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# Perceptions of Childhood Obesity and Public Support for Childhood Obesity Interventions: A Comparison of Parents in Japan and Colorado

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Perceptions of Childhood Obesity and Public Support for Childhood Obesity Interventions:  
A Comparison of Parents in Japan and Colorado

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## **Abstract**

The rate of adult and childhood obesity has doubled and in some countries tripled worldwide over the last few decades. The rise can likely be attributed to an assortment of factors such as an increase in the amount and accessibility of soft drinks and processed foods (increased energy intake) and less time spent exercising inside and outside of schools (decreased energy expenditure). A body of research exists on the public's awareness of obesity in the United States, but limited research has been done on the perceptions of obesity in Japan. A survey using the Qualtrics software was sent to parents in Japan and in Colorado to understand the differences between perceptions in these locations (n=71, Colorado=47, Japan=24). T-tests and an ANOVA test revealed that parents in Colorado view obesity as a greater problem than parents in Japan. Parents in both Colorado and Japan believed increased energy intake (fast food, junk food, and soda consumption) significantly contributed to childhood obesity and believed that parents were primarily responsible for reducing the problem. Fewer parents in Japan believed watching television and playing video games and spending time on the Internet contributes to childhood obesity than parents in Colorado. More parents in Japan believed a lack of places to exercise contributes to childhood obesity than parents in Colorado. Tax based interventions were least supported, and school-based interventions were most supported by parents in both locations. There were significant differences between concern for drug abuse, violence, drinking, sex, and smoking amongst parents in Japan and Colorado, which warrants further research.

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**In memory of my grandmother, Theresa DeWalt**

**(March 22, 1919- November 4, 2014)**

## **Introduction**

The rate of childhood obesity has been increasing worldwide; the purpose of this study is to learn how parents' perceptions of childhood obesity and support for interventions differ in Colorado and in Japan. There have been numerous studies on parents' perceptions of childhood obesity and health; however, there has not been research done on perceptions of childhood obesity in Japan. This is likely due to the fact that the rate of obesity in Japan is much lower compared to the rest of the developed world. Japan's rate of obesity is much lower than the United States, 3.6% compared to 35.3% in the United States (OECD Health Statistics, 2014), and Colorado has the lowest rate of obesity in the United States with a rate of 21.3% (Trust for America's Health and Robert Wood Johnson Foundation, 2014). However, the prevalence of obesity has been increasing over the past three decades in Japan. Furthermore, there is a high concern for body image and a desire for thinness among the Japanese adolescents (Kaneko et al., 2002). Taking these factors into account, this study seeks to answer if childhood obesity is perceived to be a significant problem in Japan. I began with a hypothesis that parents in Colorado will be more concerned about childhood obesity than parents in Japan, despite the increasing prevalence and the concern for body image in Japan.

Specifically, there are four questions that will be answered through the use of a survey: how serious do parents think the problem of childhood obesity is when compared to other youth-related problems; what and who do parents think contribute to childhood obesity; who do parents think are responsible for reducing the problem; and what interventions do parents support to reduce childhood obesity.

Public perception of childhood obesity is an important topic, because the way people perceive a problem has an impact on the success rate of intervention programs. As Wolfson et al., states, “The public’s views of parents’ behaviors and choices—and the attitudes held by parents themselves—are likely to influence the success of efforts to reverse obesity rates” (Wolfson et al., 2015). The more a person is to perceive an issue as a serious problem, the more likely he or she is to support intervention programs. Understanding the Japanese perspective may help the United States to know what interventions will be more effective in helping to reduce obesity.

## **Chapter One: Background**

This section provides background information on obesity as a problem, its causes and possible solutions.

### **Obesity: The Problem**

The world is currently experiencing an obesity epidemic, which has influenced most developed countries and a number of developing countries. The obesity rate worldwide more than doubled from 1980 to 2014. Forty-two million children under the age of five in the world were overweight or obese in 2013, and in 2014, 13% of the world's adult population (11% of men and 15% of women) were obese (World Health Organization, 2014). From the 1970s to the late 1990s, the rate of obesity in school-aged children doubled or tripled in Canada, the United States, Brazil, Chile, Australia, Japan, Finland, Germany, Greece, Spain, and the United Kingdom (Wang and Lobstein, 2006). According to OECD data, Japan has an obesity rate of 3.6% and the United States an obesity rate of 35.3% (OECD Health Statistics, 2014).

This is a public health concern because obesity leads to health issues such as heart disease, diabetes, and cancer (Centers for Disease Control and Prevention, 2012). In the United States, obesity is the second leading cause of preventable disease and death, just after smoking. In 2000, the costs associated with obesity were \$117 billion USD (U.S. Department of Health and Human Services, 2001). Research has suggested that children who are overweight and obese when they are younger are more likely to be overweight and obese into adulthood, suggesting that prevention strategies should begin at a young age (Cunningham, 2014).

### **Defining Overweight and Obese and Trends in rates of Obesity in United States and Japan**



Body Mass Index (BMI) is one indicator used to measure the amount of body fat on a person. BMI does not directly measure body fat, although it is a fairly reliable indicator of the amount of fat on a person. BMI is calculated by dividing a person's weight by their height, and then multiplying that number by a conversion factor of 703 (Centers for Disease Control and Prevention, 2012). BMI can misdiagnose someone as being obese, when in fact the person may be muscular. Therefore BMI cannot be the only indicator when considering someone overweight or obese, but it is a beneficial tool for further assessment (Barlow, 2007). BMI can be an uncertain indicator especially in children because children are still growing (Anderson and Butcher, 2006). Further assessments such as a skinfold thickness measurement, diet evaluations, physical activity assessments, and family history need to be considered (Center for Disease Control Prevention, 2014).

For adults in the United States, a BMI below 18.5 is considered underweight, a BMI between 18.5 and 24.9 is a healthy weight, a BMI between 25.0 and 29.9 is overweight, and a BMI of 30 or higher is considered obese. In the United States, every state had an obesity rate higher than 20% (Center for Disease Control and Prevention, 2013). In Japan, because the rate of obesity is low compared to Western countries, obesity is often defined as BMI at or above 25 instead of 30 (Japan Society for the Study of Obesity, 2002).

To determine if a child is obese, a child's BMI is plotted on a BMI-for-age chart divided by sex to determine the percentile ranking. Age and sex are taken into account for children, unlike adults. Underweight children are in the less than 5<sup>th</sup> percentile range, a healthy weight is in between the 5<sup>th</sup> percentile and 85<sup>th</sup> percentile, overweight children are in the 85<sup>th</sup> to 95<sup>th</sup> percentile, and children with a BMI at or higher than the 95<sup>th</sup> percentile are considered obese. For example, a 10-year old boy with a BMI of 23 would be in the 95<sup>th</sup> percentile, and considered

obese, but a 15-year old boy with a BMI of 23 would be in the 5<sup>th</sup> to 85<sup>th</sup> percentile category, and would be considered to be at a healthy weight.

