

The Health of Iowa: Impact of Overweight and Obesity



Nutrition and Physical Activity Summary Burden Report
Iowa Department of Public Health
Bureau of Nutrition and Health Promotion
Nutrition and Physical Activity Program

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Introduction

In a 1960 *Sports Illustrated* article entitled “The Soft American,” President-elect John F. Kennedy conveyed that approximately 45 percent of American adults were overweight, including 13 percent who were obese; the rate was 4 percent among youth 6 to 17 years of age. For the next two decades, obesity rates remained relatively stable; however, from 1980 to 2000, the rates doubled. In 2001, the U.S. Surgeon General announced that obesity had reached “epidemic” proportions. By 2007, 34 percent of adults over the age of 20 were obese and two-thirds (66.3%) were either overweight or obese; approximately one in three children was overweight and almost one in five was obese (Ogden et al., 2006; 2007). Today, Americans consume an average of 2,700 calories daily, about 500 calories more than 40 years ago. In 2010, the U.S. ranked as the fattest developed nation in the world, with an obesity rate more than double that of many European nations.

Overweight and Obesity Assessment

For adults 20 years old and older, Body Mass Index (BMI) is interpreted using standard weight status categories that are the same for all ages and for both men and women. The standard weight status categories associated with BMI ranges for adults are shown in Table 1 (NIH, 1998). BMI is used to define overweight and obesity. Overweight is considered to be a BMI value greater than or equal to 25 and less than 30; obesity is considered to be a BMI greater than or equal to 30.

Table 1. BMI Classification for Adults 30 Years of Age and Older

BMI	Weight Status
Below 18.5	Underweight
18.5 – 24.9	Normal
25.0 – 29.9	Overweight
30.0 and Above	Obese

Because children and adolescents (i.e., 2 to 20 years of age) are still growing and have differences in body composition, their BMI is compared to that of other youth of the same gender and age. The BMI for children and adolescents are plotted on a gender-specific growth chart by age to determine gender- and age-specific percentiles (CDC, 2000; Dietz & Bellizi, 1999). Table 2 displays the BMI ranges and corresponding weight status categories for youth.

Table 2. BMI Classification for Children 2 to 20 Years of Age

Weight Status Category	Percentile Range
Underweight	Less than the 5th percentile
Healthy weight	5th percentile to less than the 85th percentile
Overweight	85th to less than the 95th percentile
Obese	Equal to or greater than the 95th percentile

Obesity in the United States

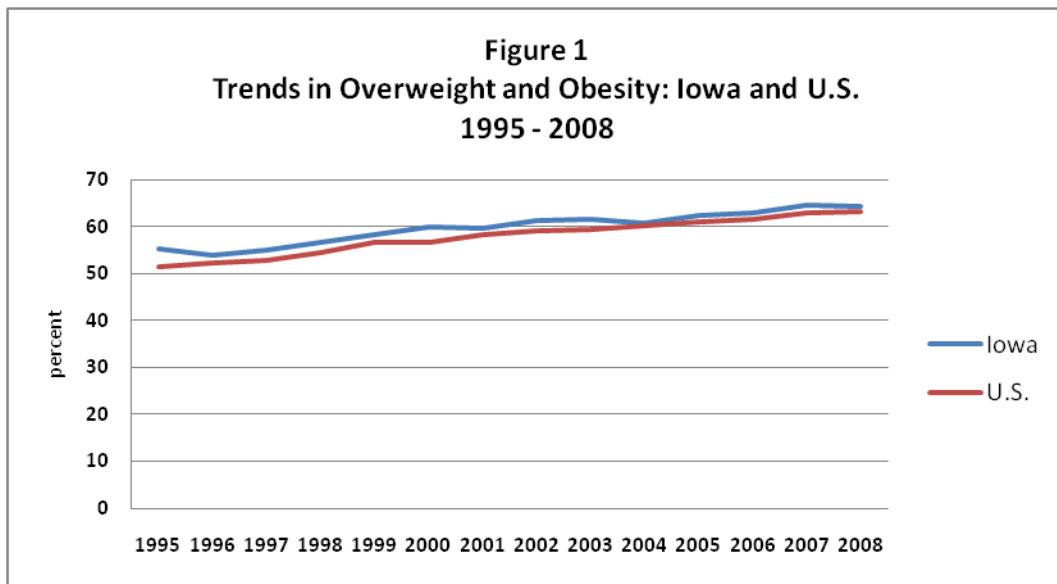
The obesity epidemic in the U.S. has been documented by the National Health and Nutrition Examination Survey (NHANES). NHANES continually assesses the health of American adults and children, including determinations of overweight and obesity (CDC, 2007a). Based on these results, obesity rates in US adults more than doubled between 1980 and 2002 (Flegal, et al., 2002; Hedley, et al., 2004). This trend appeared similar in men and women and across age and racial or ethnic groups (Flegal, et al., 2002). More than a third (34.3%) of American adults over the age of 20 are now obese (Ogden, et al., 2007); approximately two-thirds (66.3%) are either overweight or obese (Ogden, et al., 2006). Perhaps more alarming are parallel increases in obesity observed among youth over the past several decades. Between 1980 and 2002, the percentage of obesity more than doubled in children between the ages of 2 and 11 and more than tripled for adolescents, aged 12 through 19 (Hedley, et al., 2004; Ogden, et al., 2002). Among youth 2 to 19 years of age, 17% are obese, and over a third (34%) are either overweight or obese (Ogden, et al, 2006).

Obesity in Iowa

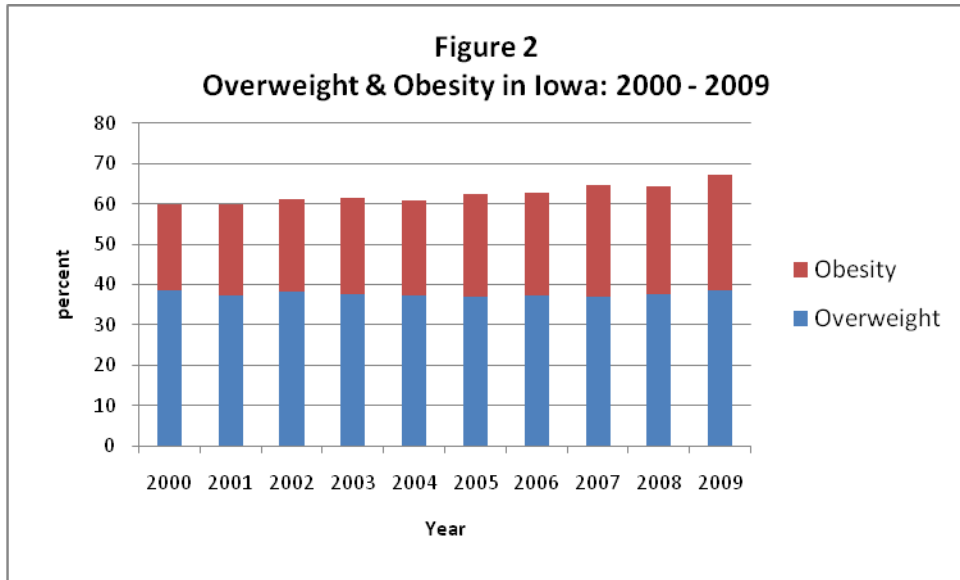
Adults

In Iowa, information related to the prevalence of adult obesity is based primarily on results from the Behavioral Risk Factor Surveillance System (BRFSS). The BRFSS is a large, population-based, random-digit-dial telephone survey of health conditions and related behaviors, conducted annually in all U.S. states and territories (CDC, 2008b). The BRFSS provides annual prevalence estimates of obesity and overweight, or the proportion of adults that fall into each of these weight categories, for the nation and individual states.

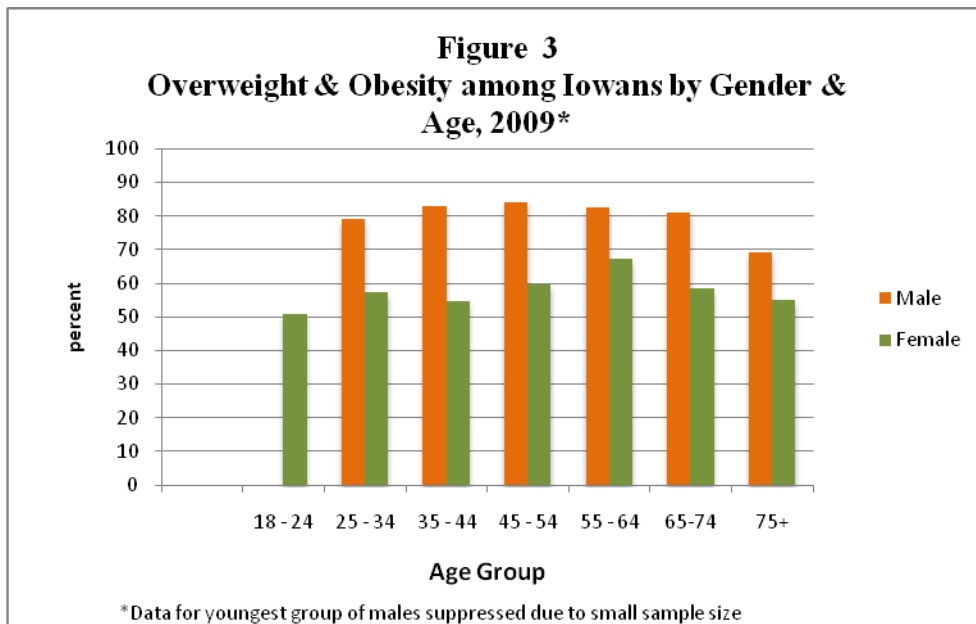
The 2009 BRFSS found that the combined percentage of Iowa adults who were overweight or obese was 67.2 percent. This is higher than the 64.3 percent reported in 2008, reflecting a long trend of increasing overweight and obesity among Iowans (see Figure 1). BRFSS data indicate that the number of Iowa adults who were above a healthy weight increased by about 36 percent between 1995 and 2009, compared with a national increase of 32 percent (Figure 1) (BRFSS, 2009). In 2009, over two-thirds of the adult population in Iowa was overweight or obese; this estimate was equivalent to approximately 1.5 million Iowans. The 2008 national overall overweight and obesity median estimate was 63.2 percent (BRFSS, 2009).



