RUNNING HEAD: BIOSTATISTICS AND CHILDHOOD OBESITY

Biostatistics and Childhood Obesity

Stacy Kramer

Concordia University

The science of statistics is defined in our book as a set of concepts and methods used to analyze data in order to extract information (Schneider, 2011). Since the prefix “bio” means pertaining to life, biostatistics could be loosely defined as a set of concepts and methods used to analyze life-related data in order to extract information that pertains to life. In layman’s terms, biostatistics allows researchers to be able to make sense of data and to determine if there is a need and therefore a way to manage the consequences of the data.

In determining the prevalence of childhood obesity, both qualitative and quantitative data are collected. The National Center for Health Statistics (NCHS), which is part of the Centers for Disease Control and Prevention (CDC), has the responsibility for producing the vital and health statistics for the Nation (CDC, 2012, September 19). A major program of the NCHS is the National Health and Nutrition Examination Survey (NHANES) which is a program of studies designed to assess the health and nutritional status of adults and children in the United States (CDC, 2012, September 19). The survey is unique because it collects data from both interviews and physical examinations.

According to information from the CDC, the NHANES program began in the early 1960s and has been conducted as a series of surveys focusing on different population groups or health topics. In 1999, the survey became a continuous program that has a changing focus on a variety of health and nutrition measurements to meet emerging needs. The survey examines a nationally representative sample of about 5,000 persons each year and includes questions pertaining to demographics, socioeconomic status, dietary practices and personal health. The examination component consists of medical, dental, and physiological measurements, as well as laboratory tests administered by highly trained medical personnel. The sample for the survey is selected to represent the U.S. population of all ages. In order to produce reliable statistics, NHANES over-samples persons 60 and older, African Americans, and Hispanics (CDC, 2012, September 19).

Information taken from the National Health and Nutrition Evaluation Survey information page informs that primary data users are federal agencies that collaborated in the design and development of the survey. The National Institutes of Health, the Food and Drug Administration, and CDC are among the agencies that rely upon NHANES to provide data essential for the implementation and evaluation of program activities. Two important accomplishments of the NHANES are:

 1. past surveys have provided data to create the growth charts used nationally
 by pediatricians to evaluate children’s growth.
 - the charts have been adapted and adopted worldwide as a reference
 standard – and have recently been updated using the latest NHANES
 figures

 2. overweight prevalence figures have led to the proliferation of programs
 emphasizing diet and exercise, stimulated additional research, and provided
 a means to track trends in obesity

According to the Harvard School of Public Health, it’s very challenging to track childhood obesity across the world. There are only a few countries who field nationally representative surveys that measure weights and heights of school-aged children. And, because there are multiple definitions of childhood obesity across the globe, it is difficult to compare data that is collected by agencies such as WHO (the World Health Organization), CDC, and/or the International Obesity Task Force (IOTF). The NHAMES uses information gathered from the weights and heights of the children. Overweight in children was defined as body mass index (BMI) greater than or equal to the age- and sex-specific 85th percentiles of the 2000 CDC growth charts; and obesity in children was defined as a BMI greater than or equal to the age- and sex-specific 95th percentiles of the 2000 CDC growth charts (Carroll, Flegal, Kit & Ogden, 2012).

Qualitative data gathered from the NHANES compares the prevalence of obesity in different races/ethnic groups as well as the differences between males and females. For instance, according to the American Heart Association, black, non-Hispanic females have the highest prevalence of obesity among adolescents in grades 9-12 while white, non-Hispanic females have the lowest prevalence of obesity among adolescents in grades 9-12. However, overall, fewer females are obese than males. In addition, the prevalence of obesity was higher among adolescents (age 6-19) than in preschool children (age 3-5).

Quantitative data gathered from the NHAMES is based on directly measured weight and heights (Healthy People, 2010). Goals for the obesity epidemic in the United States were not met by the Healthy People 2010 initiative. In fact, goals for obesity prevalence moved away from the targets instead of closer to the targets. Data compared between 1988-94 and 2005-2008 showed a 54.5% increase in obesity for kids aged 6-11 and a 63.6% increase in obesity for kids aged 12-19 (Healthy People, 2010). The target for 2010 (which was set in 2000) was five percent.

