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Prevalence of Obesity Among Head Start Preschoolers in Western Ohio

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Abstract

Objective: The intent of this study was to examine low income Head Start overweight and obese preschoolers, ages 3-5, in 8 western Ohio counties. Variables of interest included: obesity status, rural versus metropolitan location, home versus center-based Head Start, and access to physicians.

Methods: Data was collected retrospectively from the host Head Start site located in Piqua, Ohio. All Head Start enrolled preschoolers (N=1,181) ages 3 to 5 within the 8 western Ohio counties and 43 programs were studied. All children were considered of low income based on their acceptance into the Head Start program.

The data was retrieved from an internal software program that housed all self-reported Head Start enrollment information. Data retrieved from the software included, age, height, weight, body mass index, gender, and home versus center-based care. Classifications on metropolitan versus rural counties were retrieved from the Office of Management and Budget. Access to physicians referred to the Ohio Department of Health's socioeconomic profiles identifying the number of physicians per 10,000 by county. Descriptive data analysis was conducted using Excel[®], and statistical analysis was conducted using SAS[®].

Results: Total subjects were 1,181 within 43 Head Start programs in 8 western Ohio counties. Rural locations accounted for 674 subjects within 6 counties, and metropolitan locations accounted for 507 subjects within 2 counties. The prevalence of Head Start preschool obesity (<95th percentile) varied by county from 14.8% in metropolitan Greene County to 21.1% in rural Darke County. Data on metropolitan versus rural location was highly statically significant, $p < .0001$. Head Start preschoolers from rural locations are 2.18 times more likely to be overweight or obese. There was no significant outcome when comparing the prevalence of Head Start preschool obesity to home versus center-based programs, gender or access to physicians.

Conclusion: Head Start preschoolers attending a rural location program are at high risk of becoming overweight or obese. A major limitation to this study is the unknown home environment. The average child spend 2.5 hours at the Head Start center for 4 days a week suggesting that an imbalance of calories in versus calories out may be likely related to the rural home environments rather than the standardized Head Start programs.

Introduction

National statistics show the prevalence of obesity among preschool children ages two through five has almost tripled in less than 30 years (The Centers for Disease Control [CDC], 2009). Untreated childhood obesity is an untreated medical condition that can cause medical and psychological damage. If childhood obesity develops into adult obesity, everyone may incur direct or indirect costs. The CDC reported that in 1998 the United States (US) spent \$51.5 to \$78.5 billion in medical bills related to overweight and obesity (CDC, 2009). The Ohio Department of Health reports Ohio spends \$289 per person, per year on medical cost related to obesity, the 11th highest in the nation ("Ohio Obesity Fact Sheet", n.d.).

Childhood obesity can be defined as having a weight beyond a healthy level for his or her age with respect to height and gender. Body Mass Index (BMI) is calculated by measuring the height and weight, and those measurements are put into the formula to produce the BMI, which is converted to a percentile based on age and gender. Current CDC standards of BMI percentile classification for overweight and obese children are: 85-94th percentile is overweight and greater than or equal to the 95th percentile is obese (CDC, 2009). In the past, some defined BMI differently for children by indicating BMI percentiles at 85-94 as at risk for overweight, and those with BMI percentiles >95 as overweight rather than obese. For this paper, current CDC definitions are used and the terms overweight and obese refer to anything greater than or equal to the 85th percentile, unless otherwise noted (See Table 1).

Table 1: CDC Classification for BMI percentiles for children 2-19 years of age

Title	Classification Criteria
Underweight	<5 th percentile
Healthy Weight	5 th -84 th percentile
Overweight	85 th -94 th percentile
Obese	Greater than or equal to 95 th percentile

Source: cdc.gov/healthyweight

Childhood obesity in rural locations may be more difficult to identify and treat due to large service areas with limited access to healthcare. As of 2010, the United States Department of Agriculture (USDA) identifies 17% of its population as rural ("Fact Sheet", 2011). In Ohio, a larger population (19%) lives in rural locations ("Fact Sheet", 2011). Based on assumption and using US Census 2000 (www.census.gov) an estimated 116,000 rural preschoolers may have limited access to physician driven messages on weight control.

Treatment of childhood obesity is especially challenging with limited access to primary care. The US Health Resources Service Administration identified 113 Ohio areas as medically underserved. Although most underserved areas appeared to be sections of cities the data also revealed seven rural Ohio counties and two metro Ohio counties as having severe shortages in primary care (datawarehouse.hrsa.gov).

Head Start (HS) is a national early childhood education program serving preschoolers of low socioeconomic status (SES) in rural and metropolitan locations. Head Start aims at promoting school readiness by offering education, health, nutrition and social services to children and their families. Obesity risk factors including SES, home environment, community, work, and genetics (CDC, 2009) are routinely found among HS

preschoolers. Since HS services many high risk preschoolers, understanding preschooler obesity among this population can be insightful.

In April 2009, a study revealed 18.4% of US children 4-years-old were obese, a rate higher than all other previous studies (Anderson & Whitaker, 2009), yet HS preschoolers are said to have almost double (32%) obesity prevalence (Hernandez, Uphold, Graham, & Singer, 1998). By 2009, two studies on the prevalence of obesity among Head Start preschoolers confirmed that over 33% of the children were overweight or obese (Hudson, Cherry, Ratcliffe, & McClellan, 2009; Harbaugh, Bounds, Kolbo, Molaison, & Zhang, 2009).

Statement of Purpose

The purpose of this project is to study the obesity prevalence among preschoolers of low SES enrolled in western Ohio's HS programs. Results will provide insight on the prevalence of preschool obesity within the home and child care environments throughout rural and metropolitan western Ohio. This study will also enhance the limited research available on the prevalence of obesity among low SES, Head Start preschoolers.

Literature Review

Obesity Prevalence and Demographics

Data from the National Health and Nutrition Examination Surveys (NHANES) indicates that childhood obesity rates have tripled among all age groups (2-19) within the last 30 years (CDC, 2009). Comparing 1976 to 2008 NHANES data on preschoolers ages two through five suggests recent improvements in preschool obesity from 5% in 1976 to 13.9% by 2004 and back to 10.4% by 2008. The 2003 to 2008 *Pediatric Nutrition Surveillance* data on predominately low income children participating in public health assistance programs also suggests that the prevalence of preschool obesity among 2- to 5-year-olds has stabilized at approximately 14.7-14.9%; (US Department of Health and Human Services, CDCP [HHS, CDC], 2009; see Figure 1). A review of seven HS studies revealed that preschool children attending HS programs experience higher than normal obesity prevalence at rates 9.6% to 38.5%, regardless of gender (see Table 2).

Figure 1: Ten year glance at the obesity prevalence among preschoolers, 24-59 months of age

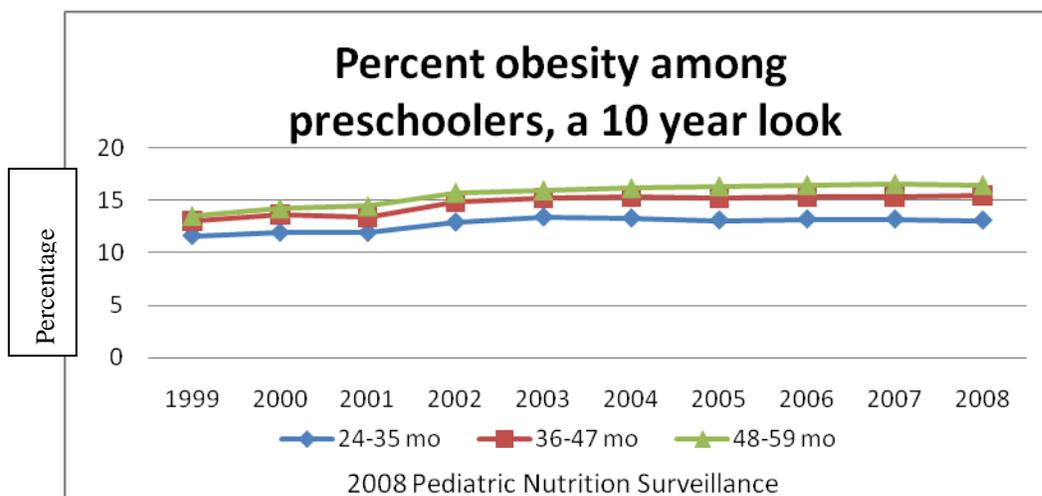


Table 2: Review of obesity prevalence among Head Start studies by author, title and year published