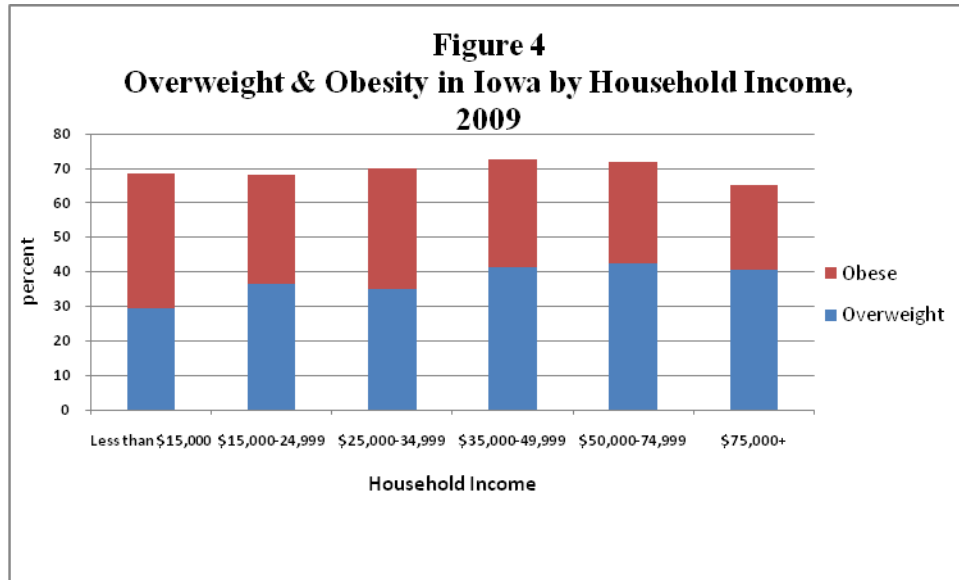
The BRFSS data show that in 2009, 38.7% of Iowans were overweight and 28.5% were obese, based on BMI. The combined percentage of individuals who were overweight or obese was 67.2%. This follows the long trend of increasing overweight and obesity (see Figure 2). The self-reported weights show more males than females were overweight or obese.



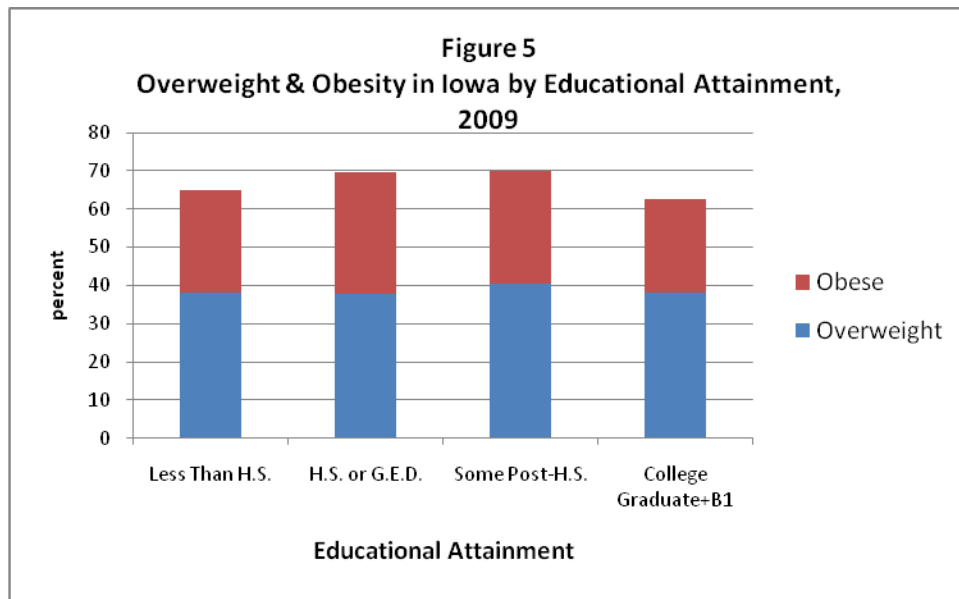
Overweight and obesity increase with age until late middle age after which a decline is seen. Obesity shows a very sharp decrease for both sexes in the 75 year old and older age groups. This decline is even more pronounced for men (see Figure 3). There is a much stronger gender difference for overweight than for obesity. More men are overweight than women, and there is no decline or equalization at the oldest age group. The demographic group with the highest prevalence rate for overweight/obesity was lowans age 55 to 64 years (75.1%) (See Figure 3). The group with the lowest prevalence rate was lowans 18 to 24 years old (48.2%). More men were overweight/obese than women in all age groups.



The effects of income are different for overweight and obesity. The percentage of overweight among Iowans tends to increase a little with increasing income. On the other hand, obesity tends to decrease at the higher income levels (see Figure 4).



The tendency for overweight and obesity to be oppositely related to demographic variables is demonstrated with education. Iowans with less than a high school education have the lowest rate of overweight, but college graduates have the lowest rate of obesity (see Figure 5).



In terms of race and ethnicity, the reported number of Blacks and Hispanics who participated in the 2009 BRFSS was too low to calculate meaningful percentages of overweight/obesity prevalence rates.

A high prevalence of overweight and obesity is of great public health concern because excess body fat leads to a higher risk for premature death, type 2 diabetes, hypertension, dyslipidemia, cardiovascular disease, stroke, gall bladder disease, respiratory dysfunction, gout, osteoarthritis, and certain kinds of cancers (Morbidity and Mortality Weekly Report, 1997). While overweight and obesity are currently significant public health issues, not all Americans need to lose weight. People at a healthy weight should strive to maintain their weight, and underweight individuals may need to increase their weight.

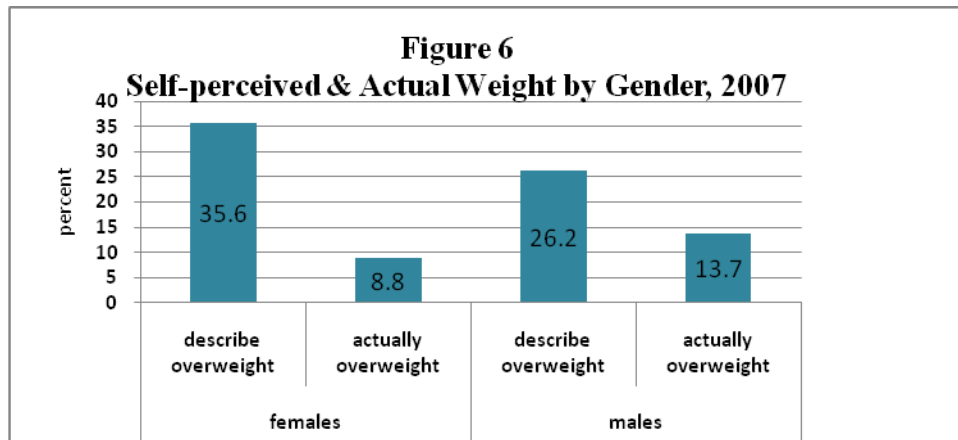
Youth

Adolescents

Youth Risk Behavior Survey

The Youth Risk Behavior Survey (YRBS) was established by the U.S. Centers for Disease Control and Prevention (CDC) to help monitor the prevalence of behaviors that put youth at risk for serious health and social problems. The YRBS is used by the State of Iowa to monitor these behaviors among young Iowans. The most recent findings (2006 - 2007) focused on students in grades 9 through 12 who were attending Iowa public high schools, plus traditional and alternative schools. Schools were randomly selected to be in the final sample; in total, 29 schools participated in the survey. The overall student response rate was 60 percent. Final data were weighted so that the results of the survey can be generalized to all Iowa high school students. A total of 1,440 students participated in the survey; 49.1% were female.

According to the self-reported data, 30.8 percent of Iowa youth surveyed self-described as “slightly” or “very overweight”. 13.5% were actually overweight (i.e., BMI \geq 85th percentile, and \leq 95th percentile) and 11.3% were actually obese (i.e., BMI > 95th percentile). The percentage of females who self-described as being overweight (i.e., 35.6%) was significantly higher than males (i.e., 26.2%). However, proportionately fewer female youth than male youth were actually overweight (i.e., 8.8% vs. 13.7%) (See Figure 6).



There were no significant grade level differences in BMI or perceptions of overweight. However, 45% of surveyed students indicated they were trying to lose weight; 59.8% of students reported exercising to lose weight or to keep from gaining weight during the past month; and 40.6% of students ate less food to keep from gaining weight in the past month. Further, more females than males indicated they were trying to lose weight through various strategies.

Overall, 45 percent of surveyed students indicated they were trying to lose weight; during the past month, 40.6 percent ate less food, fewer calories, or foods low in fat to lose weight or to keep from gaining weight. 10.6 percent went without eating for 24 hours or more to lose weight or to keep from gaining weight during the past month. Further, more females than males indicated they were trying to lose weight through various strategies.

Iowa Youth Survey

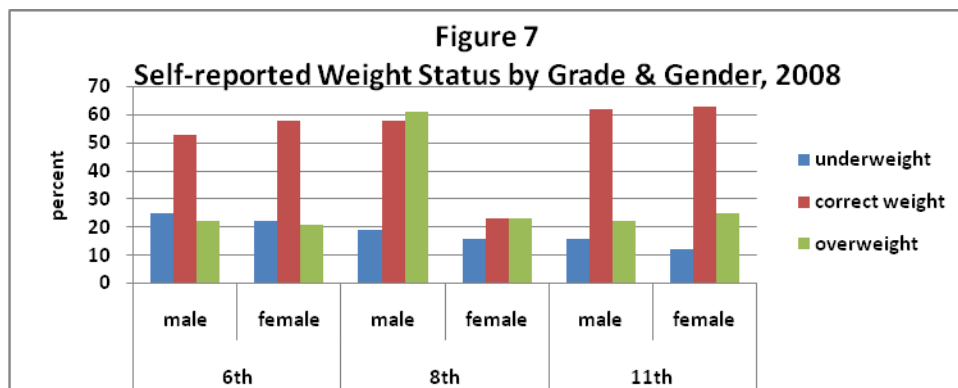
In September and October 2008, the Iowa Department of Public Health collaborated with schools in Iowa to conduct the 2008 Iowa Youth Survey (IYS). The 2008 IYS is the twelfth in a series of surveys that have been completed every three years since 1975. The survey is conducted with students in grades 6, 8, and 11 attending Iowa public and private schools. The IYS includes questions about students' behaviors, attitudes, and beliefs, as well as their perceptions of peer, family, school, neighborhood, and community environments.

In 2008, a change in the method used to conduct the IYS took place. All 2008 surveys were conducted via the internet and completed by students online through an electronic survey tool (SurveyMonkey) administered by the Iowa Department of Administrative Services in conjunction with the Iowa Department of Public Health.

A total of 97,741 records were received from students across the state. Data in this report assumes each record represents one student. Validated data was received from 94,708 students attending public school districts, and 3,033 students attending nonpublic schools and a regent's institution. Data was

identified from 347 of Iowa’s 362 public school districts (95.9%), and from 48 of the 184 nonpublic schools (26.1%), including one regent’s institution. The data received represented all 99 counties in Iowa. Nearly all Iowa counties were represented with a minimum of 200 students in each county.