### **United States: Trends in Obesity**

The rate of childhood obesity has been steadily increasing over the past few decades. In the United States, the prevalence of childhood obesity has increased from 5% in the 1963-1970 period to 17% in 2003-2004 (Barlow, 2007). In 2011 to 2012 the rate of childhood obesity was still about 17%, however, the obesity rate among children aged two to five years had gone down from 13.9% in 2003-2004 to 8.4% in 2011-2012. The obesity rate has also been increasing among adults at an alarming rate. In 1960-1962, the prevalence of adult obesity was 13.4% while in 2007-2008 it was 34.3% (Ogden et al., 2010).

Colorado has the lowest rate of adult obesity in the United States with a rate of 21.3% (Trust for America's Health and Robert Wood Johnson Foundation, 2014).

### **Japan: Trends in Obesity**

Westernization in Japan after World War II and the remarkable economic growth period between the 1970s and early 1990 brought many changes to lifestyles in Japan. During this period, adult and childhood obesity become more prominent (Yoshinaga et al., 2010). A study by Matsushita et al. using data from nationwide surveys from 1976 to 2000 found that the prevalence of obesity increased from about 6.1% in boys and 7.1% in girls in the years between 1976 and 1980, to 11.1% and 10.2% in the years between 1996 and 2000. Here, obese was categorized as a +20% excess of body weight from the standard body weight. The increasing rate of obesity was most prominent in children between the ages of nine and eleven living in small towns. However, no changes were seen in girls in metropolitan areas (Matsushita et al., 2004).

## **Obesity: The Causes**

“The causes of obesity are those factors that promote excessive energy intake, reduce expenditure, or impair the regulation of energy balance” –W.H. Dietz

The reason behind the rising rates of obesity in the world is not attributable to one factor, but many. Some possible explanations for the increase in childhood obesity over the past three decades include but are not limited to changes in the food market, the built environment, schools, childcare settings, and the role of parents (Anderson and Butcher, 2006). In recent years, children have gained easy access to energy-dense and high-calorie foods and drinks in schools. Additionally, many children are living with parents who both work outside the home or in single-parent households, which may result in an increase in pre-prepared food consumption. Further, children today expend less energy than in the past because they are less likely to walk or bike to school and more likely to travel by car. Children are also spending more time in sedentary activity such as watching television and using computers (Anderson and Butcher, 2006).

Genetics does have an impact on obesity; about twenty-five to forty percent of BMI is heritable (World Health Organization, 1997). Some children have a higher propensity for weight gain due to genetics; however, the rapid rise in the rate of obesity over the past few decades cannot be attributed to genetics (Anderson and Butcher, 2006).

## **Increased Energy Intake**

### **Soft Drink Consumption**

Putnam and Gerrior found an increase in total consumption of carbonated soft drinks in the last few decades (Putnam and Gerrior, 1999). There was a slight increase in soda consumption in the 1970s, was stable in the 1980s, and then consumption exploded in 1987 and

continued through the 1990s. Soda consumption almost doubled from five to twelve ounces a day (French et al., 2003). The amount of money soft drink companies spent on advertising increased from \$541 million in 1995 to \$799 million (Harris et al., 2002).

The availability of soft drinks and other energy-dense snacks in schools has also been rising. The amount of soda consumption from vending machines in schools increased 48 percent (Anderson et al., 2003). Student access to vending machines has increased, motivated by school districts' desire to make profits from soft drink companies. Schools also sell cookies, crackers, cakes, pastries, and soft drinks in school stores. More and more, schools are using money from food sales to supplement budgets (Anderson and Butcher, 2006).

### Eating Out

The number of children living with both parents who are in the labor force has increased over the past forty years. This change could account for the rise in food consumption outside of the home and the consumption of pre-prepared food. Lin et al. documented that from 1977-1978, only 18 percent of calories from food were consumed outside of the home. In 1987-1988 this number was 27 percent and by 1995 the percent of calories consumed outside the home was 34 percent (Lin et al., 1999). Chou et al., reported that up to two-thirds of the rise in obesity since 1980, can be attributed to the increase in per capita fast food restaurants (Chou et al., 2004). One study of eight to twelve year-old girls found that eating fast food two or more times a week resulted in weight-gain during a three-year follow-up. However, this was only one study in one demographic, therefore there is no certainty that fast food increases weight (Thompson et al., 2004). Portion sizes also started to increase in the 1980s, and during the late 1990s portion sizes increased more than sixty times. This increase in portion size occurred concurrently with the rise in childhood obesity (Anderson and Butcher, 2006).

Policies put in place in the 1970s by the U.S. government to increase food supply lead to more energy intake. U.S. farm subsidies lead to an increase in food production resulting in lower prices for those foods. (Wallinga, 2010).

### **Decrease in Energy Expenditure**

Research on the link between physical activity and BMI have had mixed results. One reason may be because BMI can be a misleading indicator if a person has a lot of muscle mass. Increased activity may increase muscle mass and in turn may increase a person's BMI. A study of twelve-year-old French children confirms this theory. Researchers found that physical activity was correlated to a smaller waist circumference for boys and girls but a lower BMI only in girls (Platat et al., 2005). Long-term studies have found that increased activity leads to a decrease in BMI (Berkey et al., 2003).

### **Increased television viewing**

A number of epidemiological studies have looked at the relationship between television viewing and childhood obesity. One study found that every extra hour of television per day increased the prevalence of obesity by two percent (Dietz and Gortmaker, 1985). This correlation may be because watching television is a sedentary activity that does not require any energy expenditure. It may also be due to an increase in energy intake influenced by television advertisements that encourage the consumption of more energy-dense foods, or because watching television is often accompanied by snacking. A third potential reason is that children experience a lower metabolic rate while watching television (Robinson, 2001). Other studies have found no significant relationship between television and obesity or have found mixed results. A few experimental studies have shown a strong correlation between watching television

and an increase in BMI (Robinson, 2001).

### Lack of Exercise in Schools

One change in the school system has been the pressure to focus more on academics, and less on physical and nutrition education. The National Association of Early Childhood Specialists in State Departments of Education (NHANES) found that 40 percent of elementary schools reduced, cancelled, or have considered cancelling recess since 1989 (National Association of Early Childhood Development Specialists in State Departments of Education, 2005). MacPherson found that since the 1970s, the amount of time children play has dropped 25 percent and there has been a 50 percent drop in unstructured outdoor activities (MacPherson, 2002).

### Urban Sprawl

Urban sprawl leads to a rise in automobile travel. There was an increase in daily vehicle miles traveled from 1990 to 1995. The amount of children traveling by foot or bicycle has been decreasing over the past several decades. Fifty-three percent of parents drove their children to school in 2002; only 17% of parents said their children walked to school and 5% said their children bike to school (Russonello, 2003). Sixty-six percent of the parents who reported their children do not ride a bike or walk to school said it was because the school was too far. More than 70% of the parents said they walked or biked to school as children. Less than one-fourth of children walk or bike to school. There is an indication that less dense urban development leads to children being farther in distance from their schools which contributes to less physical activity among children.

## Japan

In Japan, the rise in obesity, especially in children in rural areas, could be attributed to environmental and cultural changes that lead to low activity levels. About 80% of students in middle school in Japan have been reported to have sedentary lifestyles outside of school. Sedentary lifestyle could be due to a stressful academic schedule and indoor entertainment. Greater reliance on automobile transportation may be another reason (Murata, 2000).