Primary Author	Title	Year Published	State	Outcomes
Wiecha	Among Head Start Children in Massachusetts	1994	Massachusetts	4 Studies from 1998-1991 showed prevalence of overweight (>95 th percentile) 9.6%-13.3%
Derrickson	Heights and weights of Head Start preschool children in Hawaii	1997	Hawaii	12% of the total sample were classified as obese (>95 th percentile), overweight was not looked at.
Hernandez	Prevalence and Correlates of Obesity in Preschool Children	1998	Florida	32% of total sample from North central Florida Head Start program were obese (>90 th percentile)
Williams	Body Size and Cardiovascular Risk Factors in a Preschool Population	2004	New York	Of the total population 16.8% were classified as overweight (84-95 th %) and 15.1% were classified as obese (>95 th percentile)
Hu	Childhood Obesity Among Head Start Enrollees in Southeastern Minnesota: Prevalence and Risk Factors	2007	Minnesota	The prevalence of obesity and overweight from 1998 to 2001 was 12.9% and 12.2% respectively. Data suggests lower prevalence of overweight in rural areas.
Hudson	Head Start Children's Lifestyle Behaviors, Parental Perception of Weight, and Body Mass Index	2009	Northern Alabama	One third of the children were obese or overweight
Harbaugh	Prevalence Estimates of Overweight	2009	Mississippi	38.5% of total sample was overweight or obese

The risk of developing obesity is higher among Hispanic and non-Hispanic black preschoolers. One study looked at the prevalence of obesity (>95th percentile) and ethnicity among 4-year-old US children and found that Native American Indians or Alaskans had an obesity prevalence rate of 31.2%, Hispanics 22%, non-Hispanic blacks 20.8%, and white, non-Hispanic 15.9% (Anderson & Whitaker, 2009). Another study looked at the

prevalence of obesity among HS preschoolers and found higher prevalence of obesity among non-Hispanic blacks (39%) vs. non-Hispanic whites (35%) (Harbaugh et al., 2009).

The CDC states there are a variety of factors such that play a role in obesity. Factors playing a role in obesity include behavior, environment, and genetics, but not specifically gender or age ("Obesity and Overweight, Causes and Consequences", 2011). Gender is said to correlate with obesity in adults, but not in children (Hu, Wilcox, Foley, Kozera, Morgenstern, & Juhn, 2007; Hudson et al., 2009). Age is not correlated with childhood obesity (Hu et al., 2007; Hudson et al., 2009).

Socioeconomic status is considered an indicator of childhood obesity. A study by Harbaugh, Bounds, Kolbo, Molaison, and Zhang (2009) on HS preschoolers in Mississippi provided alarmingly high results on obesity prevalence, 38.5%, among low SES preschoolers enrolled in HS programs. This study also remarks on the similarities of high prevalence of preschool obesity among both low income programs, HS and Women Infant and Children (WIC). Preschoolers of low SES are reported to have higher odds, 1.59, of being overweight or obese when compared to an odds ratio of 1.0 for those of high SES (Kitsantas & Gaffney, 2010).

Children of low SES receiving childcare at home may be at higher risk for obesity. A study from the *Journal of American College of Nutrition* evaluated the nutrient intake of HS children and found potential calorie imbalance within the preschooler's home (Bollella, Spark, Boccia, Nicklas, Pittman, & Williams, 1999). Furthermore, a study on childhood obesity and child care revealed a significant increased risk of obesity among parent care givers (29.9%) vs. HS care givers (10.6%) (Mahner, Li, Johnson, & Johnson, 2011).

Families of preschoolers living in rural locations encounter barriers that prohibit healthy lifestyles. In 2009, Larson, Story and Nelson (2009) reviewed 38 studies on

neighborhood environments and disparities in accessing healthy foods. Larson stated, “Despite some inconsistencies, several U.S. studies have shown that residents of rural, low-income, and minority communities are most often affected by poor access to supermarkets, chain grocery stores, and healthful food products” (Larson, Story, & Nelson, 2009). The healthy lifestyle of rural children is also impacted by: lack of social support systems, child caretakers facilitating more television use, decreased knowledge of healthy food choices, the absence of walking trails, and the threat of unattended dogs in play areas (Cherry, Huggins, & Gilmore, 2007; Joshi, Boehmer, Brownson, & Ewing, 2009). Lutfiyya, Lipsky, Wisdom-Behounek, and Inpanbutr-Martinkus (2007) completed a study looking at obesity and rural vs. metro and remarked, “the major finding of this study is that children living in rural areas in the U.S. are about 25% more likely to be overweight or obese than their metropolitan counterparts.

Obesity and Parental Perceptions

Nutritional habits, feeding techniques, parenting style, and society are all part of the environment that impacts what children eat. Birch (2006) emphasizes parenting style by stating, “Infants and young children are dependent on parents and caregivers to provide food that will promote healthy diets, growth, and development.” The health aspect of parenting means to filter or buffer the negative environmental influences on a child’s health. However, many parents are unable to perform this parenting role (Birch, 2006). The inability to filter negative environments may not be the fault of the parent but rather a preexisting culture or behavior. Asking one to change their culture and behaviors will take time and education.

Mothers of low SES children have difficulty accepting and managing childhood obesity. Jain, Sherman, Chamberlin, Carter, Powers, and Whitaker (2001) completed a

questionnaire of low income mothers regarding obesity and noted that the mothers felt they lacked control over the family's diet, that they were unable to say no to a child who claimed to be hungry, and when they did provide authority over the food, it was challenged by caretakers such as grandparents and fathers. A questionnaire on obesity perception was given to 622 mothers within two clinics (one low income and one not of low income). The results showed that among the 99 children identified as overweight, 79% of the parents did not recognize their child as overweight (Baughcum, Chamberlin, Deeks, Powers, & Whitaker, 2000).

Historical Environmental Changes Associated with Childhood Obesity

The history of childhood obesity is often best explained by examining what was going on in the environment at that time. A publication titled, "*The Future of Children: Childhood Obesity*" examined when childhood obesity began rising more dramatically in the 1980's. The environmental trends that emerged included: increased availability of energy dense drinks, high caloric foods at schools, increased advertising of high calorie products to children, more dual career or single parent families, and more prepared foods frozen and away from home (Anderson & Butcher, 2006). In addition to nutritional trends, physical activity trends were also assessed. Obesity is not just what is consumed, but also the body's expenditures. The environmental trends impacting energy expenditure included less walking to school, longer work hours and less play time, a decrease in physical activity, and an increase in sedentary activities such as screen time (Paxson, Donahue, Orleans, & Grisso, in press).

Medical and Psychosocial Problems Associated with Childhood Obesity

Currently, obese children are being treated for conditions that historically only adults were thought to carry. The National Alliance for Nutrition and Activity identifies

three categories of childhood obesity complications: medical, physical, and social (Institute of Medicine, 2005; see Table 3). Examples of these complications include ailments such as high blood pressure, and depression. The question becomes, if a parent knew their child was currently obese or at risk for obesity and the associated medical, emotional and social health complications, would they make lifestyle changes for their child or family?

Table 3: Summary of childhood obesity complications by state of health

Physical Health	Emotional Health	Social Health
Glucose intolerance & resistance Type 2 Diabetes High Blood Pressure & Cholesterol Fatty Liver Disease Sleep Apnea Asthma Menstrual Abnormalities Orthopedic problems	Low self esteem Negative body image Depression	Stigma Teasing & Bullying Negative Stereotyping Discrimination Social Marginalization

Note. Adapted from American Academy of Pediatrics, "Prevention and Treatment of Childhood Overweight and Obesity"

To further understand the true medical & psychological risks of childhood related obesity, Daniels (2006) conducted a review of medical complications based on various sources. Disorders and complications identified included: Hypertension, Atherosclerosis, Dyslipidemia, Metabolic Syndrome, Type 2 Diabetes, Asthma, Obstructive Sleep apnea, Fatty Liver, Gastroesophageal Reflux, and Depression (Daniels, 2006) (see Table 4).