Other data collected by the NHAMES and reported by the American Heart Association as of 2009-2010 showed that:

* Among 2-19 year olds, 1 out of 3 are overweight or obese
	+ 32.1% are boys and 31.3 are girls
* Among 2-19 year olds, 1 out of 6 are obese
	+ This is approximately 12.5 million children and adolescents
* 20% of children aged 6-11 are obese compared to only 4% of 6-11 year olds from 1971-74
* 18% of adolescents aged 12-19 are obese compared to only 6% of the same age in 1971-74
	+ the number of obese children ages 5-19 is 5 times greater than it was in 1971-74
* over the past decade, there has been a significant increase in the prevalence of obesity among men and boys but not among women and girls (Carroll, Flegal, Kit & Ogden, 2012)
* globally, an estimated 43 million preschool-aged children (3-5 years old) were overweight or obese in 2010 which was a 60% increase since 1990 (Harvard School of Public Health, 2012).

Overall, the statistics for childhood obesity are depressing. Overweight adolescents have a 70% chance of becoming overweight as an adult and if they have just one parent who is overweight, that likelihood of being overweight as an adult jumps to 80% (American Heart Association, 2012). As the number of children who are overweight and/or obese increases, so does the number of children with hypertension, type 2 diabetes, high cholesterol and/or blood pressure, and multiple other heart and lung-related diseases. This leads to other potential medical problems as well as higher medical costs; and they will most likely continue into adulthood. Currently, according to the American Heart Association, the total cost related to adolescent overweight and obesity is estimated to be $254 billion. If this trend continues, roughly 18% of U.S. health expenditures will be attributable to obesity by 2030.

 Regardless, there may be some light to be found at the end of the tunnel with recent reports saying that there hasn’t been an increase in prevalence for any group since 2007-2008. This could be good news in terms of obesity prevalence leveling off. If so, the goals of the Healthy People 2020 initiative may be possible to attain. However, it will take a lot of work to encourage collaborations across communities, empower individuals toward making informed health decisions and measure the impact of prevention activities.

References

American Heart Association. (2012). *Statistical fact sheet 2012 overweight and obesity*. Retrieved from [http://www.heart.org/idc/groups/heart-public/@wcm/@sop/@smd/documents/downloadable/ucm\_319588.pdf](http://www.heart.org/idc/groups/heart-public/%40wcm/%40sop/%40smd/documents/downloadable/ucm_319588.pdf)

Carroll, M. D., Flegal, K. M., Kit, B. K. & Ogden, C. L. (2012). *Prevalence of obesity in the United States 2009-2010*. Retrieved from <http://www.cdc.gov/nchs/data/databriefs/db82.htm>

Harvard School of Public Health. (2012). *The obesity prevention source child obesity*. Retrieved from http://www.hsph.harvard.edu/obesity-prevention-source/obesity-trends/global-obesity-trends-in-children/index.html

Healthy People 2010. (2010). *Final review nutrition and overweight*. Retrieved from <http://www.cdc.gov/nchs/data/hpdata2010/hp2010_final_review_focus_area_19.pdf>

National Health and Nutrition Examination Survey. (2012). *About the national health and nutrition examination survey*. Retrieved from http://www.cdc.gov/nchs/nhanes/about\_nhanes.htm

Roger VL, Go AS, Lloyd-Jones DM, Benjamin EJ, Berry JD, Borden WB, Bravata DM, Dai S, Ford ES, Fox CS, Fullerton HJ, Gillespie C, Hailpern SM, Heit JA, Howard VJ, Kissela BM, Kittner SJ, Lackland DT, Lichtman JH, Lisabeth LD, Makuc DM, Marcus GM, Marelli A, Matchar DB, Moy CS, Mozaffarian D, Mussolino ME, Nichol G, Paynter NP, Soliman EZ, Sorlie PD, Sotoodehnia N, Turan TN, Virani SS, Wong ND, Woo D, Turner MB; on behalf of the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. Heart disease and stroke statistics—2012 update: a report from the American Heart Association. *Circulation*. 2012: published online before print December 15, 2011, 10.1161/CIR.0b013e31823ac046.
 http://www.heart.org/idc/groups/heart-public/@wcm/@sop/@smd/documents/downloadable/ucm\_319588.pdf