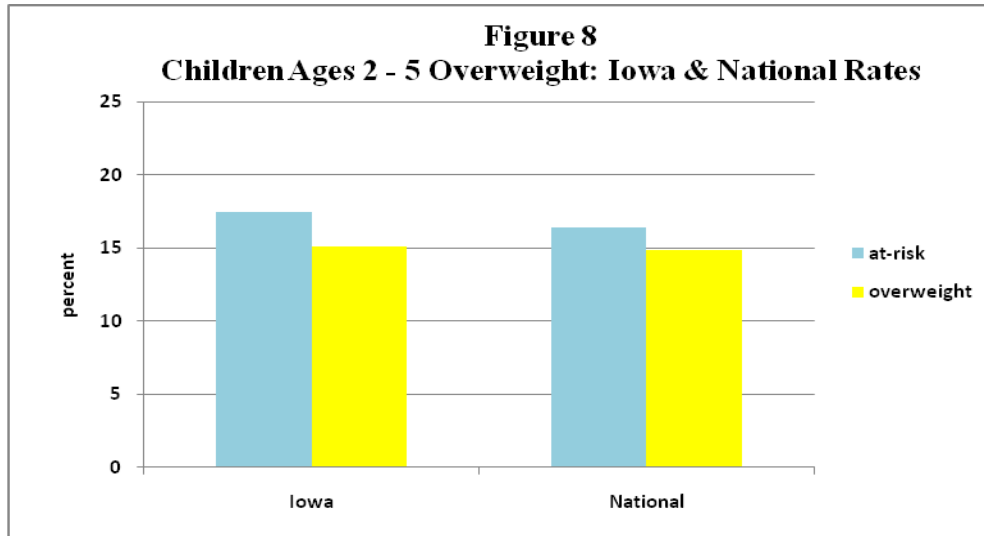
In the 2008 IYS, 19 percent of participating youth (6th, 8th, 11th grades) self-described as “underweight”; 59 percent as “about the right weight”; and 23 percent as “overweight”. Figure 7 depicts the differences between males and females across the grades. The majority of students participating in the IYS self-described as “about the right weight”.



Young Children

Data on maternal health and behavioral risk factors and infant birth outcomes are collected on low-income women who participate in federally funded public health programs. Child health indicators are collected during clinic visits to monitor the prevalence of nutrition and behavioral risk factors related to child mortality and poor birth outcomes.

Approximately one-third (32.6 percent) of children ages 2 to 5 years of age who participate in the Iowa Women Infants and Children (WIC) Program are at-risk of overweight or overweight (BMI 85th to 100th percentile); 17.5 percent are at-risk of overweight and 15.1 percent are overweight. The Iowa percentages are slightly higher than the proportion of children ages 2 to 5 years who are at-risk of overweight or overweight based on estimates from national data, 31.3 percent (see Figure 8) (Centers for Disease Control and Prevention. Pediatric Nutrition Surveillance System) (Iowa WIC Program, 2008).



Recommendations

- To maintain body weight in a healthy range, balance calories from foods and beverages with calories expended.
- To prevent gradual weight gain over time, make small decreases in food and beverage calories and increase physical activity.

Specific Population Groups

- *Those who need to lose weight.* Aim for a slow, steady weight loss by decreasing calorie intake while maintaining an adequate nutrient intake and increasing physical activity.
- *Overweight children.* Reduce the rate of body weight gain while allowing growth and development. Consult a health-care provider before placing a child on a weight-reduction diet.
- *Pregnant women.* Ensure appropriate weight gain as specified by a healthcare provider.
- *Breastfeeding women.* Moderate weight reduction is safe and does not compromise weight gain of the nursing infant.
- *Overweight adults and overweight children with chronic diseases and/or on medication.* Consult a health-care provider about weight loss strategies prior to starting a weight-reduction program to ensure appropriate management of other health conditions.

(U.S. Department of Health and Human Services and U.S. Department of Agriculture. Dietary Guidelines for Americans, 2005. 6th Edition, Washington, DC: U.S. Government Printing Office, January 2005)



Contributing Factors

Although individual weight status is determined by many factors, the primary causes of overweight and obesity in most individuals is an imbalance between nutrition and physical activity (U.S. D.H.H.S., 2001). CDC recommends that efforts to prevent and control obesity target the following areas based on the best available evidence: (Dietz, 2008; CDC, 2009):

- Increase physical activity
- Decrease television viewing
- Increase the consumption of fruits and vegetables
- Decrease the consumption of sugar-sweetened beverages
- Reduce the consumption of high energy-dense foods (high calorie foods)
- Increase breastfeeding initiation, duration, and exclusivity

The BRFSS and YRBS surveys collect information on adult and high school student nutrition and physical activity behaviors. In addition, BRFSS provides information on some of the social and environmental factors that contribute to physical inactivity and poor nutrition.

Physical Activity

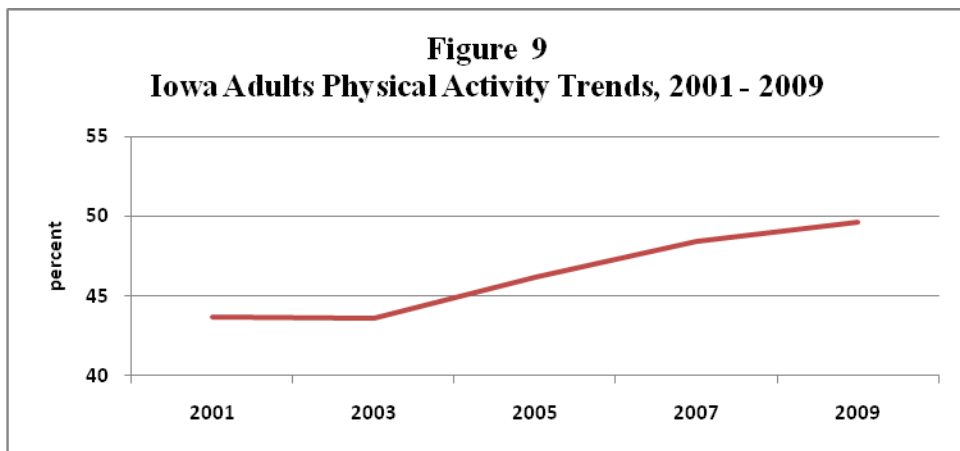
The U.S. Department of Health and Human Services released the first comprehensive physical activity recommendations in 2008. The physical activity guidelines for Americans recommends adults ages 18 – 64 get 150 minutes each week of moderate activity or 75 minutes each week of vigorous activity or a combination of the two. The recommendations for children and adolescents (6 to 17 years of age) are 60 or more minutes of moderate to vigorous activity every day with vigorous activity at least 3 days each week.

Adults

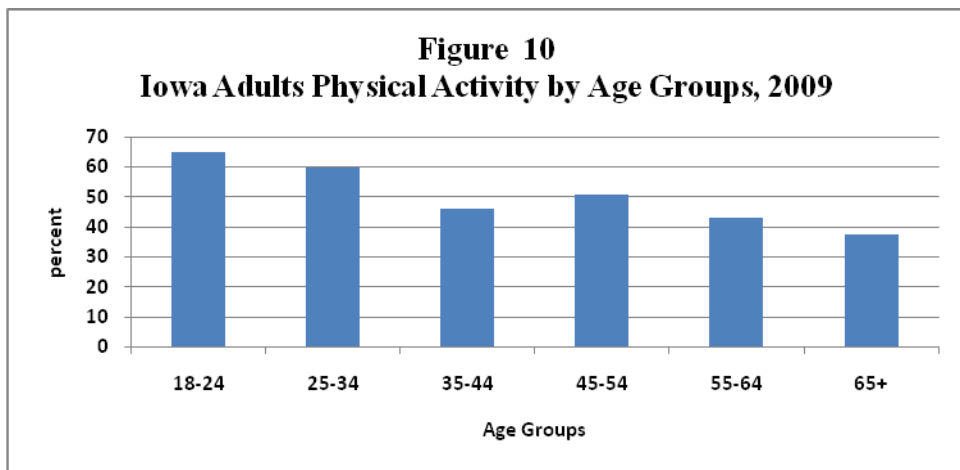
Physical activity may be classified as either moderate or vigorous (Iowa Behavioral Risk Factor Surveillance System 2009 [BRFSS], Bureau of Health Statistics, Iowa Department of Public Health, 2009). Vigorous activities cause large increases in breathing or heart rate; moderate activities cause small increases in breathing or heart rate. The recommended level of physical activity may be either regular, moderate or regular, vigorous. Regular, moderate is defined as physical activity for 30 or more minutes each day for 5 or more days

each week. Regular, vigorous is defined as physical activity for 20 or more minutes each day, 3 or more days each week. Nationally, the prevalence of adults (2009) who reported at least moderate physical activity ranged from 28 percent in Puerto Rico to 60.6 percent in Alaska; the average rate nationally was 50.5 percent. Adults who reported vigorous physical activity ranged from 13.7 percent in Puerto Rico to 40.1 percent in Alaska; the average rate nationally was 29.2 percent (Center for Disease Control and Prevention, Behavioral Risk Factor Surveillance System [BRFSS], 2009).

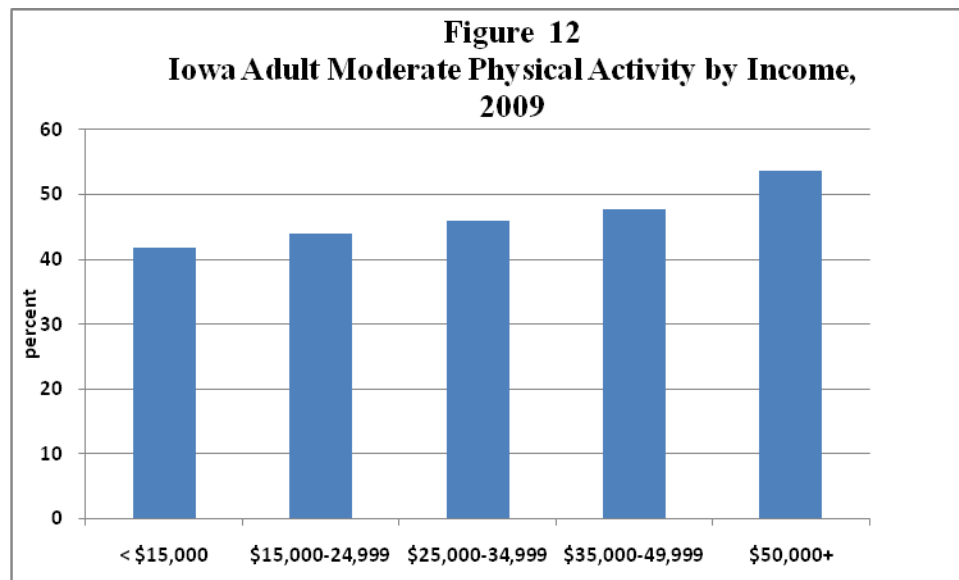
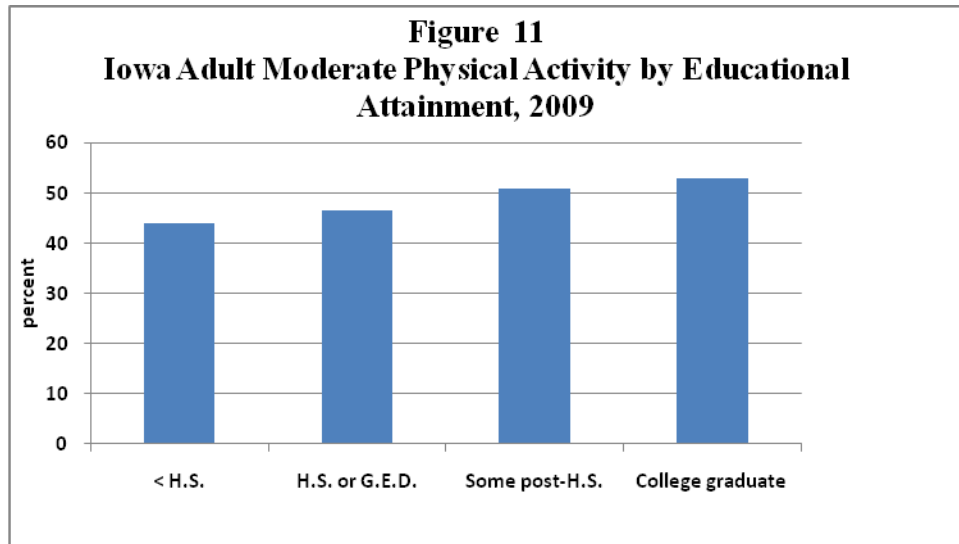
In 2009, 49.6% of respondents in Iowa reported that they had engaged in some sort of physical activity for exercise during the past month other than their regular job. This is a bit higher than the 48.4% found in 2007 (see Figure 9).