Table 4: Examples of disorders related to childhood obesity, and its estimated prevalence

Health Disorders	Estimated Prevalence
Hypertension	2-4%
Atherosclerosis	50% for fatty streaks
Asthma	7-9%
Nonalcoholic fatty liver	50%
Depression	1-2%

Source: The Consequences of Childhood Overweight and Obesity by Stephen R. Daniels

The psychosocial issues are present even in preschool aged children. A randomized experimental study on 291 children 3-11-years old determined that children perceive obesity negatively and that preschoolers are more likely to blame their role model for their weight status (Iobst, Ritchey, Nabors, Stutx, Ghee, & Smith, 2009). The results also demonstrate that as age increases, children become less accepting of obese subjects (Iobst et al., 2009). It appears that children have already observed the stigma attached to obesity and parents are beginning to prep their children at young ages for psychological harm. This is supported by a questionnaire given to WIC mothers who had overweight preschoolers (Jain, Sherman, Chamberlin, Carter, Powers, & Whitaker, 2001). Results found that mothers' think they must strengthen their child's self-esteem to buffer the effects of potentially being teased (Jain et al., 2001).

Suspected Causes of Childhood Obesity

Everyone is looking for the one factor that has caused the childhood obesity epidemic, yet no one has the answer. It has become very clear that there is not one factor that contributed to children ingesting more calories than required. The childhood obesity

epidemic is the result of many changes (food consumptions, decline in physical activity, medical status, environment, and the lack of resources) over many years. Anderson and Butcher (2006) wrote a review of the trends and potential causes of childhood obesity and confirmed that certain characteristics did in fact contribute to a child's negative calorie balance and increased BMI, sugar beverage intake over years and elevated screen time. This review also pointed out that for every 10% increase in junk food at schools the average BMI went up by 1%. Furthermore, if a maternal figure increased the work load by 10 hours per week there was a 1% increase in the probability of childhood obesity. It was dually noted that there was no relationship between snacking and basal metabolism on the child's BMI (Anderson & Butcher, 2006).

Physical Activity: Many believe that physical activity should be in safe environments such as school. However, with the increasing academic pressure to meet or exceed educational standards, school physical education is decreasing. States vary widely on their physical education levels. In Dayton, Ohio, the *Dayton Daily News* reported in March, 2007 that Ohio "is the only state in the union that has no statewide elementary school standards for Physical education" (DeBrosse, 2007). In 2007, House Bill 119 passed, requiring schools to report the number of minutes per week of physical education and for schools to adopt physical education standards. In December of 2008, the Ohio State Board of Education adopted the Nation Association of Sports and Physical Education (NASPE) standards which recommends at least 150 minutes of physical education per week for elementary schools (The National association for Sport and Physical Education [NASPE], 2008). However, a "*Physical Education Survey Report to the Ohio General Assembly*" by the Ohio Department of Education shows on average 72.7 minutes of

physical education, not the recommended 150 minutes, was given per week during the 2007-2008 school year (Zelman, 2008).

Preschool children enrolled in HS were studied to better understand a preschooler's engagement in community-based monthly activities. Parents reported examples of physical activities beyond the HS class as: doing crafts, visiting playgrounds, attending church activities, going to the mall and seeing attractions (Tarullo, Aikens, Molduddin, & West, 2010). Although schools and preschools offer opportunities for physical activity it should not be the sole source of a child's daily physical activity. Society must come together for a diversified physical activity plan that is safe and tailored to the child's needs.

Food Consumption: Balancing the caloric expenditure to combat childhood obesity is not only done with physical activity but also with the food consumed. Throughout society, citizens again are looking for that one primary food or dietary habit that causes obesity: fast food, processed foods, parental habits, portion sizes, and even non-organic foods. A research piece published by Bray (2008) looked at high fructose corn syrup as being the cause of obesity. Bray (2008) states, "The current epidemic of obesity could be explained by the consumption of one extra 20oz of soda a day", as soda is the major source of high fructose corn syrup. However, one must question if it is really the high fructose corn syrup or the excessive calories. Murry, Frankowski, and Taras (2005) wrote in a commentary stating, blaming obesity on soda consumption is a scapegoat.

The American Dietetic Association (ADA) did a multiple evidence-based summary analysis on juice consumption and its effect on obesity. After reviewing four studies (cohort, case control and longitudinal) it was determined that there is no positive association between fruit juice and childhood obesity. It was noted that rather large

quantities (>12oz) of 100% juice per day could contribute to obesity. Again, excessive calorie input in any form will likely contribute to excessive weight (ADA, 2009).

With so many potential contributing factors to the obesity epidemic, the problem becomes how do we determine what area of nutritional concern to focus on? The ADA conducted an evidence analysis on 43 studies to determine whether or not total energy intake was related to childhood obesity. The final conclusion was that “Total energy (caloric) intake measured using current dietary assessment tools, which may not accurately assess total energy intake does not appear to have a strong association with overweight in children” (ADA, 2009). However, in 2005 The American Dietetic Association also peer reviewed six articles related to portion size and childhood obesity and concluded that “Increased portion sizes may be associated with increased adiposity in children” (ADA, 2005). Despite poor studies with mixed messages the consistent message remains, it is not so much as the type of food we consume, but the quantity needed for daily activity. Any imbalance potentially leads to childhood obesity.

Screening and Treating Childhood Obesity

Primary care providers have the opportunity to identify and treat childhood obesity. However, research suggests an area for improvement in recognition and treatment of childhood obesity. A review of 1,216 children showed that of the obese children (BMI >94th percentile), only 28% of the children were actually identified as obese (Dilley, Martin, Sullivan, Seshadri, & Blinns, 2011). Failure to recognize the remaining 72% of obese children is a concern primary care providers must address.

With the growing concerns associated with obesity and the inability to identify and treat some states have passed laws mandating schools to complete BMI screenings. Effective September of 2010 Ohio passed “Healthy Choices for Healthy Children”

legislation which provided the Ohio Department of Education the framework to measure and record BMI's on school children. Schools will now be required to complete BMI screening upon entry into kindergarten, 3rd, 5th and 9th grades (S. Res. SB 210, 2009).

The federal government also requires BMI checks on preschoolers enrolled in HS. The challenge among HS locations is how to appropriately handle the BMI results. Teachers do not feel comfortable addressing the subject of obesity under health and nutrition services. Lumeng, Kaplan-Sanoff, Shuman, and Kannan (2008) noted that teachers were skeptical about the definition of obesity, discussing obesity with parents and believe that it is too early to worry about a preschooler's weight. Teacher's also reported that parents were often offended by HS staff raising concerns about a child's weight (Lumeng, Kaplan-Sanoff, Shuman, & Kannan, 2008). Despite excellent resources within the HS program barriers still prevent assessment and treatment of childhood obesity.

Best Practices

The treatment of childhood obesity extends from the national to county level, from immediate to extended family, from primary care providers to the specialist and from preschool through school. A group of experts from nine nationally recognized associations published expert committee recommendation for the evaluation and treatment of obesity. Recommendations were made for medical management, behavior therapy, parenting skills, physical activity and calorie control (Barlow & Dietz, 1998). Community programs include school wellness policies, extension office food programs, community farmers markets, city parks and sidewalk planning and much more. More recently the 2010 Dietary Guidelines were published and identify exact amounts of foods to consume, or to limit. Pediatric obesity requires a combination of family, school, community and medical providers working toward obesity prevention. Many programs are available to assist with

obesity prevention but some policy may be needed to ensure standardized services among all populations, including low SES and rural locations.