## **Other Factors**

Gao et al. conducted a study to see if there was a correlation in risk of obesity and hypertension in children who are born to women who smoked during pregnancy. The results showed that there was a correlation between prenatal nicotine exposure and childhood obesity and hypertension (Gao et al., 2005). Another study by Rundle et al., found that there was a link between prenatal exposure to air pollution, specifically polycyclic aromatic hydrocarbon (PAHs) and obesity in childhood. PAHs are created during incomplete combustion and are known human carcinogens. They are also endocrine disruptors, which are thought to be a factor in the childhood obesity epidemic (Rundle et al., 2012).

## **Obesity: Proposed Solutions**

In the United States, there have been a number of school-based interventions to encourage children to increase activity levels and eat healthier foods. The Center for Disease Control and Prevention estimates that 63% of schools have stopped selling soft drinks (Suddath, 2009). In Colorado, Chef Ann Cooper, the interim director of nutritional services for the Boulder Valley School District in Colorado is striving to emphasize the health of students over “the

financial health of agribusiness corporations,” by getting back to the basics. She wants to transform middle and high school food programs. Her menus emphasize regional and organic foods and whole grains. Many school districts in the United States are cutting down on the number of fried foods and increasing the amount of fruits and vegetables served in school lunches (Johns, 2010). In 2009, the United States government gave \$40 million for the Fresh Fruit and Vegetable Program to provide more fresh produce to elementary schools (Suddath, 2009).

Interventions such as Planet Health, an interdisciplinary curriculum program that focuses on eating healthy, promoting physical activity, and limiting the amount of time spent in front of the television have been implemented in schools, with mixed results as to the effectiveness in reducing the prevalence of obesity. The Planet Health initiatives reduced the prevalence of obesity amongst girls, but similar school-based programs have not shown a decrease in BMIs (Ebbeling et al., 2002). A meta-analysis of school-based interventions by Hung et al. did not find a relationship between the interventions and a reduction in BMI for children (Hung et al., 2015).

An initiative by the First Lady of the United States Michelle Obama called *Let's Move!* was created in 2010 to help reduce childhood obesity in the United States. This initiative encourages families, schools, and communities to promote more physical activity and healthy eating ([www.letsmove.gov](http://www.letsmove.gov)). The initiative's main goals are to improve the nutritional standards of the National School Lunch Program and changing the nutritional labeling on food products (Wojcicki and Heyman, 2010).

Family based interventions have not found much success, however, one long-term study by Epstein et al., found that when parents limited the amount of high-calorie foods and children



exercised more, a decrease in overweight amongst the children in the study (Epstein et al., 1990).

## **Japan**

In Japan, childhood obesity reduction interventions have been focused on all aspects of well-being. The community participation approaches the interventions implement, have been found to improve health-related behavior (The Ministry of Health, Labor and Welfare created a plan in 1988 to help promote health and wellness called the “Active 80 Health Plan.” The plan offered medical checks and nutrition and exercise counseling in every city and town. In 2001, the ministry also published *Health Japan 21*, a 10-year national plan for health promotion and disease prevention (Sakamoto, 2006). There are nine fields in the *Health Japan 21*: Nutrition and Diet, Physical Activities and Exercises, Relaxation and Mental Health, Tobacco, Alcohol Consumption, Dental Health, Diabetes, Cardiovascular Diseases, and Cancer. These were created to address health problems, assess the results of health promotion, and to develop effective health promotion. Through public administration by the central and local governments and collaboration by organizations working with health issues, these objectives could be achieved.

In 2005, Shokuiku, which when translated to English means “dietary education,” was enacted in Japanese schools. The law was passed to educate Japanese children on food safety, dietary health issues, food self-sufficiency, and an appreciation for traditional Japanese food culture. This was the first law to regulate a person’s diet and eating habits (Miyoshi et al., 2012). The law was enacted as a response to factors such as a rise in obesity and life-style related diseases, an excessive desire for being thin amongst young women, an over-dependency on food from overseas, and the loss of traditional food culture. The law proposed that dietary issues

should be reinforced by using homes, schools, daycare centers, and in the communities to promote good eating behaviors. It also promotes interaction between food producers and consumers, and activities that will help preserve traditional food culture. Through the enactment of Shokuiku a Japanese food guide called the, “Japanese Food Guide Spinning Top,” was created. Similar to the United States’ MyPlate nutrition guide, the Spinning Top provides the portion sizes for fruits, milk, fish and meat, vegetables, and grains. The photo also shows a person running on the top to symbolize that people also need to exercise (Ministry of Agriculture, Forestry and Fisheries, 2005).

In April of 2007, the Diet and Nutrition Teacher System was created in order to enhance the school-based Shokuiku programs. This system promotes the placement of Diet and Nutrition Teachers in public elementary schools and middle schools. These teachers oversee school lunch programs and create lunch menus. They work with families, teachers, school doctors, and nutrition experts in order to help children maintain healthy diets. The Diet and Nutrition Teachers also provide guidance for children and families on obesity, unhealthy eating, and issues relating to diet. As of 2011, 3,853 Diet and Nutrition Teachers were placed in schools throughout the country, and positive impacts were reported regarding health and dietary habits amongst the students, such as an increase in the number of children eating breakfast and a reduced amount of leftovers at lunch. However, only 12% of schools in Japan have these teachers (Tanaka et al., 2012).

In 2008, the School Lunch Act was altered to change the focus from improving dietary habits to promoting Shokuiku. The four main goals of this act are to develop, “a proper understanding of diets and healthy eating habits in every day life, enrich school life and nurture sociability, aim at rationalization of diets, nutritional improvement and health promotion, and

enhance a sound understanding on food production, distribution, and consumption” (Tanaka et al., 2012).

## **Chapter Two: Literature Review**

Oliver and Lee (2001) wrote what they refer to as “the first examination of public attitudes towards obesity and obesity policy” (Oliver and Lee, 2001). They surveyed public attitudes on obesity and related policies. Questions answered were: what are Americans’ attitudes about obesity and what determines support for obesity policies? They found that most Americans are not exceedingly concerned with obesity, show little support for obesity related policies, and view obesity as a result of individual failure rather than environmentally sourced or genetically induced. People are less likely to support obesity-related policies if they believe that obesity is due to moral failure. Oliver and Lee conducted telephone surveys in April and May of 2001 to measure public information and attitudes on obesity, negative stereotypes concerning discrimination against the obese, and support for public policies regarding obesity. There were 909 respondents.

Obesity was ranked behind cancer, AIDS, heart disease and diabetes. Obesity was not seen as a major health issue. People were more likely to support initiatives requiring motorcycle helmets, taxing cigarettes and banning public smoking. The majority of respondents blamed individuals for lacking willpower to diet or exercise. Environmental factors, such as unhealthy food in restaurants and grocery stores, were also believed to be responsible. A very small percentage of respondents attributed genetics as a cause of obesity. Conservatives and liberals did not significantly differ in their agreement with obesity policies as compared to moderates. People with higher BMIs were more likely to oppose snack taxes but were more apt to support banning fast foods in public schools (Oliver and Lee, 2001).