The percentage of respondents in Iowa reporting they had engaged in moderate physical activity was slightly higher for males than for females. In addition, physical activity decreased with age. The lowest percent for all demographic groups considered was for those age 65 years and older (37.5%), while the highest percent was for ages 18 to 24 years (64.8%) (see Figure 10).



A larger percentage of lowans who were better educated and had a higher annual household income engaged in the recommended amount of physical activity (Figure 11 and Figure 12).

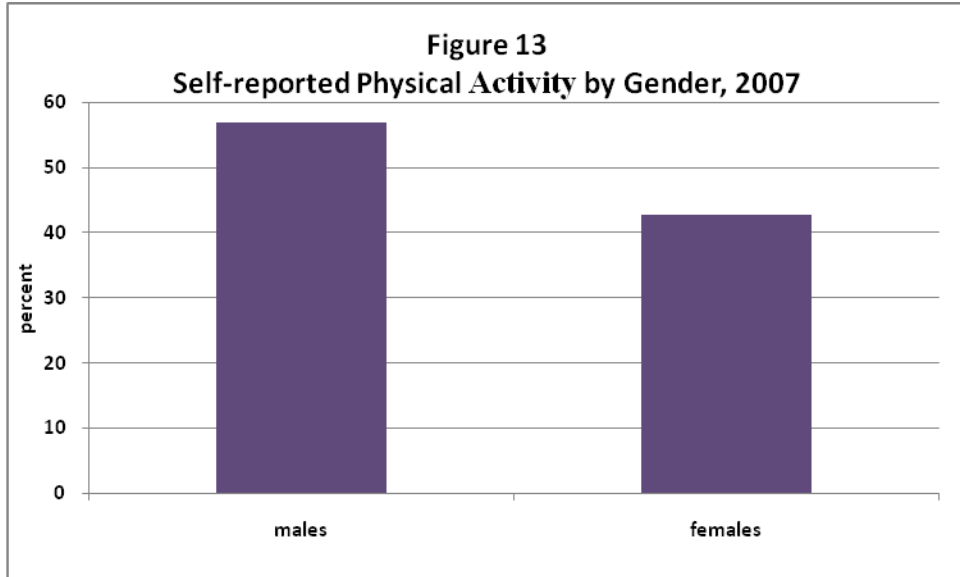


Adolescents

Youth Risk Behavior Survey

Among Iowa youth responding to the 2007 YRBS (i.e., 9th through 12th graders), 49.9 percent reported being physically active for at least 60 minutes on 5 days in the past week. Significantly fewer females (42.7%) than males (56.9%) reported

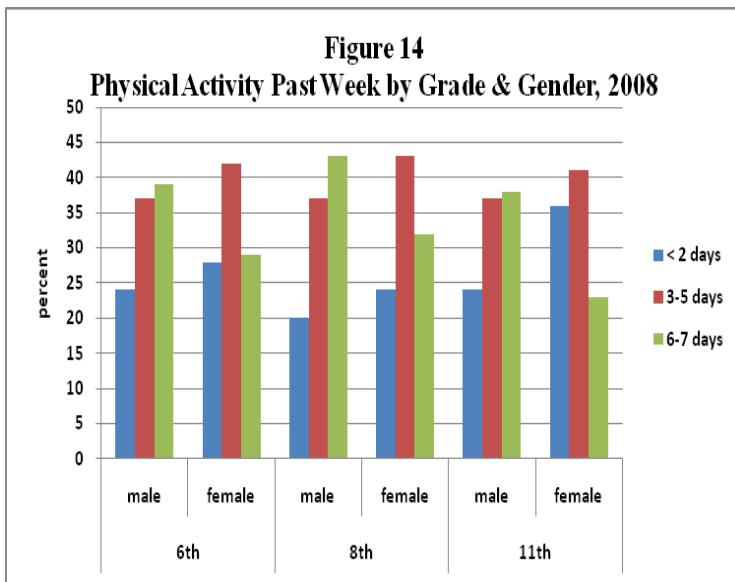
being physically active for at least 60 minutes on 5 days in the past week (Figure 13).



Overall, 65.4% of students reported playing on one or more sports teams in the past year. Across all the grades, 20 percent indicated they attended a physical education (PE) class in an average week.

Iowa Youth Survey

The 2008 Iowa Youth Survey (IYS) found that 11percent of youth engaged in 60 minutes of physical activity on 2 or fewer days in the past week; 39 percent reported 3 to 5 days; and 34 percent reported 6 to 7 days. Figure 14 depicts the differences between male and female students across the three grades.



Television Viewing

Television viewing is a popular leisure-time activity (McCarthy, Gibney, & Flynn, 2002) and promotes a sedentary lifestyle by infringing on the time available for physical activity. Many researchers have reported a positive association between hours spent watching television and overweight or obesity status (Bowman, 2006). Television viewing may not only facilitate low energy expenditure, but also increase energy intake and thereby play a role in the current obesity epidemic.

Many research studies have shown positive associations between prolonged television viewing and obesity and health conditions. Researchers (Hu, Leitzmann, Stampfer, Colditz, Willet, & Rimm, 2001; Hu, Li, Colditz, Willet, & Manson, 2003; Hu, 2003) have observed that prolonged television watching was positively associated with an increased risk of obesity and type 2 diabetes in men and women. Fung et al, (2000) found a positive association between television viewing and leptin levels and low-density lipoprotein cholesterol and an inverse association between television viewing and high-density lipoprotein cholesterol and apolipoprotein A1. After adjusting for socioeconomic and demographic variables, adults who watched more than 2 hours of television per day consumed 137 calories more than adults who watched less than 1 hour of television per day (Bowman, 2006).

Bowman (2006) found that watching more than 2 hours of television daily was associated with being overweight or obese in both men and women. Across all socioeconomic and demographic groups, significantly higher percentages of adults who watched more than 2 hours of television per day were overweight compared with adults who watched less than 1 hour of television daily. Further, a high percentage of adults aged 50 or older watched more than 2 hours of television each day.

Adults

To assess a sedentary lifestyle, Iowa BRFSS survey respondents were asked how many hours were spent watching television, playing video games, or at the computer for leisure activity. The average amount of time engaged in such activities was 2.7 hours each day; the median was two hours. Almost 6 percent (i.e., 5.8%) engaged in such activities never or less than daily, while 0.8 percent responded twelve or more hours each day (see Table 3 and Table 4).

Table 3. Iowa Adults Week-day TV & Video Viewing 2 - 3 Hours, 2009

Demographic Groups	Percent
TOTAL	26.4
GENDER	
Male	27.6
Female	25.3
AGE	
18 - 24	26.7
25 - 34	26.0
35 - 44	23.7
45 - 54	30.2
55 - 64	27.9
65-74	25.9
75+	22.1
EDUCATION	
Less than H.S.	22.4
H.S. or G.E.D.	27.2
Some Post-H.S.	26.7
College Graduate	26.2
HOUSEHOLD INCOME	
Less than \$15,000	17.1
\$15,000- 24,999	22.4
\$25,000- 34,999	29.8
\$35,000- 49,999	30.5
\$50,000- 74,999	25.2
\$75,000+	27.6

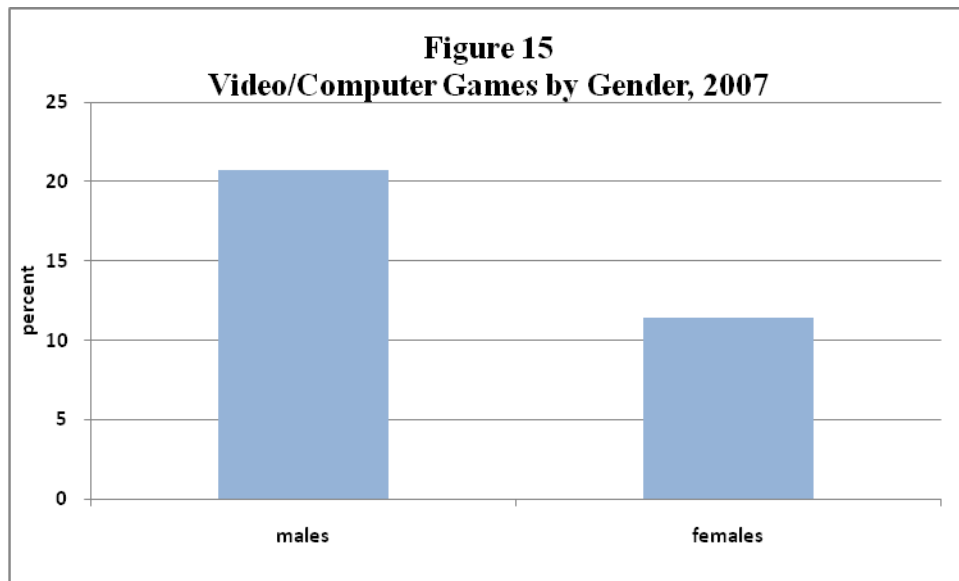
Table 4. Iowa Adults Week-end TV & Video Viewing \geq 5 Hours, 2009

Demographic Groups	Percent
TOTAL	41.1
GENDER	
Male	44.1
Female	38.1
AGE	
18 - 24	36.7
25 - 34	38.1
35 - 44	38.2
45 - 54	41.7
55 - 64	45.6
65-74	46.7
75+	43.6
EDUCATION	
Less than H.S.	39.6
H.S. or G.E.D.	44.0
Some Post-H.S.	42.4
College Graduate	37.1
HOUSEHOLD INCOME	
Less than \$15,000	46.5
\$15,000- 24,999	41.6
\$25,000- 34,999	47.8
\$35,000- 49,999	38.8
\$50,000- 74,999	38.0
\$75,000+	40.1

Adolescents

Youth Risk Behavior Survey

The 2007 YRBS found that 25 percent of students reported watching 3 hours or more of television on an average school day; 16.2 percent reported playing video or computer games 3 hours or more on an average school day; significant differences were found between males and females (20.7% vs. 11.4%) (See Figure 15).