Methods

Design: This study looked at all 3-5-year-old preschoolers enrolled within 43 federally funded HS programs among the eight western Ohio counties. This was a quantitative, cross sectional study using electronic retrospective data from 2010 stored at the host site in Piqua, Ohio. All 3-5-year-old HS preschoolers were studied to determine the prevalence of overweight and obesity with regard to gender, county, location of childcare (home versus center-based), availability of physician per county, and rural versus metropolitan. The western Ohio counties used in this study included: Auglaize, Champaign, Darke, Greene, Logan, Miami, Shelby, and Van Wert. Overweight represents BMI percentiles 85-94%, and obesity represents those with BMI percentiles greater than or equal to 95%. Rural, also known as non-metro, locations refer to counties with core urban populations of less than 50,000 as identified by the Office of Management and Budget (OMB) in 2005. Home versus center-based HS refers to a preschooler receiving HS in a private home versus a designated HS childcare Center. The number of county physicians per 10,000 population came from 2006 data extrapolated from county socioeconomic profiles published by the Ohio Department of Health.

Participants: Data from all 1,181 preschoolers within the 43 programs were used in the data analysis.

Data Collection: Data was collected by using an internal software program located at the main HS office in Piqua, Ohio. Information on date of birth and gender was collected from self-report enrollment packets that the parents completed prior to starting a HS Program. The main HS office set up the internal software to represent all enrolled

children and the child's demographics as reported on the enrollment forms. All HS teachers were trained by one nurse on how to complete accurate heights and weights. Teachers completed the measurements and entered the measurements into the internal software program. The on-site outcomes specialist queried the software program for preschoolers, height, weight, BMI, BMI percentile, age, gender, county, HS program name, and home or center-based HS childcare. The outcomes specialist and the registered dietitian reviewed all data to validate outliers.

Data Analysis: Data analysis was done using Excel[®] and SAS[®] and the prevalence of obesity was examined for: gender, county, metro versus rural county, home versus center-based care, and access to physicians. Descriptive statistics were calculated for all subjects (1,181) and all variables. Logistic regression used all variables except for county and preschoolers classified as underweight, thus the total subjects for logistical analysis was 1,100. Each variable was considered a potential predictor of overweight and obesity, and the level of significance was set at 5% ($p=0.05$). IRB approval was received for this study from Wright State University.

Table 5: Criteria for Descriptive Variable

Overweight	BMI percentiles 85-94%
Obese	BMI percentile greater than or equal to 95%
Rural/Non-metro	Counties with core urban population of less than 50,000 as identified by the Office of Management and Budget.
Home-based HS	HS provided in a private home
Center-based HS	HS provided in a designated childcare center
Physician per County	Number of County physicians per 10,000 population per the Ohio Department of Health socioeconomic profiles as of 2006.

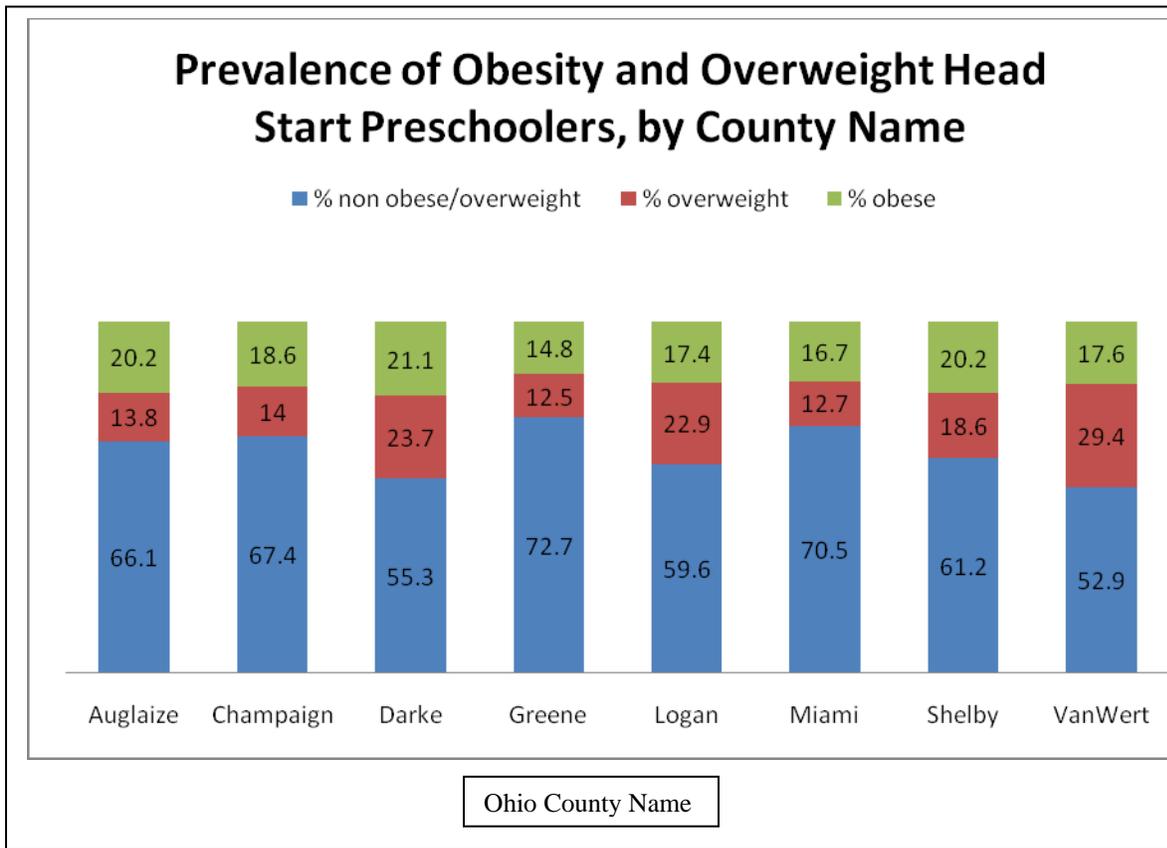
Results

This study looked at the prevalence of overweight and obesity among HS preschoolers to determine significant correlations between: gender, county, metro versus rural county, home versus center-based care, and access to physicians. Of the total subjects (1,181), 81 were removed for the logistical regression analysis due to underweight status; all 1,181 were used for the descriptive analysis. Van Wert County had the least amount of subjects (68), while Greene County had the most subjects (256). The number of HS programs varied, ranging from 2 to 10 programs per county. On average there were approximately 28 preschoolers in each program, children were usually 4-years-old, and there were 1.1 females (623) to male (555) subjects.

Table 6: Descriptive data on subjects, by rural vs. metro and by county

Rural/Non-metro				Mean	Median	S.E.	sd
Auglaize County	n= 109	4 sites	Subjects	27.25	33	6.1	12.2
			Age	3.75	4	0.06	61
			BMI Percentile	70.7	77.2	2.41	25.15
Champaign County	n= 86	4 sites	Subjects	21.5	22	6.38	12.77
			Age	3.67	4	0.06	0.58
			BMI Percentile	52.21	54.9	4.05	37.59
Darke County	n= 114	4 sites	Subjects	28.5	34	5.84	11.68
			Age	3.72	4	0.04	0.47
			BMI Percentile	65.56	75.85	3.09	32.97
Logan County	n= 109	4 sites	Subjects	27.25	31	4.82	9.64
			Age	3.83	4	0.06	0.62
			BMI Percentile	70.63	78.6	2.57	26.88
Shelby County	n= 188	6 sites	Subjects	31.33	34.5	8.87	21.73
			Age	3.65	4	0.04	0.61
			BMI Percentile	67.98	73.4	2.06	28.26
Van Wert County	n= 68	2 sites	Subjects	34	34	0	0
			Age	3.68	4	0.07	0.58
			BMI Percentile	75.57	84.9	2.95	24.37
<i>Rural/Non-Metro Summary</i>	n=674	24 sites	Subjects	28.08	33.5	2.79	13.67
			BMI Percentile	67.14	76.5	1.16	30
Metro/Urban							
Greene County	n= 256	10 sites	Subjects	25.6	32.5	3.77	11.91
			Age	3.54	4	0.06	0.53
			BMI Percentile	57.42	61.85	2.04	32.21
Miami County	n= 251	9 sites	Subjects	27.89	33	3.5	10.51
			Age	3.82	4	0.04	0.64
			BMI Percentile	57.38	60	2.09	33.18
<i>Metro/Urban Summary</i>	n=507	19 sites	Subjects	26.68	33	2.53	11.02
			BMI Percentile	57.4	60.9	1.45	32.66

Figure 2: Prevalence of Obesity and Overweight Head Start Preschoolers by County Name



Prevalence of Preschool Obesity by County

The prevalence of obesity among HS preschoolers fluctuated by county. Among all eight counties studied there were more obese preschoolers than overweight, 19% and 17% respectively. The lowest prevalence of obesity (BMI percentiles greater than or equal to 95%) was in metropolitan Greene County, while highest prevalence of obesity was in rural Van Wert County, 27.3% and 47% respectively. Seven of the eight counties studied had obesity prevalence rates higher than (14%) the 2008 Pediatric Nutrition Surveillance Study.