The Kaiser family foundation and San Jose Mercury News conducted a survey of 1,175 randomly selected parents throughout the Bay Area in California during 2004. This survey

looked at parental attitudes and knowledge of childhood obesity. Support of public policy options to decrease childhood obesity were explored, as well as the responsible party for addressing the problem, parental views on the weight and habits of their children and the role of media in childhood obesity. The study compared differences in attitudes of Hispanics, whites, and Asians. Questions on public policy options were surveyed at the national level and then compared with the Bay Area.

Sixty-nine percent of respondents in the Bay Area answered that being overweight or obese is a major problem for children and teenagers. Thirteen percent believed obesity to be the greatest problem; however, respondents were more likely to say that illegal drugs, alcohol and violence were larger issues. Eighty-two percent of parents surveyed concluded that children and teens lacking regular exercise was a major factor in childhood obesity. Fifty-four percent of respondents said fast food restaurants and food companies produce an abundance of unhealthy food; 45% reported excessive advertising being aimed at the youth; 38% said most diets are ineffective; 37% of respondents expressed that children lack self-control and 23% believed obesity to be inherited from parents. When asked whether obesity was a public or a private issue, the response of 52% was that society needs to help solve this issue and 45% said it is a private issue. As to the responsible party for addressing the problem of childhood obesity, 88% noted that parents have the greatest responsibility; 84% said individuals are answerable; 54% held doctors or other healthcare providers as accountable; 42% charged the food industry; 38% reported schools as culpable and 26% attributed responsibility to the government. Questions were asked regarding support for public policy on childhood obesity. The obligation of schools to offer educational, nutritional and exercise programs to decrease childhood obesity was explored. Questions regarding the presence of soda and vending machines, fast food

advertisement directed toward students and availability of fast foods in schools were asked. The frequency of eating out, eating habits of the children, amount of physical activity, mode of transportation to school and media usage of their children were investigated. The most support for policy interventions was for government-funded advertising campaigns that promote eating right and exercising (84% in Bay Area; 73% in U.S.). The next most supported policy was for making a law requiring fast food restaurants to provide nutritional information for all items on their menus (78% in Bay Area; 70% in U.S.). The least supported policy (51% in Bay Area; 40% in U.S.) was for putting a tax on junk food and using the money for programs to combat obesity. Whites and Asians were especially against taxing junk food. Twenty-seven percent of whites and 29% of Asians supported taxing junk food while 46% of Hispanics supported taxing (San Jose Mercury News and Kaiser Family Foundation, 2004).

Evans et al., conducted a study in 2004 to research the perceptions of obesity, specifically what intervention strategies should be used to reduce childhood overweight and obesity in the United States. Their research questions are:

“How serious does the U.S. public consider the problem of childhood overweight and obesity in comparison to other youth health threats? What specific interventions to control or prevent childhood overweight and obesity does the U.S. public support? To what extent does the public continue to support these interventions in light of potential consequences, such as increased government regulation or taxes? What sociodemographic characteristics are associated with support for specific childhood overweight and obesity interventions?” (Evans et al., 2005).

Evans et al. developed an instrument to capture opinions on the seriousness of childhood overweight and obesity compared to other issues. The instrument also measured support for

specific interventions and potential barriers to support certain interventions. They asked the participants questions regarding his or her sociodemographic status and questions about adult obesity. The intervention questions were based on recent interventions that had been aimed toward reducing childhood obesity. The questions were divided into three groups: schools, media, and communities. Scales were used to rank interventions by degree of intensity or restrictiveness. Participants were recruited using random-digit-dialing methodology.

The sample frame included the set of all telephone exchanges that met residential telephone-exchange geographic criteria; the list covered about 96.4% of United States residential telephone numbers. The sampling system, Genesys Sampling Systems, Inc. was used to compute an interval that was equal to the sample size they wanted. Within every interval a single random number was generated between one and the interval size. Participants had to be at least eighteen years of age and the research was conducted by trained interviewers. One thousand and ten interviews were done with participants from all fifty states and the District of Columbia.

Results revealed 41% of Americans perceive childhood overweight and childhood obesity to be a very serious problem, which was similar to tobacco use (42%). Respondents determined the most significant contributors to childhood overweight were consumption of junk food (77%), fast food (65%), watching two or more hours of television per day (56.6%), video games or the Internet (54.4%), lack of exercise in school (44.2%), lack of places to exercise (25.7%) and crime (17.8%). Approximately 91% of respondents held parents as most responsible for reducing childhood overweight. Television advertising was rated as responsible by 44.8% of respondents, 39.3% thought it was the individual child's responsibility, 32.4% held food companies at fault, 30% reported schools, 27% considered restaurants as responsible, 26.8% said healthcare providers and only 16.8% thought the government should take responsibility.

Increasing costs of unhealthy foods was not well supported by the respondents. Fifty-nine percent were against increasing the cost of fast food marketed to children and only 45% were in support of increasing the price of unhealthy foods in school cafeterias. However, most respondents were in favor of restricting the amount of unhealthy foods in school vending machines (74%) and in school cafeterias (75%). The majority of respondents also supported requiring healthy eating and exercise education in schools (94%) and requiring more time for physical education (82%).

Statistical analyses through logistic regressions showed that support for interventions was statistically higher among more educated respondents for eight of the eighteen interventions described in the survey. Women were more likely to show support for interventions than men. A lower income did not have a significant impact for supporting these interventions. Those who had children at home were less supportive of weight evaluation in schools.

Evans et al.'s research found that there is strong public support for interventions that are in favor of reducing childhood overweight and obesity, which is consistent with other recent surveys' findings. The public is most in favor of school-based interventions, like healthy eating and exercise education in schools and reducing the availability of unhealthy foods in school cafeterias. The public was very much in opposition to any tax-based or regulatory interventions. This finding is consistent with the Harvard School of Public Health study, and an American Heart Association study that Americans generally do not want to have a "fat tax" (American Public Health Association, 2003 and Perry, 2003).

Increased health and physical education was highly supported, but not if it came as a cost to other subjects such as science and reading. Policymakers should understand the importance of nutrition and fitness in educational success (Sallis et al., 1999 and U.S. Department of Health



and Human Services, 2001).

A survey by Hilbert et al. was conducted in August of 2005 in Germany. The focus of the study was on support for specific obesity prevention measures for children and adults. Random digital dialing methodology was used to gather the sample size. There were 1000 respondents who completed the interview, 431 men and 569 women. The average age of the participants was 45.9 years old. To measure problem identification, there were six statements which respondents were invited to rate on a five-point scale, 1 being disagree completely and 5 being agree completely to measure problem awareness, prevalence, comorbidity and chronicity. Causal attribution was measured through eleven items on behavioral, environmental and genetic factors. For example, respondents were asked to rate how much they agreed with the statement, "Lack of facilities for outside physical activity" as being a causal mechanism in obesity. Support for obesity prevention was measured with eleven items that covered a range of behavioral and environmental measures of prevention. For example, "Classes about healthy eating and physical activity by health insurance providers." These items were again measured on a scale of 1=disagree completely to 5=agree completely. 76.6% of the population thought obesity was one of the major health problems, 86.3% knew that obesity increases the risk of contracting certain chronic diseases. On average, respondents overestimated the rate of adult and childhood obesity. Causal attributions: Lack of activity behavior (82.4%) and overeating (72.8%) were the most supported attributions by respondents. Activity environment: lack of sports programs (16.1%) and lack of facilities for outside physical activities (31%) and hereditary factors were thought to be less important (34.9%).