Recommendations

All healthy adults ages 18 to 65 years need moderate-intensity aerobic physical activity for at least 30 minutes on five days each week or vigorous-intensity aerobic physical activity for at least 20 minutes on three days each week, according to updated physical activity guidelines released today by the American College of Sports Medicine (ACSM) and the American Heart Association (AHA) (Haskell, Lee, Pate, Powell, Blair, Franklin, Macera, Heath, Thompson, & Bauman, 2007).

It is recommended that children and adolescents participate in at least 60 minutes of moderate intensity physical activity most days of the week, preferably daily (Dietary Guidelines for Americans, 2005).

Various opportunities exist for Iowa to improve access and venues for physical activity. The indicators below represent key areas in which policy and environmental support can help increase physical activity levels.

- Create or enhance access to places for physical activity

Creating and enhancing access to safe places for physical activity can provide environmental opportunities, support, and cues to help people develop healthier behaviors.

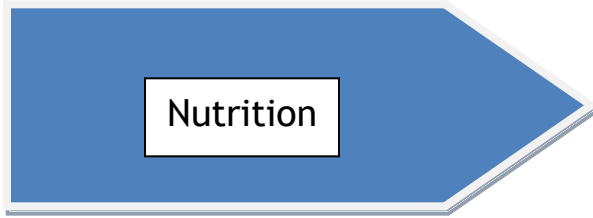
- Enhance physical education and physical activity in schools and physical activity in child care settings

Schools and child care settings are well-positioned to model and reinforce healthful behaviors by assuring standards, requiring daily physical education (PE) classes and recess, and providing safe routes to schools for active transport.

- Support urban design, land use, and transportation policies

The design of communities and neighborhoods can encourage or discourage physical activity among residents. Safe, walkable neighborhoods can promote routine physical activity, regardless of an individual's fitness level.

For more information or additional details on the physical activity guidelines, please visit www.americanheart.org/fitness.



Adults

Fruits & Vegetables

According to the 2009 BRFSS, lowans consumed an average of three and one-half servings of fruit and/or vegetables each day. The percentage of lowans who ate five or more servings of fruits and/or vegetables each day was 19.5 percent, minimally lower than the 19.9 percent reported in 2007.

Significantly more females than males ate five or more servings of fruits and vegetables each day (see Table 5). Also, older lowans were more likely to report meeting the five-a day recommendation than younger lowans (see Table 5). This was also true for those with more education. The age group most likely to eat the five or more servings was lowans 65 years old or older (24.6%); those least likely were lowans in the youngest age group (i.e., 18 to 24 years of age) (13.7%). Hispanic lowans were less likely to eat the recommended five or more servings of fruit and vegetables (14.5%) (See Table 5).



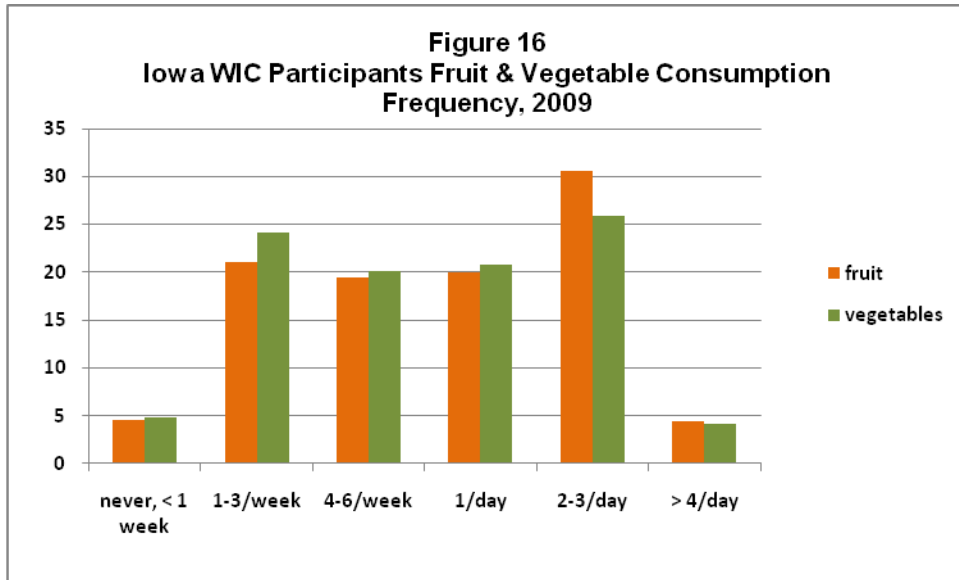
Table 5. Iowa Adults \geq 5 Daily Servings Fruits & Vegetables, 2009

Demographic Groups	Percent
TOTAL	19.5
GENDER	
Male	13.2
Female	23.4
RACE/ETHNICITY	
White/Non-Hisp	18.4
Black/Non-Hisp.	14.9
Other/Non-Hisp.	N/A*
Hispanic	14.5
AGE	
18 - 24	13.7
25 - 34	15.7
35 - 44	17.4
45 - 54	18.2
55 - 64	19.0
65+	24.6
EDUCATION	
Less than H.S.	14.3
H.S. or G.E.D.	14.9
Some Post-H.S.	16.8
College Graduate	24.9
HOUSEHOLD INCOME	
Less than \$15,000	15.0
\$15,000- 24,999	18.9
\$25,000- 34,999	20.7
\$35,000- 49,999	12.9
\$50,000+	19.7

*N/A=Not available due to small sample size

Women, Infants, and Children

The National Food and Nutrition (NATFAN) survey was administered to over 71,000 Women, Infants, and Children (WIC) participants in 39 states during the fall, 2009. In Iowa, surveys were sent to 8 sites offering WIC programs (i.e., Broadlawns Hospital, Mid-Iowa Community Action, Operation Threshold, Siouxland WIC, Hawkeye Area Community Action, Community Action of Southeast Iowa, Scott County Health Department, and Pottawattamie County). 66% of participants reported receiving WIC foods for themselves in the past 30 days; 47.5% were pregnant; and 39.1% had delivered a baby within the last 6 months. Participants were asked about their sugar-sweetened and diet beverage consumption. Figure 16 indicates 35% ate fruit twice or more daily and 30.1% ate vegetables twice or more daily.



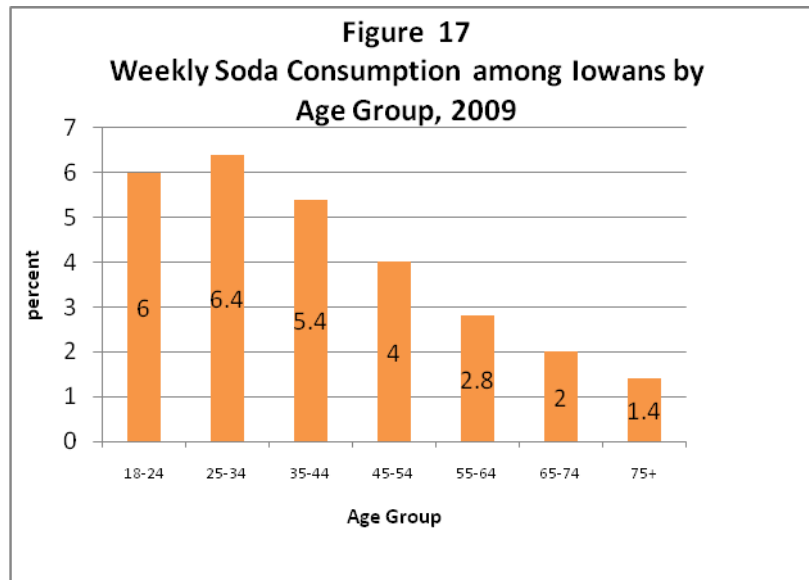
Sugar-sweetened Beverage Consumption

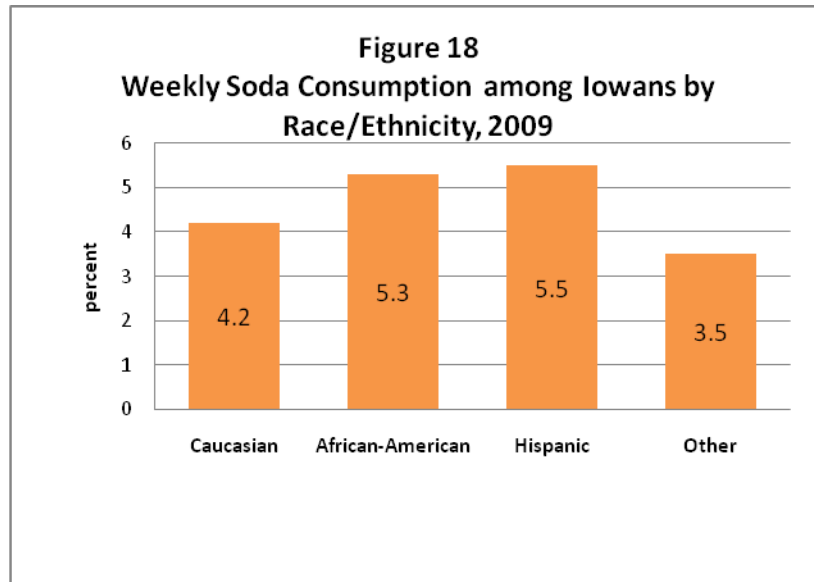
Substantial evidence links overweight and obesity with the consumption of sugar-sweetened soda or fruit drinks. Sugar-sweetened beverages (SSB) account for an estimated 8 to 9% of the energy intake for both youth and adults (Malik, et al., 2006). The Dietary Guidelines for Americans (USDA, 2005) recommends the avoidance or limitation of SSBs.

A series of nutrition questions about various dietary practices was included in the 2009 BRFSS. One of these questions inquired about weekly soda consumption. Adult Iowans drank an average of 4.3 glasses of SSB weekly. Men (i.e., 5.5 glasses) reported great weekly SSB consumption than women (i.e., 3.1 glasses) (see Table 6). Young adults (i.e., 25 to 34 years of age) reported the highest consumption (i.e., 6.4 glasses weekly) and Hispanic Iowans (i.e., 5.5 glasses weekly) (see Table 6, Figures 17-18).