The prevalence of overweight and obesity combined among HS preschoolers also varied by county. The three counties with obesity and overweight prevalence rates over

40% were Miami, Shelby, and Van Wert Counties. In general, at least one of every four HS preschoolers were obese or overweight, with actual overweight and obesity prevalence of greater than 27% for all counties studied.

Prevalence of Preschool Obesity by Metropolitan versus Rural

Of the eight counties studied two were identified as metro/urban and 6 were identified as rural/non-metro. Only two counties qualified as metropolitan; Greene and Miami County. The highest prevalence of overweight and obesity was among HS preschoolers from rural Van Wert County (47%). The 256 HS preschoolers from metropolitan Greene County were least likely to be overweight or obese (27%). Head Start preschoolers from rural/non-metro locations had a 39% higher prevalence of overweight and obesity when compared to metro/urban, 28% and 39% respectively. Logistic regression of the prevalence of obesity and overweight among HS preschoolers of rural versus metropolitan counties shows statistical significance ($p < .0001$). Those living in rural locations are 2.18 more likely to be overweight or obese.

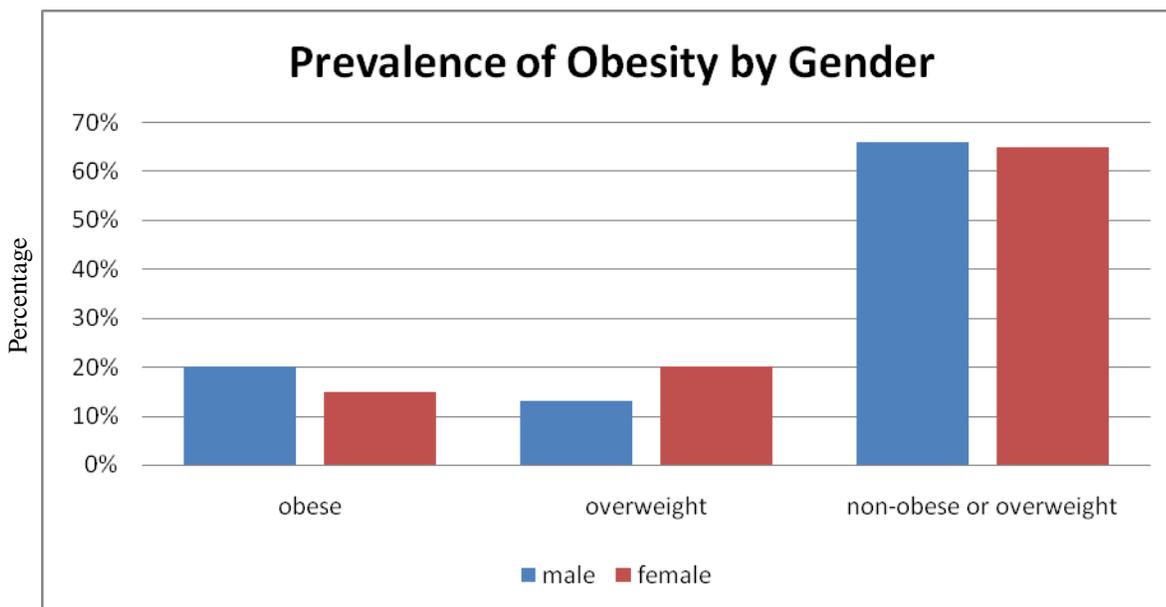
Figure 3: Prevalence of overweight/obese vs. non-overweight/obese by rural vs. metropolitan County type



Prevalence of Preschool Obesity by Gender

The prevalence of obesity and overweight varies with gender. Obesity is higher among males compared to females, 20% and 15% respectively. However, it's the reverse for overweight, 20% prevalence for females and 13% for males. The overweight and obesity prevalence shift by gender can be observed in Figure 4. Gender is not a significant indicator ($p = .4240$) of obesity or overweight for HS preschoolers.

Figure 4: Prevalence of overweight and obesity by gender type

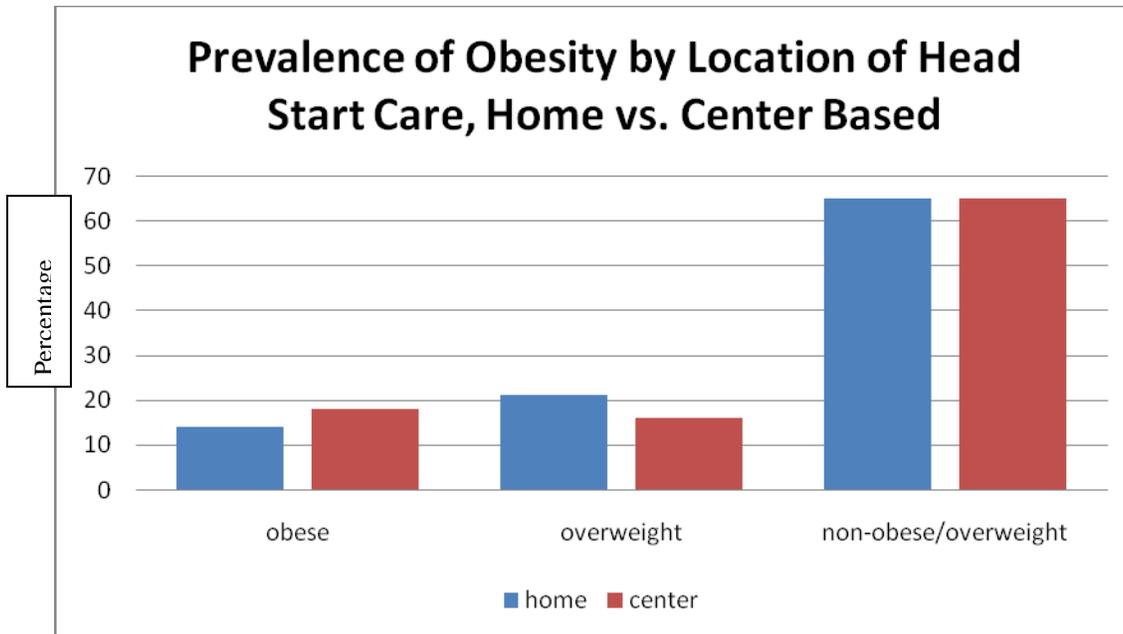


Prevalence of Preschool Obesity by Home versus Center-based Care

Preschoolers receiving HS care in a home are more likely to be overweight rather than obese, 21% vs. 14%. Among all eight counties only 97 of the 1,181 preschoolers received HS care in a private home. Descriptive analysis show that the prevalence of overweight and obesity among home based preschoolers was the same as center-based preschoolers. Logistic regression shows that the location of HS childcare, home-based

versus center-based, is not a significant indicator of overweight or obesity ($p=.7399$). The shift of overweight and obesity among male and female Head Start preschoolers is displayed in Figure 5.