Obesity prevention was supported by 71.4% of participants. The most support was for school curriculum on healthy eating and increased physical activity (93.5%). The second most

supported was parental education to better care for their children's healthy eating and physical activity (91.6%). There was considerable support for preventing childhood obesity and endorsement for information-based prevention targeted towards adults. Support was greater for individual behavior change in children and adults and less for regulations. Results indicated that the population is open to obesity prevention (Hilbert et al., 2007).

In 2011, Lusk and Ellison conducted a survey to understand who the public blames for the rise in obesity. Their research found that the majority of people find fault with the individual for the rise in obesity. Eighty percent of respondents believed individuals were primarily to blame, 59% held parents responsible, 35% food manufacturers, 20% restaurants, 18% government policies, 10% grocery stores and 4% of respondents believed farmers were primarily to blame (Lusk and Ellison, 2013). Lusk and Ellison argue that the emphasis on parents being held responsible for their child's obesity could reduce the amount of governmental action (Lusk and Ellison, 2013).

Research conducted by Harris et al., found that parents attribute 60% of the blame for childhood obesity to personal responsibility and 40% to the food environment (Harris et al., 2012). Wang and Coups found that 72% of respondents reported overeating and not exercising had a great deal to do with causing obesity. Only 19% reported that genetics was a contributing factor in causing obesity. Individuals who believed obesity was a result of genetics were less likely to exercise and eat healthily than individuals who believed lifestyle behaviors had a significant role in obesity (Wang and Coups, 2010).

A similar study of 315 adults in Melbourne, Australia was conducted in 2003. The results were similar to American studies. Most people believed that childhood obesity was due to overconsumption of unhealthy food, parental responsibility and mass media. Compared with

nonparents and men, parents were more likely to believe that government policy was an important means of prevention of childhood obesity. Prevention strategies that were least supported were banning food advertising on children's television programs and increasing tax on high-fat foods (Hardus et al., 2003).

A study published in 2015 by Wolfson and colleagues looked at how the role of parents in the obesity epidemic could influence support for obesity reduction strategies. Wolfson et al. analyzed two studies to look at perceptions of who is to blame for causing obesity, who is responsible to solve it and how these perceptions differ between parental status and gender. They also looked at the relationship between parental views and support for obesity related policies. Wolfson et al. looked specifically at the public's attitudes toward parents of overweight and obese children, as well as support for obesity prevention policies according to parental status. They questioned whether beliefs that parents are responsible for childhood obesity translated into less support for obesity prevention policies, controlling for sociodemographic status and political attitudes. Wolfson et al. found that most of the public attributed the blame and responsibility of childhood obesity to parents. Findings suggest that people who blame parents do not devalue the power of broader policy action. Appealing to parents to support the prevention of obesity in the same way as one would support parent-initiated movements such as drunk driving prevention may be difficult outside of the school setting. Women were found to be more likely than men to support the prohibition of food advertisements during children's television shows and for discontinuing the inclusion of toys in children's meals by fast-food companies. Support for schools, the food and beverage industry, and the government solving the childhood obesity problem was positively associated with support for policies designed to prevent childhood obesity. People who held parents responsible for childhood obesity were more likely to support

school-based prevention programs (Wolfson et al., 2015).

## Chapter Three: Methodology

In 2004, Evans et al, created an instrument used to study opinions on the seriousness of childhood obesity compared to other youth issues, the factors that have contributed to childhood obesity, who or what is responsible to reduce childhood obesity, support for specific interventions, and potential barriers to support. Their list of specific intervention questions was derived from a review of childhood interventions that had recently been enacted or proposed. This study conducted for this paper was largely based on the Evan et al. study with a few modifications. Three of the specific interventions Evans et al. used were adopted for this study, and one was added from an outside source. The interventions chosen for this study covered school, market, and government interventions. The purpose of the questions asked of respondents was to gain an understanding into what factors people perceive to be contributing to the rise in childhood obesity. Crime, which was used in the Evans et al. study, was eliminated and air pollution was added. Air pollution was included because if a neighborhood is highly polluted, children may be less likely to go outside and exercise. In this study, respondents were asked to rate each question on a four-point Likert scale (e.g. 1=should not contribute at all, 2= should somewhat contribute, 3= should contribute, 4=should contribute a significant amount).

Survey respondents were recruited through a purposeful sample and a snowball sampling method. Surveys were sent to a non-random sample of 46 parents of school-aged children living in Colorado and Japan. Thirty-three were sent to Colorado residents, and thirteen to Japanese residents. A snowball sampling method was used, in which participants would suggest other parents who might be able to participate in the survey, in order to recruit more participants. The goal was to receive 25 responses from each location, for a total of 50 responses. The survey was distributed through the Qualtrics software and was open from February 28 to March 13, 2015.

The introduction of the survey stated the approximate amount of time a participant would spend taking the survey, and reminded the participant that his or her information would remain confidential. The English survey is attached in Appendix I and the Japanese version is attached in Appendix II. The International Review Board at the University of Colorado Boulder approved the study; the letter of approval is attached in Appendix III.

## **Analysis**

SPSS software was used for all statistical analyses. A series of independent-sample t-tests were conducted to examine the differences in perceptions of childhood obesity being a significant problem by location and gender. Colorado was coded as 0, and Japan was coded as 1. For gender, male was coded as 1 and female was coded as 2. An ANOVA test was used to control for gender. A set of linear regressions were conducted to test whether or not the belief that obesity was a significant problem was correlated with responses to other questions, with concern for obesity as the independent variable.

A set of linear regressions were run to test if concern for obesity was correlated with beliefs that certain entities should be responsible to reduce childhood obesity, beliefs that certain factors contribute to childhood obesity, and support for certain interventions. Obesity was the independent variable.

## Chapter Four: Results

### Sample Characteristics

Responses with missing data and respondents who indicated they were not from either Colorado or Japan were deleted from the data. After the data were cleaned and an analytic data set was prepared, there was a total of 71 respondents, 47 from Colorado and 24 from Japan. Table 1 presents the characteristics of the respondents. 66.2% of respondents were from Colorado, and 33.8% were from Japan; approximately 75% of respondents were female, and 25% were male. A majority of parents (55%) were in the age range of 40-49.

**Table 1.**

<b>Demographic Group</b>	<b><i>n</i></b>	<b>%</b>
<b>Overall</b>	71	100
<b>Gender</b>		
Male	18	25.35
Female	53	74.65
<b>Location</b>		
Colorado	47	66.20
Japan	24	33.80
<b>Age</b>		
<30	1	1.45
30-39	12	17.39
40-49	38	55.07
50-59	17	24.64
>60	1	1.45
<b>Number of Children</b>		
1	13	18.57
2	35	50.00
3	16	22.86
4	5	7.14
5	0	0.00
6	1	1.43

## Obesity as a Problem

Results reveal that in total, 31% of parents surveyed perceived childhood obesity to be a very serious problem. 32% of Colorado parents and 29% of Japanese parents reported obesity to be a significant problem. Among Colorado parents, obesity was considered a similar problem to drinking alcohol (30%), but not as serious as drug abuse (43%). Among Japanese parents, childhood obesity was thought to be the least serious problem, compared to drug abuse, violence, drinking, sex, and smoking. Drug abuse and sex were viewed as the most serious problems at 79%. Results are recorded in Table 2.