Table 6. Iowa Adults Weekly Sugar-sweetened Beverage Consumption, 2009

Demographic Groups	Glasses per week
TOTAL	4.3
GENDER	
Male	5.5
Female	3.1
EDUCATION	
Less than H.S.	4.5
H.S. or G.E.D.	5.0
Some Post-H.S.	4.2
College Graduate	3.4
HOUSEHOLD INCOME	
Less than \$15,000	5.7
\$15,000- 24,999	5.9
\$25,000- 34,999	4.0
\$35,000- 49,999	4.5
\$50,000-74,999	4.4
\$75,000+	3.6





Women, Infants, and Children

The National Food and Nutrition questionnaire NATFAN survey queried participants about their sugar-sweetened and diet beverage consumption. Table 7 indicates 19.4% drank diet drinks at least once daily; 33.1% drank sugar-sweetened beverages at least once daily.

Table 7. Iowa WIC Participants Beverage Consumption, 2009

How often drink the following beverages	Never or < 1/week %	1-3 times/week %	4-6 times/week %	1 time/day %	2 times/day %	≥3 times/day %
Artificially sweetened drinks (e.g., diet cola, diet soda)	44.3	25	11.2	9.6	4.4	5.4
Sugar-sweetened drinks (e.g., Kool-aid, soda, cola, sport drinks, sugar sweetened tea)	23.2	31.3	12.4	11.7	10.7	10.7

Dairy

Dairy foods are a rich source of energy, protein, and calcium, as well as Vitamin D, and potassium. Dairy foods have also been shown to increase levels of good HDL cholesterol. The U.S.D.A. Food Guide recommends 3 servings of dairy each day. To lower additional fat and calories, reduced fat, low-fat, or even fat-free products are optimal. Low-fat options are available for cheese, butter, milk, cream, and yogurt. Dairy products that are low in fat and less than 3 grams of fat per serving represent the best choice. For example, skim milk is fat-free and saves on additional calories and grams of fat compared to 2% or even whole milk. (<http://www.mypyramid.gov/pyramid/milk.html>). Low-fat dairy options

include: low-fat cream cheese, low-fat cottage cheese, skim milk, reduced fat sour cream, one-third less fat cream, cheese made from skim milk, and low-fat and non-fat yogurt.

The American Heart Association’s (AHA) recommends Americans follow healthy dietary patterns, including low-fat and fat-free milk and milk products. The 2005 U.S.D.A. Dietary Guidelines increased the recommendation of dairy foods to three servings of low-fat or fat-free milk, cheese or yogurt every day to help meet the nutrition requirements for four of the seven most critical nutrients Americans are lacking, including: vitamin A, calcium, magnesium and potassium. The Dietary Guidelines also recognize that people who consume more dairy foods have better overall diets, consume more nutrients and have improved bone health.

<http://www.nationaldairycouncil.org/PressandMedia/NewsAlertArchives/Pages/AmericanHeartAssociationDietandLifestyleRecommendationsRecognizeDairysRoleinaHeartHealthyDiet.aspx>

An additional 2009 BRFSS nutrition question concerned daily use of low-fat dairy products. The percentage of lowans who reported use of low-fat dairy each day was 69% in 2009 (see Table 8). The percentage of Iowa women who used low-fat dairy was higher than the percentage of Iowa men (i.e., 69.5% vs. 68.4%). The age group with the reported highest daily consumption of low fat dairy was lowans who were 35 to 44 years of age (i.e., 72.8%), college graduates (i.e., 76.2%) and lowans at the highest income bracket (i.e., 76.3%).

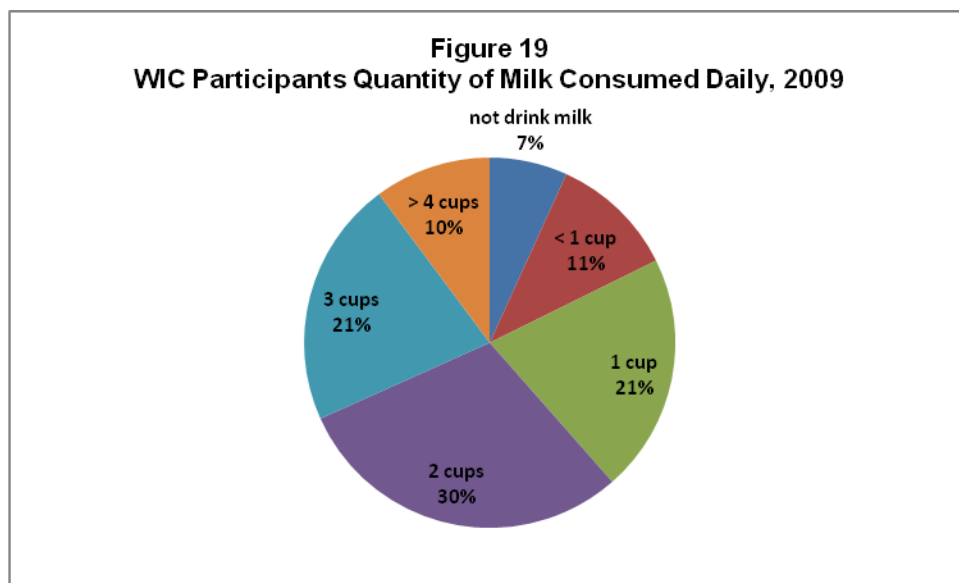
Table 8. Iowa Adults \geq 1 Daily Use of Low Fat Dairy, 2009

Demographic Groups	Percent
TOTAL	69.0
GENDER	
Male	68.4
Female	69.5
AGE	
18 - 24	64.8
25 - 34	71.1
35 - 44	72.8
45 - 54	69.5
55 - 64	66.1
65-74	66.2
75+	70.3
EDUCATION	
Less than H.S.	54.8
H.S. or G.E.D.	64.9
Some Post-H.S.	69.5
College Graduate	76.2
HOUSEHOLD INCOME	
Less than \$15,000	61.6
\$15,000- 24,999	57.8
\$25,000- 34,999	69.5
\$35,000- 49,999	68.5
\$50,000- 74,999	71.0
\$75,000+	76.3



Women, Infants, and Children

Participants in the National Food and Nutrition NATFAN survey were asked about their milk consumption. Figure 19 indicates the majority of respondents (61.5%) indicated drinking 2 or more cups of milk daily. The majority of respondents (76.1%) reported drinking low-fat (i.e., 2% or 1%) or skim milk.



Whole Grains

The 2009 BRFSS also included a question related to whole grains. Grains are an essential part of a healthy diet. Also called cereals, grains are the seeds of grasses, which are cultivated for food. Grains come in many shapes and sizes, from large kernels of popcorn to small quinoa seeds. All types of grains are good sources of complex carbohydrates, vitamins and minerals and are naturally low in fat. Grains that have not been refined (i.e., whole grains) are better for nutrition. Whole grains are excellent sources of fiber and other important nutrients (e.g., selenium, potassium, magnesium).

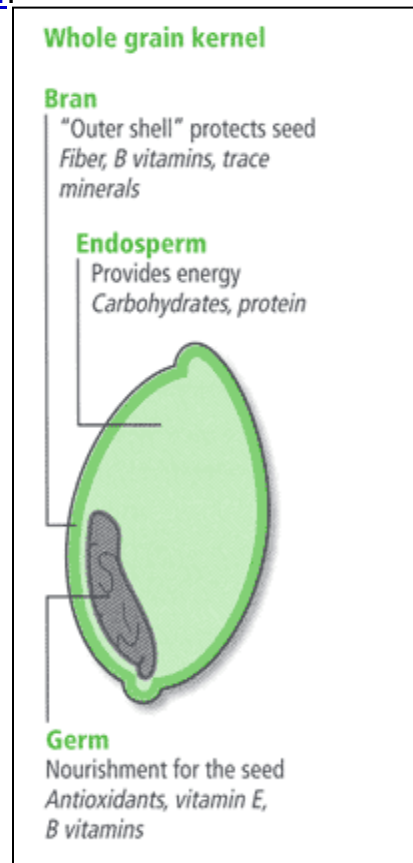
A slice of commercially prepared white bread has 66 calories, 1.9 grams protein and 0.6 grams fiber. A slice of whole wheat bread has 69 calories and provides 3.6 grams protein and 1.9 grams fiber. The whole wheat bread represents the best nutritional choice.



Whole grains have not had their bran and germ removed by milling and are good sources of fiber; fiber is the part of plant-based foods that is not digested by the body. Among many health benefits, high-fiber foods also tend to make the body feel full longer. Refined grains, such as white rice or white flour, have both the bran and germ removed from the grain. Although vitamins and minerals are added back into refined grains after the milling process, they still do not have as many nutrients as whole grains and do not provide as much natural fiber (source <http://www.mayoclinic.com/health/whole-grains/NU00204>).

Examples of whole grains include:

- Barley
- Brown rice
- Buckwheat
- Bulgur (cracked wheat)
- Millet
- Oatmeal
- Popcorn
- Whole-wheat bread, pasta or crackers
- Wild rice



The percentage of lowans who reported daily use of whole grains was 61.3% in 2009 (see Table 9). The percentage of Iowa women who used whole grain products was somewhat higher than the percentage of Iowa men (i.e., 61.6% vs. 61.0%). The age group with the highest daily consumption of whole grain products was lowans who were 75 years of age and older (i.e., 67.6%), college graduates (i.e., 65.5%), and lowans at the highest income bracket (i.e., 66.9%).