Figure 5: Prevalence of Obesity by Location of Head Start Child Care, Home versus Center Based

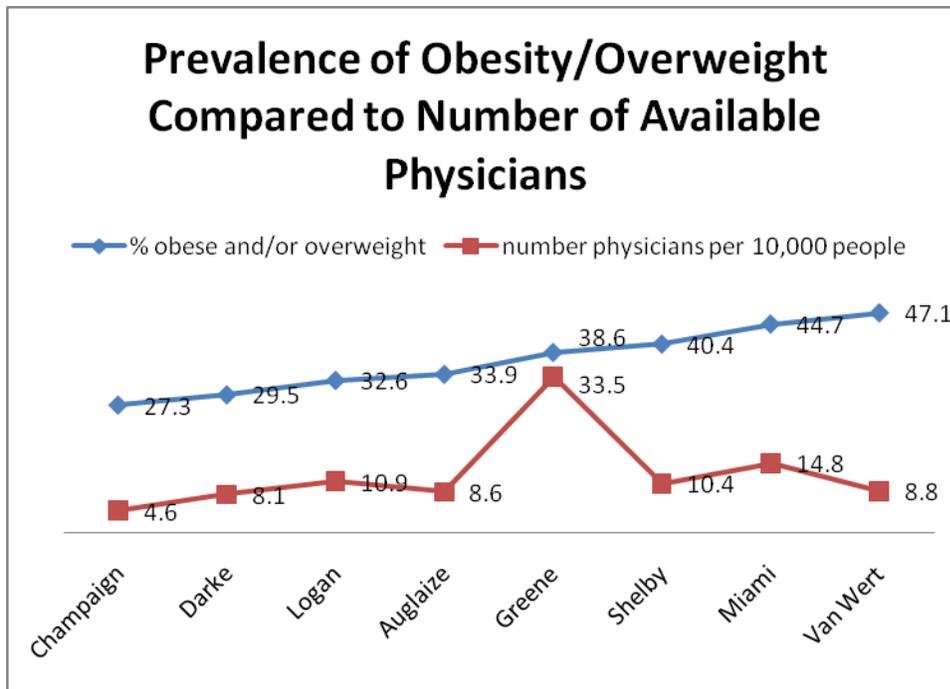


Prevalence of Preschool Obesity by Access to Physicians

Of the eight counties studied there were an average of 12.5 physicians for every 10,000 people. Access to physicians ranged from 4.6 to 33.5 per 10,000. The two counties with the most physicians per 10,000 were metro/urban Greene and Miami County. Within the six rural/non-metro counties access to physicians dropped from an average of 24 to 9 physicians per 10,000 people. The outlier was Greene County who was the 4th highest in overweight and obesity prevalence with access to the most amount of physicians (33.5) (see Figure 6). A comparison by county, access to physicians and prevalence of

overweight and obesity is displayed in Figure 6. Access to physicians is not a significant indicator of obesity or overweight among Head Start preschoolers ($p=.7409$).

Figure 6: Prevalence of obesity and overweight by county and available number of physicians



Discussion

The only significant relationship between overweight and obesity among HS preschoolers 3-5-years-old was whether the preschooler attended a rural or metropolitan HS program. There was no significant relationship between overweight and obesity among HS preschoolers for gender, access to physicians, or home versus center-based HS childcare.

All children of this study were thought to be of low income based on their qualified enrollment into a HS program. Given the standards of age and income, our study found that low income preschoolers attending rural HS programs were more than twice as likely to be overweight or obese. Lutfiyya, Lipsky, Wisdom-Behounek, and Inpanbutr-Martinkus (2007) looked at overweight and obesity risk factors and rural residency noting some similar findings as this study; overweight or obese children less than 5 years of age were more likely to live in rural rather than metropolitan areas, be white, live in household <200% the federal poverty level, have no health insurance, be female and watch more than three hours of TV per day.

The question becomes, is the obesity issue the result of the HS environment in which children spend approximately 10 out 12 months per year? Keeping in mind HS programs are federally mandated to provide nutritionally balance meals, with appropriate amounts of calories, servings and nutrients. HS programs are also mandated to provide structured and unstructured play time. Or, is the obesity issue among HS children the result of the unknown and un-standardized home environment? The majority of the population used for this study usually only received 2.5 hours of HS services per day for four days per week. Leaving plenty of hours left to the unknown home environment. Recently the Piqua, OH hose site observed improvements in prevalence of obesity for HS preschoolers

enrolled full time (8 hours) for the whole school year (10 months). More research is needed to appropriately suggest rural locations, and not HS, are related to increased risks of preschool obesity.

This study did look at home versus center-based HS programs with relationship to obesity and found no significant findings. A potential limiting factor was the small home based subject size (n=97). Other potential limiting factors impacting the prevalence of obesity among home-based HS are dietary restrictions resulting from medical illnesses, and food cultures, allergies or intolerances which may be the very reason that placed the child into a home-based center.

Although this data reflects overweight and obesity prevalence by county, we were unable to complete a logistical procedure to determine any statistical significance by county due to the fact there is no given acceptable standard prevalence of obesity. Given our fixed population of low income children, it is interesting that almost all counties studied had obesity prevalence rates higher than both the NHANES (10.4%) and the Pediatric Nutrition Surveillance Study (14.9%). Future studies using a national study, such as NHANES, as the standard may produce significant results by geographical location(s). Establishing obesity prevalence standards may also help future research.

Due to the use of regression analysis and the need to compare only two variables, obese/overweight vs. non-obese/overweight, we had to remove the underweight population. This meant 6.86% of our total population was lost during the regression analysis. Because our data on rural versus metropolitan was very significant ($p > .001$) it is unlikely that the removal of this sample would change the statistical outcomes.

Additional limiting factors are the unknowns prior to enrollment into HS and the timing of measurement collection. We did not look at whether the child received HS

services and training the prior year. Knowledge of the prior HS status may reflect improved weight status. Although the heights and weights were taken within the first 45 days of enrollment this can be a significant time in which growth can occur.

Other studies have shown no significant results between obesity and gender (Hernandez et al., 1998). Our descriptive results on overweight and obesity by gender (33% male-35% female) are similar to Hernandez results (49% male-51% female) in that the prevalence of obesity between males and females differs only by 2% (Hernandez et al., 1998). Our study suggests female preschoolers struggle with overweight while male preschoolers struggle with obesity. Perhaps, studying the positive and negative BMI percentile shifts along growth records would more clearly explain if males are truly more at risk for obesity during their lifecycle and females more at risk of overweight during their lifecycle.

Although there is much research about obesity and medical outcomes (Daniels, 2006), currently there is no research available on obesity with relationship to accessing the very physicians treating the medical outcomes related to obesity. Our study showed no significant relationship between availability to physicians and overweight or obesity among HS preschoolers. More research is needed to explain why Greene County, with the highest amount of physicians still ranked 4th in the highest prevalence of preschool overweight and obesity. Factors such as Greene County's community environment, schools, homes, parental perceptions, and physician knowledge should all be considered.

Obesity is being evaluated nationally and locally. In 2006, the international Congress on Obesity met in Sydney, Australia and for the first time in history noted that the population of overweight outnumbered the hungry (Katz, 2009). In 2008, a U.S. National Conference of State Legislatures remarked on childhood obesity rates tripling and

quadrupling in the past three decades with 75 billion being spent on obesity related medical fees in 2003. However, as of December 2008, only 12 out of 50 states enacted some type of childhood obesity policy (National Conference of State Legislatures, 2008).

Ohio has determined that obesity is no longer a cosmetic issue but an issue of imminent public health importance that requires coordinated, immediate and long term strategies (Ohio Department of Health, 2009). In March of 2009, Ohio released their Ohio Obesity Prevention Plan with the intent to halt the prevalence of obesity by 2014. The prevention plan has many goals including, but not limited to, interventions for: nutrition and physical activity, work place obesity prevention and intervention programs, using existing programs such as “Farm to Table” & “Safe Routes to School”, utilizing current successful private and public programs and creating a repository database for tracking initiatives and sharing successful programs.

Agencies such as the American Academy of Pediatrics, The American Dietetic Association, and the American Obesity Society are just a few agencies that are looking at the pandemic of childhood obesity. Research and policy are some avenues to help combat this pandemic, but the likelihood of a new federal policy is minimal. Ohio State legislation is often non-existent and programs are usually developed as a result of initiatives. These initiatives will likely disseminate to the larger cities that have resources to carry out the goals and plans. The problem becomes how do we get the resources to the rural areas that are as worthy or more worthy of the resources.