**Table 2.**

<b>Believe that each of the following is a "very serious" problem</b>	<b>Total</b>	<b>%</b>	<b>Colorado</b>	<b>%</b>	<b>Japan</b>	<b>%</b>
Drug abuse	39	54.93	20	42.55	19	79.17
Violence	28	39.44	10	21.28	18	75.00
Drinking	29	40.85	14	29.79	15	62.50
Sex	35	49.30	16	34.04	19	79.17
Smoking	27	38.03	11	23.40	16	66.67
Obesity	22	30.99	15	31.91	7	29.17

## Statistical Comparison by Location

A t-test was conducted to test the hypothesis that parents in Colorado view childhood obesity as a more significant problem compared to parents in Japan. After an initial t-test, no significant difference ( $p=0.312$ ) was found between the way parents in Colorado viewed childhood obesity compared to parents in Japan (Colorado mean=3.13; Japan mean=2.92). However, after controlling for gender using an analysis of variance (ANOVA) test, a significant difference was found between the opinions of parents in Japan and in Colorado. The results of the t-test are recorded in Table 3 and the ANOVA test is reported in Table 10.



A t-test was run on each issue: drug abuse, violence, drinking, sex, and smoking. The results revealed that there is a significant difference ( $p < 0.05$ ) between perceptions of drug abuse ( $p = 0.017$ ), violence ( $p = 0.000$ ), drinking ( $p = 0.017$ ), sex ( $p = 0.000$ ), and smoking ( $p = 0.001$ ). Results of this test are reported in Table 3.

**Table 3.**

Concern	Colorado Mean	Japan Mean	p-value
Drug Abuse	3.23	3.71	.017
Violence	2.77	3.71	.000
Drinking	3.20	3.58	.017
Sex	3.07	3.79	.00
Smoking	2.89	3.58	.001
Obesity	3.13	2.92	.312

### Statistical Comparison by Gender

The same t-test statistic was used to test whether there was a significant difference between perceptions of childhood obesity by the gender of the parent. A p-value of 0.046 shows that there is a statistically significant difference between the way females perceive childhood obesity compared to how males perceive it. The mean for males was 2.72 and 3.17 for females. Differences were also significant between perceptions of drug abuse ( $p = 0.015$ ).

### Contributing Factors

Parents in both Japan and Colorado perceived the most significant contributors to childhood obesity to be those that are related to an increase in energy intake. Fast food, junk food, and soda consumption were thought to be the greatest contributors to childhood obesity as seen in Table 4. Both Japanese and Colorado parents rated junk food to be the most significant contributing factor to childhood obesity at 70.83% and 74.47%, respectively. Air pollution was chosen least among the factors for Colorado parents, only 2.82% of Colorado respondents

thought air pollution significantly contributed to childhood obesity. Among Japanese parents, air pollution and watching more than two hours of television per day were the lowest, both at 4.17%. Results are reported in Table 4.

**Table 4.**

<b>Believes that each of the following has significantly contributed to childhood obesity</b>	<b>Total</b>	<b>%</b>	<b>Colorado</b>	<b>%</b>	<b>Japan</b>	<b>%</b>
Watching more than 2 hours of TV per day	25	35.21	24	51.06	1	4.17
Fast food such as McDonald's	48	67.61	34	72.34	14	58.33
Junk Food	52	73.24	35	74.47	17	70.83
Sodas	46	64.79	33	70.21	13	54.17
Playing video games or spending time on the Internet	23	32.39	19	40.43	4	16.67
Lack of exercise in school	20	29.41	16	34.04	4	19.05
Lack of places to exercise	16	22.54	7	14.89	9	37.50
Air pollution	2	2.82	1	2.13	1	4.17%

Statistical Comparison by Country

When an independent sample t-test was run, significant differences were found between watching television for more than two hours per day ( $p=0.00$ ) playing video games or spending time on the Internet ( $p=0.03$ ), and lack of places to exercise ( $p=0.004$ ). Compared to parents in Colorado, Japanese parents do not think watching more than two hours of television or spending time playing video games or on the Internet contributed to childhood obesity. However, more parents in Japan believe that a lack of places to exercise significantly contributes to childhood obesity (Colorado mean=2.40; Japan mean=3.08). Results are recorded in Table 5.

**Table 5.**

<b>Contributors</b>	<b>Colorado Mean</b>	<b>Japan Mean</b>	<b>p-value</b>
Watching more than 2 hours of TV per day	3.38	2.29	.000
Fast food such as McDonald's	3.68	3.38	.068
Junk Food	3.72	3.67	.666
Sodas	3.66	3.46	.183
Playing video games or spending time on the Internet	3.21	2.79	.030
Lack of exercise in school	2.98	2.9	.754
Lack of places to exercise	2.40	3.08	.004
Air Pollution	1.72	2.00	.159

### Statistical Comparison by Gender

Statistical significances were computed for lack of places to exercise ( $p=0.034$ ) and air pollution ( $p=0.006$ ). Slightly more females believed a lack of places to exercise contributes than males (female mean=2.77; male mean=2.22), and more females reported that air pollution contributes than males did (female mean=1.96, male mean= 1.39).

### Responsibility

Both parents in Colorado and Japan believed that parents should contribute a significant amount to reducing childhood obesity. Of Colorado parents, 95.74% reported that parents should be responsible, while 91.67% of parents in Japan believed they were primarily responsible. Among both Colorado and Japanese respondents, television advertising and the government were perceived to bear the least responsibility for childhood obesity. Results can be seen in Table 6.

**Table 6.**

<b>Believes that the following should contribute a significant amount to reducing childhood obesity</b>	<b>Total</b>	<b>%</b>	<b>Colorado</b>	<b>%</b>	<b>Japan</b>	<b>%</b>
TV advertising	14	20.00	9	19.57	5	20.83
Parents	67	94.37	45	95.74	22	91.67
Government	14	19.72	8	17.02	6	25.00
The Child	30	42.25	21	44.68	9	37.50
Food Companies	25	35.21	16	34.04	9	37.50
Schools	32	45.07	23	48.94	9	37.50
Restaurant (fast food or others)	16	22.54	10	21.28	6	25.00
Health care providers or physicians	27	38.03	21	44.68	6	25.00

#### Statistical Comparison by Country

As seen in Table 7, significant differences were found only between responses for the belief that physicians should contribute to reducing childhood obesity ( $p=0.038$ ). Compared to Japan, more parents from Colorado believed physicians should be held responsible (Colorado mean=3.40; Japan mean=3.08)

**Table 7.**

<b>Responsibility</b>	<b>Colorado Mean</b>	<b>Japan Mean</b>	<b>p-value</b>
TV advertising	2.78	2.75	.873
Parents	3.96	3.92	.488
Government	2.68	2.92	.254
The Child	3.32	3.08	.221
Food Companies	3.04	3.25	.317
Schools	3.34	3.29	.781
Restaurant (fast food or others)	2.72	2.96	.286
Health care providers or physicians	3.40	3.08	.038

Statistical Comparison by Gender

The beliefs that physicians should be responsible statistically differed between males and females (p=0.018). The mean for males was 3.00 and the mean for females was 3.40.

