fruit consumption. However, the differences across health zones seemed to decrease over the 2009 - 2013 year period and the overall means indicate that all respondents from all health zones had low intake of fruits and vegetables. What is evident is that although their behaviors might be similar to those of their peers in other zones, Health Zone 1 has the greatest risk of high blood pressure, diabetes, heart attacks, and has the shortest life expectancy than the other zones in Duval County. Therefore, the need for urgency in changing students' perceptions and behaviors is great because these youth are facing a future that is dire given the current health statistics. As teenagers transition to adult roles, in just a few years, these same citizens will be more than likely responsible for their own eating and healthy habits. Coincidentally, with Health Zone 1 also having the highest teenage pregnancy rate, these young parents would then be responsible for their own children's physical health. It is critical at this point to change behaviors in order to avoid perpetuating the risks of continuous unhealthy practices. Heightening their awareness now of the relationship between their current behavior and long-term consequences can possibly help minimize their future health risks.

### **Implications for Health Education through Public Health and Community Initiatives**

When considering the future for youth living in Health Zone 1, it is daunting, and the challenges may seem to be insurmountable by comparison to other communities in the county. Knowing the issues related

to health, diversity, education, income, and employment, innovative and well-established community initiatives must be ongoing, ever-present and accessible to residents throughout this area (Martens et al., 2014).

### **Implications for Health Education through the Public Schools**

In terms of application to education, Health Zone 1 appears to need greater emphasis on overall vegetable consumption, especially for salad and carrots. The practical implications of these results warrant health and educator professionals to examine how to support students (teachers and parents) in becoming more aware in identifying healthy food choices and appropriate weight management options. Over time, children who do not practice healthy habits are more likely to grow into obese adults and could experience medical complications related to weight. From a public health perspective these statistics are a significant burden for children, families, and communities at large.

It is important to note in this analysis that students report their home zip codes and not the zip code of the school in which they attend in the county. Therefore, the implications include a district-wide emphasis, because it is likely that students could attend schools anywhere in the district, regardless of where they reside most of the time. A more systematic approach needs to be emphasized by the school district so that all children regardless of where they live will be more cognizant of the dietary habits that lead to chronic illness or health.

The CDC identified six approaches to improving student nutrition (CDC.gov – Six Approaches to Improving Student Nutrition). Those approaches include: establishing nutrition standards for competitive food; influencing food and beverage contracts; making more healthy foods and beverages available; adopting marketing techniques; limiting access to competitive foods; and using fundraising activities. Aligned with these approaches, are suggestions of ways Duval County Schools could adopt them. Examples are provided of school approaches being addressed across the nation.

Nutrition policies are most effective when they are tailored to the specific needs of a school, district, or state. Student involvement is critical to gaining students' attention and participation in any school initiative. Teachers and health care professionals can involve students by including them in the planning and identifying of foods that meet nutrition criteria, tasting

**Table 4**  
**CDC's Six Approaches to Improving Student Nutrition**

CDC's Six Approaches	Suggestions	National Examples
Establish Nutrition Standards for Competitive Foods	Adopt and implement a schoolwide nutrition plan for students; Develop and maintain positive relationships with local vendors, with an agreement to purchase nutritious beverages and snacks only; Promote healthy practices to lose weight by displaying nutritional value food charts and signage in the school cafeteria and around the school.	<a href="http://www.cdc.gov/healthyouth/mih/stories/richland_one.htm">http://www.cdc.gov/healthyouth/mih/stories/richland_one.htm</a>  <a href="http://www.cdc.gov/healthyouth/mih/stories/bozeman.htm">http://www.cdc.gov/healthyouth/mih/stories/bozeman.htm</a>
Influence Food and Beverage Contracts	Challenge staff and students to find creative ways to fundraise without selling candy bars and other non-nutritive foods.	<a href="http://www.cdc.gov/healthyouth/mih/stories/fairfax.htm">http://www.cdc.gov/healthyouth/mih/stories/fairfax.htm</a>  <a href="http://www.cdc.gov/healthyouth/mih/stories/richland_one.htm">http://www.cdc.gov/healthyouth/mih/stories/richland_one.htm</a>
Make More Healthy Foods and Beverages Available	Initiate a Nutrition Fair that includes educational and wellness booths, nutrition guidelines, and healthy food choices Include cafeteria food options that are low in sodium and fats.	<a href="http://www.cdc.gov/healthyouth/mih/stories/mercedes.htm">http://www.cdc.gov/healthyouth/mih/stories/mercedes.htm</a>
Adopt Marketing Techniques	Have students create flyers, school-wide PA announcements, school newspaper articles and ads, banners, and commercials to market the healthy food products sold in their vending machines; Use technology and social media to promote health awareness initiatives so the messages are controlled and supportive of school/district wellness activities; Use school TV monitors to air infomercials and signs that highlight health, movement, and a balanced lifestyle.	<a href="http://www.cdc.gov/healthyouth/mih/stories/midwest_dairy.htm">http://www.cdc.gov/healthyouth/mih/stories/midwest_dairy.htm</a>  <a href="http://www.cdc.gov/healthyouth/mih/stories/waiakea.htm">http://www.cdc.gov/healthyouth/mih/stories/waiakea.htm</a>
Limit Student Access to Competitive Foods	Review the nutritional value of foods in vending machines, snack bars, and school stores and eliminate those foods with minimal or no value; Limit the number of vending machines on school campuses; Adopt an all-school classroom snack policy of "fruits or vegetables" only.	<a href="http://www.cdc.gov/healthyouth/mih/stories/fairfax.htm">http://www.cdc.gov/healthyouth/mih/stories/fairfax.htm</a> ;  <a href="http://www.cdc.gov/healthyouth/mih/stories/cortland.htm">http://www.cdc.gov/healthyouth/mih/stories/cortland.htm</a>
Use Fundraising Activities and Rewards that Support Student Health	Institute a "Healthy Choice" Award where students document their health related experiences and community activities for school recognition; Design programs that connect school pride and student athletes; Target selected times during the day to simply "move" – promoting and encouraging movement.	<a href="http://www.cdc.gov/healthyouth/mih/stories/school_union106.htm">http://www.cdc.gov/healthyouth/mih/stories/school_union106.htm</a>  <a href="http://www.cdc.gov/healthyouth/mih/stories/old_orchard_beach.htm">http://www.cdc.gov/healthyouth/mih/stories/old_orchard_beach.htm</a>