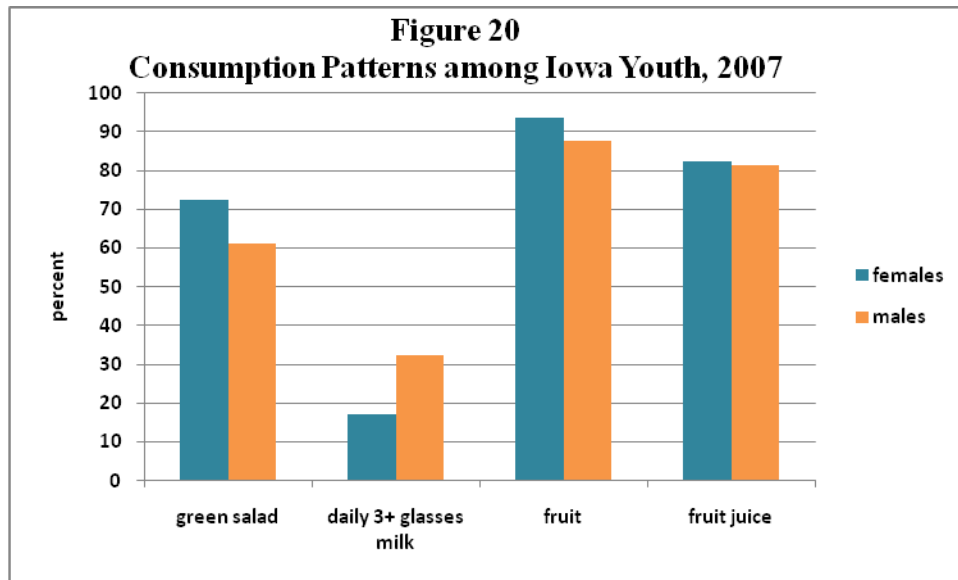
Table 9. Iowa Adults \geq 1 Daily Use of Whole Grain Products, 2009

Demographic Groups	Percent
TOTAL	61.3
GENDER	
Male	61.0
Female	61.6
AGE	
18 - 24	61.8
25 - 34	57.1
35 - 44	56.5
45 - 54	63.0
55 - 64	63.9
65-74	61.9
75+	67.6
EDUCATION	
Less than H.S.	54.9
H.S. or G.E.D.	59.0
Some Post-H.S.	61.1
College Graduate	65.5
HOUSEHOLD INCOME	
Less than \$15,000	57.5
\$15,000- 24,999	57.1
\$25,000- 34,999	63.1
\$35,000- 49,999	56.4
\$50,000- 74,999	61.6
\$75,000+	66.9

Children and Youth

Youth Risk Behavior Survey

The 2007 Iowa Youth Risk Behavior Survey (YRBS) found that 66.8 percent of youth reported eating green salad one or more times during the past week (see Figure 20). Overall, 18.9 percent of students reported eating five or more servings of fruits and vegetables daily during the past week and 24.9 percent reported drinking three or more glasses of milk daily during the past week. Significantly more males than females drank at least three glasses of milk daily during the past week; significantly more females than males reported eating five or more servings of fruits and vegetables daily during the past week.

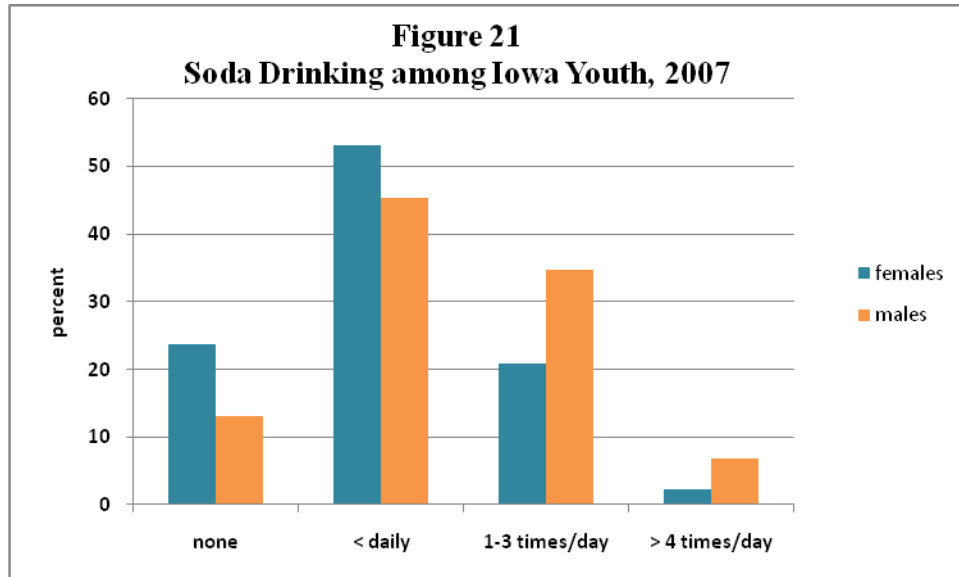


In the YRBS, high school students were asked to report how often they consumed a can, bottle, or glass of soda or pop during the past week. Although this question is not identical to inquiring about sugar-sweetened beverage (SSB) consumption, it can be used as a crude indicator of such consumption. Overall, 32.6 percent of students reported drinking SSBs at least once daily during the past week. Almost one-quarter (23.1%) of Iowa high school girls reported drinking at least one glass or can of pop daily. However, 42% of high school boys reported drinking at least one glass or can of soda daily (Figure 21).

Substantial evidence links overweight and obesity with consumption of SSB or fruit drinks. SSBs account for an estimated 8 to 9% of the energy intake of both youth and adults (Malik, et al., 2006), and represents the top energy source for adolescents (Davis, et al., 2007). According to one estimate, half of children between the ages of one and two consume sugar-sweetened beverages every day, while only one in ten eat a dark green vegetable (Davis, et al., 2007).

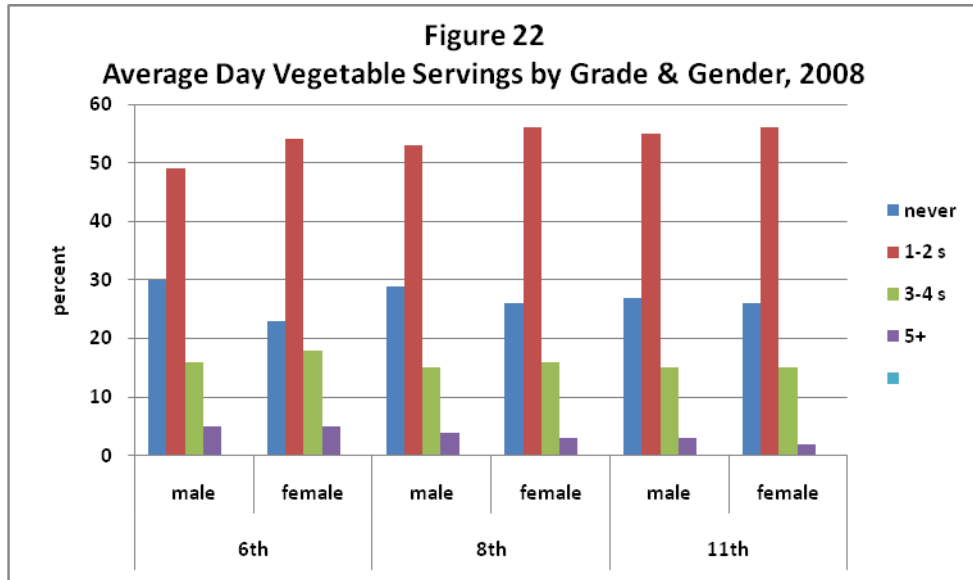
Young girls who drink soda have less healthy diets through adolescence than their peers who do not drink soda (<file:///E:/burden2010/Early%20consumption%20of%20soda%20indicator%20of%20unhealthy%20diet,%20study%20finds.mht>). A 10-year study found that girls who drank soda at age 5 had diets that were less likely to meet nutritional standards for the duration of the study, which ended at age 15. Girls who did not drink soda at age 5 did not meet certain nutritional requirements, but their diets were healthier. Milk intake also differed greatly between the two groups; soda drinkers drank far less milk than non-soda drinkers. At age 5, non-soda drinkers consumed 10 to 11 ounces of milk daily, while soda drinkers had less than 7 ounces. Adequate nutrient intake is important for optimal health and growth. For example, low calcium intake is associated with increased risk of bone fractures and higher added sugar is associated with dental problems and the development of several chronic diseases, such as type 2 diabetes.

The Institute of Medicine recommends that girls between age 14 and 18 receive at least 65 milligrams of vitamin C daily. In this study, soda drinkers fell short at just 55 milligrams daily, while non-soda drinkers exceeded the recommendation at 70.5 milligrams daily.

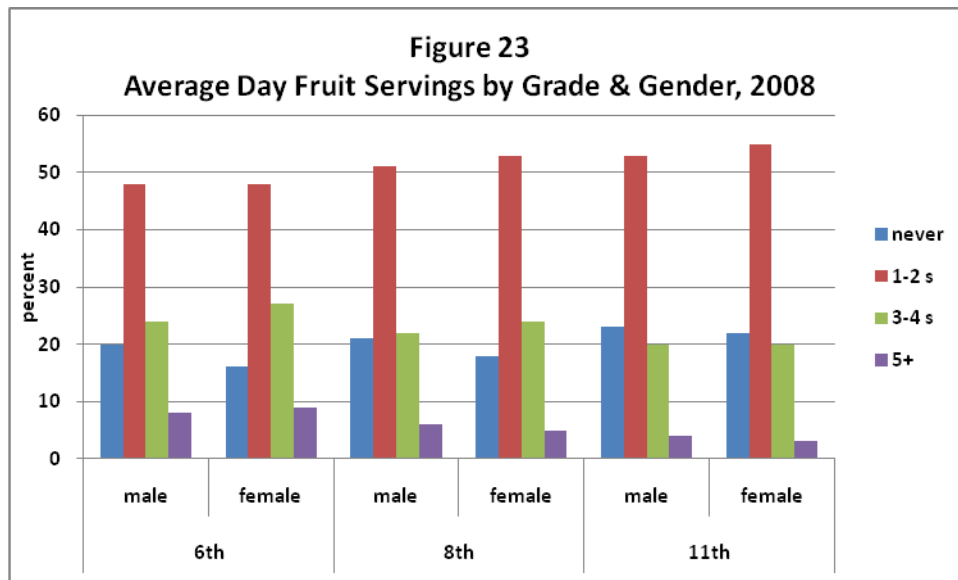


Iowa Youth Survey

The 2008 survey found that 27 percent of students (6th, 8th, 11th grades) reported that on an average day, vegetables were never eaten; 54 percent reported once to twice daily; 16 percent reported three to four times daily; and 4 percent reported five or more times daily. Figure 22 depicts the differences between males and females across the three grades.

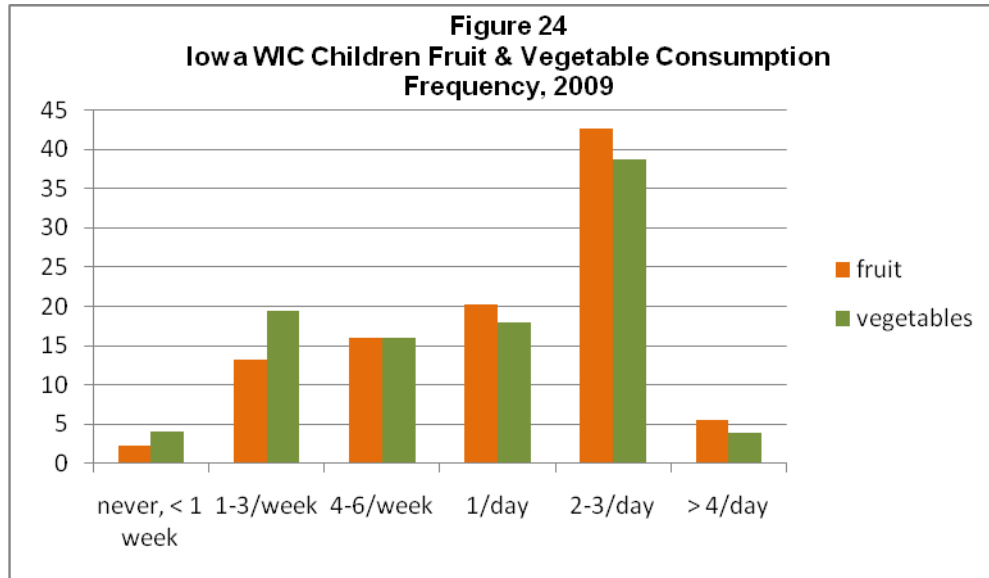


Twenty percent of students (6th, 8th, 11th grades) reported that on an average day, fruit was not eaten; 51 percent reported once to twice daily; 23 percent reported three to four times daily; and 6 percent reported five or more times daily. Figure 23 depicts the differences between males and females across the three grades.