**Interventions**

Both respondents in Japan and Colorado ranked the “Increase tax on less healthy foods marketed to kids,” their least favorable intervention. Only 4.17% of parents in Japan and 12.77% of parents in Colorado thought there should be an increase in tax for this purpose. In Colorado, the most favored intervention was requiring more physical and nutrition education in school curriculums (53.19% strongly favored and 42.55% favored). This was also the case in Japan with 29.17% strongly favoring and 66.67% favoring this intervention. Results are shown in Table 8. No statistically significant differences were found between locations or gender (Table 9).

**Table 8.**

<b>Strongly favors the following interventions for reducing childhood obesity</b>	<b>Total</b>	<b>%</b>	<b>Colorado</b>	<b>%</b>	<b>Japan</b>	<b>%</b>
Require more physical and nutrition education in school curriculum	32	45.07	25	53.19	7	29.17
Prohibit less healthy food ads marketed to kids	22	30.99	16	34.04	6	25.00
Increase tax on less healthy food marketed to kids	7	9.86	6	12.77	1	4.17
Government-funded advertising campaigns that promote eating right and exercising	24	33.80	17	36.17	7	29.17

**Table 9.**

<b>Interventions</b>	<b>Colorado Mean</b>	<b>Japan Mean</b>	<b>p-value</b>
Require more physical and nutrition education in school curriculum	3.49	3.25	.097
Prohibit less healthy food ads marketed to kids	3.13	3.13	.989
Increase tax on less healthy foods marketed to kids	2.53	2.67	.466
Government-funded advertising campaigns that promote eating right and exercising	3.17	3.13	.807

### **Concern for Obesity vs. Other Variables**

A set of linear regressions were run to test if concern for obesity was correlated with a support for a specific intervention, belief that a certain factor is a contributor to obesity, or a belief that a specific entity should be responsible for reducing obesity. The linear regressions showed that there was a significant relationship between concern for obesity and a belief that fast food contributes to childhood obesity ( $p=0.054$ ). For respondents who do not believe fast food contributes at all to childhood obesity, the expected concern for obesity is 2.059. A regression was run to test if this relationship differed by location, but no significant relationship was found ( $p=0.422$ ).

## **Chapter Five: Discussion**

### **Study Implications**

Although a significant difference was found between concern for childhood obesity among parents in Colorado and Japan, parents from both locations had similar views as to what causes obesity, who is responsible for reducing the problem, and what interventions are supported among parents.

### **Obesity as a Problem**

The hypothesis that parents in Colorado consider obesity to be a more significant problem than parents in Japan was supported. Since females were more likely to be concerned about obesity than males and there were disproportionately more females than males in the study (75% compared to 25%), it was necessary to correct for gender in the comparison between Japan and Colorado. After correcting for gender, there was a significant difference between locations (Table 10). Although the prevalence of childhood obesity is low in Japan, 41.67% and 29.17% of respondents reported that obesity was a problem and a very serious problem. However, compared to drug abuse, violence, drinking alcohol, sex and smoking, obesity is not as significant of a problem. This supports the research that has shown an increase in obesity in Japan over the last few decades, but is still comparatively low.

Mothers showed a greater concern for obesity than did fathers. This may be because mothers typically assume the role of feeding the children and therefore may have more interest in issues pertaining to diet.

### **Contributing Factors**

Parents from Colorado and Japan believed factors associated with energy intake (fast food, junk food and sodas) contributed more to childhood obesity than factors related to energy

expenditure (playing video games or spending time on the Internet, lack of exercise in school, lack of places to exercise, watching more than two hours of television per day, and air pollution). This finding is consistent with the previous research of Hardus et al., 2003, Evans et al., 2005, and Harris et al., 2012. Statistically fewer respondents from Japan considered that viewing television for more than 2 hours a day and playing video games and spending time on the Internet contributed to childhood obesity. This may suggest that children in Japan do not spend much time in front of the television or playing video games. Watching more than two hours of television per day was also ranked low among Japanese respondents for being a contributing factor for the rise in obesity. Research has shown that a decrease in time spent in front of the television is correlated with a reduction in weight, which could be one reason childhood obesity is lower in Japan compared to the United States.

Statistically more parents in Japan believed that a lack of places to exercise contributes to childhood obesity. This may be because there is more space in a suburb of Colorado compared to a city in Japan such as Tokyo, which is where most of the respondents were from.

### **Responsibility**

Results from this study were consistent with previous research that parents bear the greatest responsibility for reducing childhood obesity (San Jose Mercury News and Kaiser Family Foundation, 2004; Hardus et al., 2003; Evans et al., 2005; Wolf et al., 2015), and that the government is least responsible (Evans et al., 2005 and San Jose Mercury News and Kaiser Family Foundation, 2004). The majority of respondents in both locations identified parents as being responsible for reducing childhood obesity, 95.74% in Colorado and 91.67% in Japan. This may be a societal norm in both cultures that parents should be held most accountable for solving issues pertaining to children. Among Japanese respondents, the government was the only



entity that was determined to be an unnecessary contributor in lowering childhood obesity. This may be a general dislike for any form of government intervention in Japan, or a belief that childhood obesity is not the government's responsibility to change. It is interesting that many parents believe it is their own responsibility to reduce childhood obesity. This study did not ask for the weight status of the children to test whether the respondents' answers differed based on the weight of their child.

### **Interventions**

These findings are consistent with previous research that tax-based interventions were least supported and that school-based interventions were most supported (Evans et al., 2005). Responses between Japanese and Coloradan parents were similar. No statistically significant differences were found between Japanese and Coloradan responses. Physical and nutritional education, as well as government-funded advertising campaigns that promote eating right and exercising were the most favored. An increase in tax was not favored, although government-funded advertising campaigns were favored. The government was not thought to be responsible for reducing obesity. However, a government-funded advertising campaign to promote proper eating and exercising was more strongly favored than prohibiting less healthy food ads marketed to children.

### **Concern for Obesity vs. Other Variables**

The only relationship that was significant was between concern for obesity and a belief that fast food contributes to childhood obesity. This further supports the belief that childhood obesity is correlated with consumption of fast food.

## **Limitations**

The size and scope of this research was small due to limitations in time and monetary resources. This research was not population based; however, it provides insights into these questions and identifies questions for further research. In surveys there is a social desirability bias in which respondents are more inclined to answer what he or she thinks is the right answer. This may have skewed the results. Some respondents did not answer all the questions, which may have skewed the results as well. On the Japanese survey, the “lack of exercise in school,” option was not translated completely, which may have causes some confusion among respondents and altered the results. For the first three days the survey was open, the “lack of exercise in school,” option was not translated completely, and only stated “in school.” The complete translation was added to the survey on March 2, but four of the 24 respondents left this portion of the question blank. Furthermore, the meaning of some words may have gotten lost in translation from English to Japanese.