potential foods and beverage items, and by getting their feedback about the process. Although, not much evidence-based literature is available, there are many attempts nation-wide that do address community and school initiatives that address healthy eating and fitness. Neither Florida, nor Jacksonville (Duval County) as of 2013, participated in reporting any success stories to the Center for Disease Control and Prevention Making it Happen initiative. Moreover, tracking change by health zone enables policy and action change at the community level and to target specific populations where interventions may be needed.

## REFERENCES

Brener, N., Kann, L., Shanklin, S., et al. Methodology of the Youth Risk Behavior Surveillance System – 2013. 2015. Available at: <http://www.cdc.gov/mmwr/preview/mmwrhtml/rr6201a1.htm>. Accessed March 6, 2015.

CDC.gov. Obesity and Overweight for Professionals: Childhood: Data | DNPAO | CDC. Childhood Obesity Facts. Available at: <http://www.cdc.gov/obesity/data/childhood.html>. Accessed January 5, 2016.

CDC.gov. Six Approaches to Improving Student Nutrition. Available at <http://www.cdc.gov/healthyschools/mih/approaches.htm>. 2015. Accessed January 5, 2016.

Choosemyplate.gov Available at: <http://www.choosemyplate.gov/food-groups/vegetables-amount.pdf>. 2015. Accessed January 5, 2016

Duval.floridahealth.gov. Youth Risk Behavior Survey | Florida Department of Health in Duval. 2015. Available at: <http://duval.floridahealth.gov/programs-and-services/community-health-planning-and-statistics/youth-risk-behavior-survey/index.html>. Accessed April 1, 2015.

Duval.floridahealth.gov. Community Health Planning and Statistics | Florida Department of Health in Duval. 2015. Available at: <http://duval.floridahealth.gov/programs-and-services/community-health-planning-and-statistics/index.html>. Accessed April 1, 2015.

Florida Department of Health Duval County, Public Health Statistics, Assessment and Research. *Health: Place Matters*. 2013. Available at: <http://duval.floridahealth.gov/programs-and-services/community-health-planning-and-statistics/place-matters/documents/place-matters-final-dec2014.pdf>. Accessed April 9, 2016.

Foti, K., Balaji, A., & Shanklin, S. (2011). Uses of Youth Risk Behavior Survey and School Health

Profiles data: Applications for improving adolescent and school health. *Journal of School Health*, 81(6), 345-354.

Geller, K., & Dzewaltowski, D. (2009). Longitudinal and cross-sectional influences on youth fruit and vegetable consumption. *Nutrition Reviews*. 2009; 67(2), 65-76.

Kann, L., Kinchen, S., Shanklin, S.L., Flint, K.H., Hawkins, J., Harris, W.A., et al. (2014). Youth Risk Behavior Surveillance — United States, 2013. *MMWR Surveillance Summaries*, 63(4), 1-170.

Martens, P., Chateau, D., Burland, E. et al. (2014). The effect of neighborhood socioeconomic status on education and health outcomes for children living in social housing. *American Journal of Public Health*, 104(11), 2103-2113.

Kim, S.A., Grimm, K.A, Harris, D.M., Scanlon, K.S, & Demissie, Z. (2011). Fruit and vegetable consumption among high school students — United States, 2010. *Morbidity & Mortality Weekly Report*, 60(46), 1583-1586.

Zullig, K., Ubbes, V., Pyle, J., & Valois, R. (2006). Self-reported weight perceptions, dieting behavior, and breakfast eating among high school adolescents. *Journal of School Health*. 76(3), 87-92.

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