Is blaming a community service or program like childcare, schools, or Head Starts solving childhood obesity? Parents of children who are in school for at least seven of their 14 awake hours and receive one or two of their three meals at school are more likely to blame the schools for the obesity problem (Murnan, Price, Telljohann, Dake, & Boardley,

2006). Some school programs that have been monitoring BMI percentages have noticed higher BMI percentile increases when the children are out of school for summer break. Maybe the absence of the good school resources coupled with poor community resources (quality of food at the local store, the unsafe outdoor play areas or maybe the lack of nutritionally balanced meals that were available at school) increases childhood obesity in high risk populations. The blame of childhood obesity is not one issue but a plethora of issues. Combating childhood obesity is not one person or one program, but a community binding together with a common goal.

Conclusion

The inability to not even halt the obesity growth is thought to be the result of unstandardized approaches to assessing, managing, and preventing childhood obesity. Medical personnel, care givers, and community health advocates also suggest strong denial issues among parents. In Jain et al. (2001), a WIC questionnaire showed that mothers did not accept the health professional's classification of overweight, nor did they accept the standardized height and weight charts. "There was a shared dislike and distrust of the growth charts, along with the claim that the charts were not relevant to their children" (Jain et al., 2001). Standardizing the management of childhood obesity among medical personnel, care givers and community health professionals may improve the acceptance of BMI measurements.

The most alarming result from this study was the fact that western Ohio children enrolled in rural HS program(s) are more than twice as likely to be obese when compared to metropolitan counterparts. While conducting this study and working with area agencies one might suspect a needs deficit with medical staffing and medical staff training. These small rural communities place a lot of trust in their family physician. Family physicians do not have the time or resources to deal with childhood obesity. Even if the physician did address the issue with the caregiver, the caregiver probably didn't have the income to cover treatment. Although this study did look at access to physicians our methodology showed no significant correlations between HS preschool obesity and access to physicians. More research is needed regarding accurate assessment of preschool obesity among medical personnel, care givers and community health professionals.

The multiple unknown home environment factors potentially impacting childhood obesity is the greatest limiting factor in this study. Although many children received a

meal and over two hours of childcare per day, the average weekly visits were only four days per week. The fact that parent control was given to preschoolers for two of their three meals, and nine of their 12 wake hours per school day left us with many questions. Parents may perceive they are doing the right thing at home, and that their children are without weight issues, but our BMI data suggests differently. More research is needed on the home environment among obese preschoolers.

The ADA's position statement on Individual, Family, School, and Community Based Interventions for Pediatric Overweight states, "The ADA, recognizing that overweight is a significant problem for children and adolescents in the US, takes the position that pediatric overweight intervention requires a combination of family-based and school-based multi-component programs that include the promotion of physical activity, parent train/modeling, behavior counseling, and nutrition education" (ADA, 2006). Given that Head Start programs have federally structured meals and activity programs it may be more effective to put less emphasis on school-based programs (including HS preschools) and more emphasis on family based interventions.

References

- (2008). *Childhood Obesity-2008 Update of Legislative Policy Options*. Retrieved from: www.ncsl.org/programs/health/childhoodobesity-2008.htm.
- (2009, April 8). Update on bills introduced in congress addressing child nutrition. *School Nutrition Association*. Retrieved from: www.schoolnutrition.org.
- American Dietetic Association. (2005). *Evidence Summary: Portion sizes and childhood obesity* [White paper]. Retrieved from ADA Evidence Library: www.adaevidencelibrary.com.
- American Dietetic Association. (2006, June). *Position of the ADA: Individual-, Family, School-, and Community-Based Intervention for Pediatric Overweight* [White paper]. Retrieved from American Dietetic Association: www.eatright.org.
- American Dietetic Association. (2009). *Evidence Summary: Fruit juice consumption and childhood overweight*. Retrieved from ADA Evidence Library: www.adaevidencelibrary.com/evidence.cfm?evidence_summary_id=24.
- American Dietetic Association. (2009). *Evidence Summary: Total energy intake and childhood overweight* [White paper]. Retrieved from ADA Evidence Library: www.adaevidencelibrary.com.
- Anderson, P.M., & Butcher, K.F. (2006). *Childhood Obesity: Trends and Potential Causes*. Manuscript submitted for publication. Retrieved May 14, 2009, from: www.futureofchildren.org.
- Anderson, S.E., & Whitaker, R.C. (2009). Prevalence of obesity among US preschool children in different racial and ethnic groups. *Archives of Pediatrics & Adolescent Medicine*, 163(4), 344-348. Retrieved from: <http://archpedi.ama-assn.org.ezproxy.libraries.wright.edu:2048/cgi/content/full/163/4/344>.

- Anderson, S.E., & Whitaker, R.C. (2009, April). Prevalence of Obesity Among US Preschool Children in Different Racial and Ethnic Groups. *Archive of Pediatric and Adolescent Medicine*, 163, 344-348. Retrieved from: www.archpediatrics.com.
- Barlow, S.E., & Dietz, W.H. (1998, September). Obesity Evaluation and Treatment: Expert Committee Recommendations. *Pediatrics*, 102. Retrieved from: www.pediatrics.org/cgi/content/full/102/3/e29.
- Baughcum, A.E., Chamberlin, L.A., Deeks, C.M., Powers, S.W., & Whitaker, R.C. (2000). Maternal perceptions of overweight preschool children. *American Academy of Pediatrics*, 106, 1380-1386. Retrieved from: www.pediatrics.org.
- Birch, L.L. (in press). Child feeding practices and the etiology of obesity. *Obesity (Silver Spring)*.
- Bollella, M.C., Spark, A., Boccia, L.A., Nicklas, T.A., Pittman, B.P., & Williams, C.L. (1999). Nutrient Intake of Head Start Children: Home vs. School. *Journal of the American College of Nutrition*, 18, 108-114.
- Bray, G. (2008). Fructose: should we worry. *International Journal of Obesity*, 127-131. Retrieved from: <http://www.nature.com/ijo>.
- The Centers for Disease Control. (2009). *Prevalence of Obesity* [White paper]. Retrieved from the Centers for Disease Control website: <http://www.cdc.gov/nccdphp/dnpa/obesity/childhood/prevalence.htm>.
- Centers for Disease Control and Prevention. (2009, August 19). *Economic Consequences of Obesity* (Issue Brief). Retrieved from Centers for Disease Control and Prevention: www.cdc.gov/obesity/causes/economics.html.

Centers for Diseases Control (2009, May 19). *Defining Child Overweight and Obesity*

[White paper]. Retrieved from the Centers for Disease Control:

<http://www.cdc.gov/nccdphp/dnpa/obesity/childhood/defining.htm>.

Cherry, D.C., Huggins, B., & Gilmore, K. (2007). Children's Health in the Rural

Environment. *Pediatric Clinical Journal of North America*, 54, 121-133. doi:

10.1016/j.pcl.2006.11.008

Daniels, S.R. (2006). The consequences of childhood overweight and obesity. *The Future*

of Children, 16(1), 48-67. Retrieved from: <http://www.futureofchildren.org>.

DeBrosse, J. (2007). Gym class every day? Kids say yes. *Dayton Daily News*. Retrieved

from: <http://www.daytondailynews.com>.

Debra, C.C., Huggins, B., & Gilmore, K. (2007). Children's Health in the Rural

Environment. *Pediatric Clinics of North America*, 54, 121-133. doi:

10.1016/j.pcl.2006.11.008

Dilley, K.J., Martin, L.A., Sullivan, C., Seshadri, R., & Blinns, H.J. (2011, April 3).

Identification of Overweight Status is Associated With Higher Rates of Screening for Comorbidities of Overweight in Pediatric Practice Research Group. *Pediatrics*, 119, 148-155. doi: 10.1542/peds.2005-2867

H.R. Doc. No. HR1324 Child nutrition promotion and school lunch protection act of 2009 act 1 (2009).

Harbaugh, B.L., Bounds, W., Kolbo, J., Molaison, E., & Zhang, L. (2009, October).

Prevalence Estimates of Overweight in Head Start Preschoolers. *Journal of Pediatric Nursing*, 24, 350-359.