## **Chapter Six: Conclusion and Recommendations**

This study compared perceptions of childhood obesity and support for interventions among Japanese and Colorado parents. Answers regarding what causes childhood obesity, who is responsible to reduce the problem, and support for interventions were relatively similar between Colorado and Japanese respondents. However, parents in Colorado and females were more concerned with obesity than parents in Japan and males. It is probable that a lesser concern for obesity among Japanese participants is because the prevalence of obesity is a lot lower in Japan than in Colorado. In Japan, obesity interventions are not solely focused on obesity, but take on a more holistic approach. Because of this, parents may not think of obesity as significant of a problem as other issues such as drug abuse and drinking.

This research could be beneficial to policy makers in Colorado and Japan to know what interventions are supported and what the perceived causes of obesity are among parents. Interventions in Colorado should focus on ways to decrease the time children spend watching television and playing video games, while also reducing the consumption of junk foods. In Japan, interventions should focus on reducing consumption of junk food and increasing the amount of places to exercise. The majority of respondents reported that parents should be responsible for reducing obesity. Interventions in both Colorado and Japan should focus on educating parents on ways to decrease excess energy intake and increase energy expenditure for their children.

Further research would require a larger sample size to be able to generalize results for the population. In the future, more qualitative based studies should be used to gain a better understanding of how parents in Japan view obesity, and what specific interventions they perceive as successful.

## Appendix

### Appendix I

Thank you for taking part in this survey. This survey is to help understand parents' perceptions of childhood obesity in Japan and in Colorado. The survey is designed to learn more about your opinions regarding childhood obesity and what interventions should be put in place to reduce childhood obesity. The survey will take approximately 10 minutes to complete. All the information you provide will be kept confidential. If you have any questions please do not hesitate to contact me at [erica.jacobs@colorado.edu](mailto:erica.jacobs@colorado.edu). Click on the arrow to begin the survey

Q2 What is your gender?

- Male (1)
- Female (2)

Q3 Where is your current city of residence?

Q3 What is your date of birth?

Q4 How many children do you have?

Q5 Please rate how serious you think each of these problems are among youth

	Not a very serious problem (1)	Somewhat of a problem (2)	A problem (3)	A very serious problem (4)
Drug abuse (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Violence (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Drinking (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sex (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Smoking (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Obesity (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q6 Please rate how much you think each of these factors have contributed to an increase in childhood obesity

	Does not contribute at all (1)	Somewhat contributes (2)	Contributes (3)	Contributes a significant amount (4)
Watching more than 2 hours of TV per day (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Fast food such as McDonald's (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Junk food (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Sodas (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Playing video games or spending time on the Internet (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of exercise in school (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Lack of places to exercise (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Air Pollution (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7 Please rate how much you believe the following institutions should contribute to reducing childhood obesity

	Should not contribute at all (1)	Should somewhat contribute (2)	Should contribute (3)	Should contribute a significant amount (4)
TV advertising (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Parents (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
The Child (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Food Companies (5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Schools (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Restaurant (fast food or others) (7)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Health care providers or physicians (8)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q8 Please rate how much you are in favor of or in opposition of these interventions for reducing childhood obesity

	Strongly Oppose (1)	Oppose (2)	Favor (3)	Strongly Favor (4)
Require more physical and nutrition education in school curriculum (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Prohibit less healthy food ads marketed to kids (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Increase tax on less healthy foods marketed to kids (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Government-funded advertising campaigns that promote eating right and exercising (4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## Appendix II

この調査に参加していただき、ありがとうございます。この調査の目的は、日本とコロラド州の小児肥満の親の認識を理解することです。この調査は小児肥満に対するあなたの意見を知るためと、どんな介入によって小児肥満を減らすことができるのかを調査するように設計されています。調査には約 10 分かかります。ご提供いただく情報は機密保持を約束いたします。ご質問があれば、遠慮なく [erica.jacobs@colorado.edu](mailto:erica.jacobs@colorado.edu) までご連絡ください。調査を開始するために、矢印をクリックしてください。

Q2 あなたの性別はなんですか

- 男性
- 女性

Q3 現在、住んでいる都市はどこですか。

Q4 あなたの生年月日はいつですか。

Q5 子供は何人いますか。

Q6 あなたは以下の問題が青少年にとってどれほど深刻だと思えますか。（1~4 で評価してください）

	あまり深刻な問題ではない (1)	多少問題である (2)	問題である (3)	とても深刻な問題である(4)
薬物乱用 (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
暴力(2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
飲酒 (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
セックス(4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
タバコ(5)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
肥満 (6)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q7 以下の原因が小児肥満の増加にどれほど影響を与えたと考えますか？

	全く影響はない (1)	多少は影響がある (2)	影響がある (3)	明らかに影響がある(4)
(1) 1日にテレビを 2時間見ること	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(2) ファストフード (マクドナルド など)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(3) ジャンクフード	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(4) 清涼飲料	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(5) ゲームやインター ネット	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(6) 学校での 運動不足	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(7) 運動する場所が 少ない	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(8) 大気汚染	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



Q8 次の機関は、小児肥満を減らすためにどれくらい貢献すべきだと考えますか？

	全く貢献すべきでない(1)	多少貢献すべき(2)	貢献すべき(3)	多大な貢献をすべき(4)
(1) テレビ広告	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(2) 両親	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(3) 政府	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(4) 子供	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(5) 食品会社	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(6) 学校	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(7) レストランとファストフード	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
(8) 医師	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Q9 以下の小児肥満を減らすための介入について、あなたがどの程度賛成か反対かをお答えください。

	強く反対 (1)	反対 (2)	賛成 (3)	強く賛成(4)
学校の教育課程で健康栄養教育をもっと取り入れるよう要求する (1)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
子供向けの不健康な食べ物の広告を禁止する (2)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
子供向けの不健康な食べ物に対する税を増やす (3)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
政府提供による正しい食事と運動促進キャンペーン広告(4)	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Survey translated by Yuriko Aragai

## Appendix III



Institutional Review Board  
563 UCB  
Boulder, CO 80309  
Phone: 303.735.3702  
Fax: 303.735.5185  
FWA: 00003492

### APPROVAL

18-Feb-2015

Dear Erica Jacobs,

On **18-Feb-2015** the IRB reviewed the following protocol:

Type of Submission:	Initial Application
Review Category:	Exempt - Category 2
Title:	Perceptions of childhood obesity
Investigator:	Jacobs, Erica
Protocol #:	15-0047
Funding:	None
Documents Approved:	Recruitment E-mail Content; Protocol; Public Perceptions Survey;
Documents Reviewed:	References for Protocol; HRP-211: FORM - Initial Application;

The IRB approved the protocol on **18-Feb-2015**.

Click the link to find the approved documents for this protocol: [Approved Documents](#). Use copies of these documents to conduct your research.

In conducting this protocol you must follow the requirements listed in the [INVESTIGATOR MANUAL \(HRP-103\)](#).

Sincerely,  
Douglas Grafel  
IRB Admin Review Coordinator  
Institutional Review Board

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