Healthy People 2010. (unknown). *Nutrition and Overweight* [White paper]. Retrieved from

Healthy People 2010:

http://www.healthypeople.gov/document/HTML/Volume2/19Nutrition.htm#_Toc490383123.

Hernandez, B., Uphold, C.R., Graham, M.V., & Singer, L. (1998, April). Prevalence and Correlates of Obesity in Preschool Children. *Journal of Pediatric Nursing*, 13, 68-76.

Hu, W.T., Wilcox, R.A., Foley, T.A., Kozera, R.M., Morgenstern, B.Z., & Juhn, Y.J. (2007). Childhood Obesity Among Head Start Enrollees in Southeastern Minnesota: Prevalence and Risk Factors. *Ethnicity and Disease*, 17, 23-28.

Hudson, C.E., Cherry, D.J., Ratcliffe, S.J., & McClellan, L.C. (2009, August). Head Start Children's Lifestyle Behaviors, Parental Perception of Weight, and Body Mass Index. *Journal of Pediatric Nursing*, 24, 292-301.

Institute of Medicine. (2005). *Preventing Childhood Obesity: Health in the Balance* [The National Academies Press PDF version]. Retrieved from: http://www.nap.edu/catalog.php?record_id=11015#toc.

Iobst, E., Ritchey, P., Nabors, L., Stutx, R., Ghee, K., & Smith, D. (2009). Children's acceptance of a peer who is overweight: relations among gender, age and blame for weights status. *International Journal of Obesity*. Retrieved from: <http://www.nature.com/ijo>.

Jain, A., Sherman, S.N., Chamberlin, L.A., Carter, Y., Powers, S.W., & Whitaker, R.C. (2001). Why don't low-income mothers worry about their preschoolers being overweight? *Pediatrics*, 107, 1138-1146. Retrieved from: <http://www.pediatrics.org>.

Joshu, C.E., Boehmer, T.K., Brownson, R.C., & Ewing, R. (2009). Personal, neighbourhood and urban factors associated with obesity in the United States.

Journal of Epidemiol Community Health, 62, 202-208. doi:

10.1136/jech.2006.058321

Katz, D. (2009). School-based interventions for health promotion and weight control: not just waiting on the world to change. *Annual Review Public Health*, 30, 253-272.

Retrieved from: <http://www.annualreviews.org>.

Kitsantas, P., & Gaffney, K.F. (2010, July 10). Risk profiles for overweight/obesity among preschoolers. *Early Human Development*, 86, 563-568. doi:

10.1016/j.earlhumdev.2010.07.06

Larson, N.I., Story, M.T., & Nelson, M.C. (2009). Neighborhood Environments, disparities in Access to Healthy Foods in the U.S. *American Journal of Preventive Medicine*, 36, 74-81. doi: 10.1016/j.amepre.2008.09.025

Lumeng, J.C., Kaplan-Sanoff, M., Shuman, S., & Kannan, S. (2008). Head Start Teachers' Perceptions of Children's Eating Behavior and Weight Status in the Context of Food Scarcity. *Journal of Nutrition Education and Behavior*, 40, 237-243.

Lutfiyya, M.N., Lipsky, M.S., Wisdom-Behounek, J., & Inpanbutr-Martinkus, M. (2007, September). Is Rural Residency a Risk Factor for Overweight and *Obesity* for U.S. Children? *Obesity*, 15, 2348-2356.

Mahner, E.J., Li, G., Johnson, C., & Johnson, D.B. (2011, March 20). Preschool Child Care Participation and Obesity at the Start of Kindergarten. *Pediatrics*, 122, 321-330.

doi: 10.1542/peds.2077-2233

Metallinos-Kataras, E.S., Freedom, P.S., Fulton, J.E., & Sherry, B. (2007). The association between an objective measure of physical activity and weight status in preschoolers. *Obesity*, 15, 686-694.

Murnan, J., Price, J.H., Telljohann, S.K., Dake, J.A., & Boardley, D. (2006). Parent's perceptions of curricular issues affecting children's weight in elementary schools.

Journal of School Health, 76, 502-511.

Murry, R., Frankowski, B., & Taras, H. (2005). Are soft drinks a scapegoat for childhood obesity? *Journal of Pediatrics*, 146, 586-590.

The National association for Sport and Physical Education. (2008, May). *A position statement from the national association for sport and physical education* [White paper]. Retrieved from National Association for Sport and Physical Education:

<http://www.aahperd.org/naspe/>.

Obesity and Overweight, Causes and Consequences. (2011). Retrieved May 1, 2011, from:

<http://www.cdc.gov/obesity/causes>.

Office of Healthy Ohio Overweight and Obesity Fact Sheet. (n.d.). Retrieved from:

<http://www.healthyohioprogram.org>.

The Ohio Department of Health. (2009). *Healthy Ohio Community Profiles, Auglaize County 2008*. Retrieved from:

<http://www.healthyohioprogram.org/comprofiles/auglaize.pdf>.

Ohio Department of Health. (2009, March). *The Ohio obesity prevention plan-executive summary* [White paper]. Retrieved from Ohio Department of Health:

<http://healthyohioprogram.org/ASSETS/1240108A320B41C99B7C330907A041B5/obexecsum.pdf>.

Paxson, C., Donahue, E., Orleans, C.T., & Grisso, J.A. (in press). Childhood Obesity: Introducing the issues. *The Future of Children*. Retrieved May 1, 2009, from:

<http://www.futureofchildren.org>.

Prevention and treatment of childhood overweight and obesity. (2009). *American Academy of Pediatrics*. Retrieved from: <http://www.aap.org/obesity/about.html>.

Promoting Physical Activity. (2009). *Bright Futures*. Retrieved from http://brightfutures.aap.org/pdfs/Guidelines_PDF/7-Promoting_Physical_Activity.pdf.

State Fact Sheets: United States. (2011). Retrieved from: <http://www.ers.usda.gov/statefacts>.

State Health Notes. (2006). *Childhood obesity: states tackle a tough issue*. Retrieved April 21, 2009, from: <http://www.ncsl.org/programs>.

Sub. S.B. 210 Healthy Choices for Healthy Children, S. Res. SB 210, 128th Cong., Gen 1 (2009) (enacted).

Tarullo, L., Aikens, N., Molduddin, E., & West, J. (2010, December). *ACF/OPRE Report: A Second year in Head Start: Characteristics and Outcomes of Children Who Entered the Program at Age Three* (Annual Report). Retrieved from Department of Health & Human Services, Administration of Children and Families: <http://www.acf.hhs.gov/programs/opre/hs/faces/reports>.

Taveras, E.M., Sandora, T.J., Shih, M., Ross-Degnan, D., Goldmann, D.A., & Gillman, M.W. (2006). The association of television and video viewing with fast food intake by preschool age children. *Obesity*, *14*, 2034-2041.

US Department of Health and Human Services, CDCP. (2009). *Pediatric Nutrition Surveillance 2008 Report* [Data Files]. Retrieved from: <http://www.cdc.gov>.

Zelman, S.T. (2008, January). *Physical Education Survey Report to the Ohio General Assembly* (Annual Report). Retrieved from Ohio Department of Education, physical education: <http://www.ode.state.oh.us>.

Appendix A: Institutional Review Board Letter of Study Approval



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DATE: March 2, 2011

TO: Angela Sims, P.I., MPH Student
Center for Global Health Systems, Management and
Sara Paton, Ph.D., Fac. Adv.
Community Health

FROM: B. Laurel Elder, Chair 
WSU Institutional Review Board

SUBJECT: SC# 4403

'Prevalence of Childhood Obesity among Head Start Preschoolers in Western Ohio'

At the recommendation of the IRB Chair, your study referenced above has been recommended for exemption. Please note that any change in the protocol must be approved by the IRB; otherwise approval is terminated.

This action will be referred to the Full Institutional Review Board for ratification at their next scheduled meeting.

NOTE: This approval will automatically terminate two (2) years after the above date unless you submit a "continuing review" request (see http://www.wright.edu/rsp/IRB/CR_sc.doc) to RSP. You will not receive a notice from the IRB Office.

If you have any questions or require additional information, please call Robyn Wilks, IRB Coordinator at 775-4462.

Thank you!

Enclosure