Women, Infants, and Children (WIC)

The National Food and Nutrition questionnaire NATFAN survey asked participants about their child's fruit and vegetable consumption. Figure 24 indicates 48.2% ate fruit twice or more daily and 42.6% ate vegetables twice or more daily.



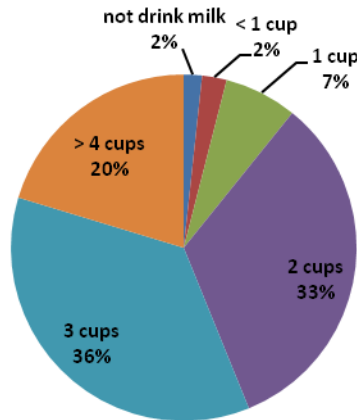
Participants were asked about their child’s juice, sugar-sweetened, and diet beverage consumption. Table 10 indicates 69.1% drank 100% juice at least once daily; 5.6% drank diet drinks at least once daily; and 11% drank sugar-sweetened beverages at least once daily.

Table 10. Iowa WIC Children Beverage Consumption, 2009

How often does your child drink the following beverages	Never or < 1/week %	1-3 times/week %	4-6 times/week %	1 time/day %	2 times/day %	≥3 times/day %
100% juice (e.g., orange, apple, tomato)	4.9	16.2	9.8	21.1	29.3	18.7
Artificially sweetened drinks (e.g., diet cola, diet soda)	73.2	19	2.3	3.4	1.4	.8
Sugar-sweetened drinks (e.g., Kool-aid, soda, cola, sport drinks, sugar sweetened tea)	49	33.6	6.3	6.6	3.2	1.2

Participants were asked about their child’s milk consumption. Figure 25 indicates 89% drank at least 2 cups of milk daily.

Figure 25
WIC Children Quantity of Milk Consumed Daily, 2009



Recommendations

The American Heart Association's (AHA) new recommendations advise Americans to follow healthy dietary patterns, such as the Dietary Approach to Stop Hypertension (DASH) – a low-fat eating plan that includes food groups, such as low-fat and fat-free milk and milk products, fruits and vegetables, plus whole grains.



New AHA recommendations mark the latest call-to-action for Americans to establish healthy eating and lifestyle habits. The USDA's 2005 Dietary Guidelines also encourage Americans to increase their intake of nutrient-rich, low-fat and fat-free milk and milk products – as well as fruits, vegetables and whole grains – to help meet nutrient needs and prevent chronic disease.

The Dietary Guidelines for Americans (USDA, 2005) recommend that individuals avoid or limit their intake of sugar-sweetened beverages. In addition, the American Academy of Pediatrics (2004) recommends that access to these beverages be eliminated in all elementary schools and restricted in all other schools.

Replacing consumption of sugar-sweetened beverages (SSBs) with water could eliminate an average of 235 excess calories per day among children and adolescents, according to a study published in the April 2009 Archives of Pediatrics & Adolescent Medicine. The study concluded that such a replacement would be a simple and effective way to reduce excess intake of calories causing childhood overweight and obesity, as well as address dental cavities and other health problems associated with added sugar with no associated detrimental effects on nutrition (http://www.eurekalert.org/pub_releases/2009-04/cums-swf040309.php).

- Consume a sufficient amount of fruits and vegetables while staying within energy needs. Two cups of fruit and 2½ cups of vegetables per day are recommended for a reference 2,000-calorie intake, with higher or lower amounts depending on the calorie level.

Choose a variety of fruits and vegetables each day. In particular, select from all five vegetable subgroups (dark green, orange, legumes, starchy vegetables, and other vegetables) several times a week.

- Consume three or more ounce-equivalents of whole-grain products per day, with the rest of the recommended grains coming from enriched or whole-grain products. In general, at least half the grains should come from whole grains.
- Consume three cups per day of fat-free or low-fat milk or equivalent milk products.

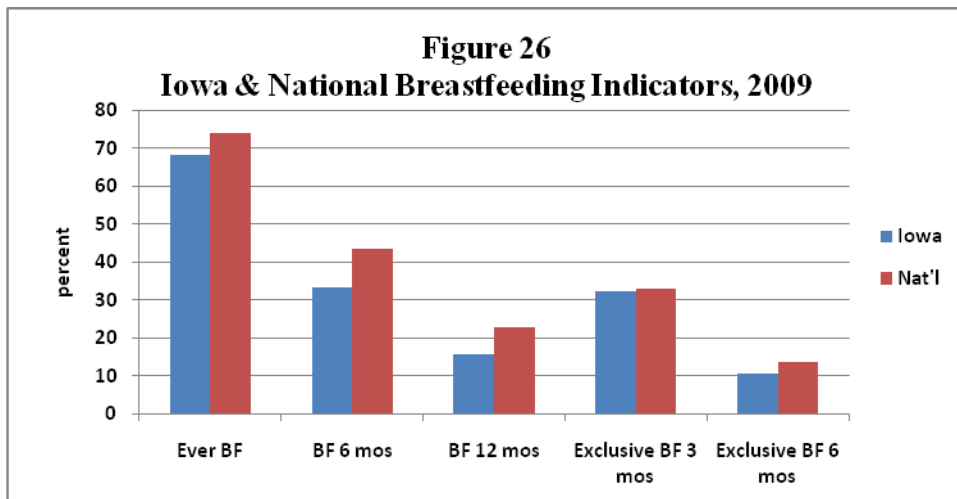
Breastfeeding

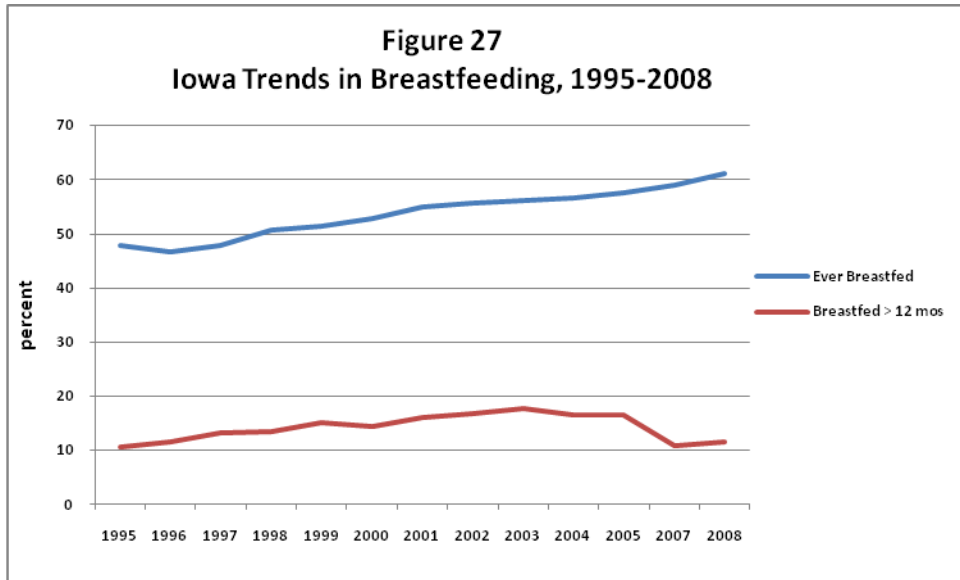
Protecting, promoting, and supporting breastfeeding, with its many known benefits for infants, children, and mothers, is a key strategy to improve the health of mothers and their children. The entire community can work together to increase the number of women who are able to start breastfeeding and the length of time they continue to breastfeed.

The *2009 Breastfeeding Report Card* demonstrates how breastfeeding is being protected, promoted, and supported using five "outcome" and nine "process" indicators. Comparisons across states and indicators to increase breastfeeding can be made (http://www.cdc.gov/breastfeeding/data/report_card.htm). The five outcome indicators are derived from the breastfeeding goals outlined in *Healthy People 2010*, a description of the nation's health priorities. Recent research also suggests that breastfeeding for as long as possible helps prevent childhood overweight (Grummer-Strawn, 2004).

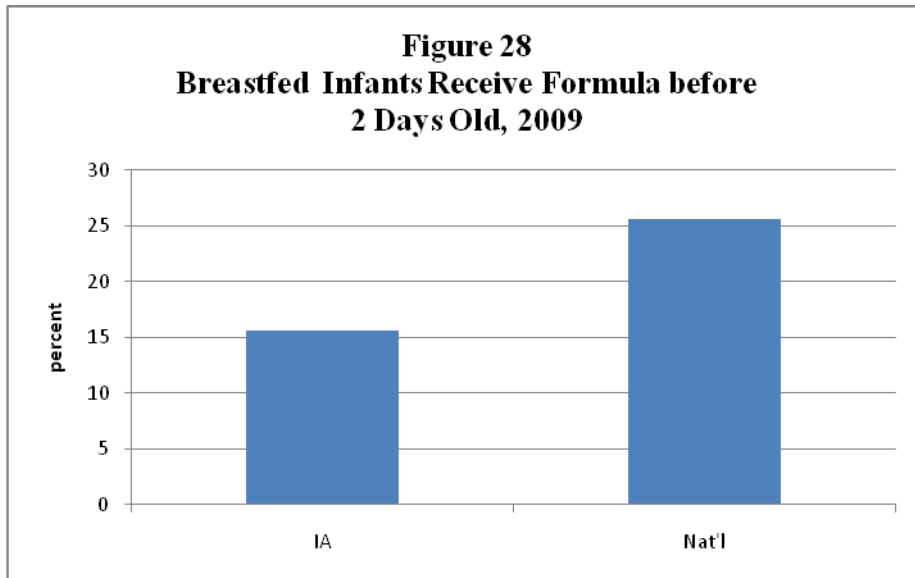
Iowa Pediatric Nutrition Surveillance System (PedNSS)

Data from the 2009 PedNSS survey show that among mothers enrolled in the Iowa Women, Infants, and Children (WIC) Program, the percentages who have ever breastfed their infants (68.1%), breastfed for 6 months (33.2%), and breastfed for 12 months (15.8%) are lower than the percentages for the nation as a whole (73.9%, 43.4%, and 22.7%, respectively) (see Figure 26 and Figure 27). However, the percentage of Iowa infants who receive formula before 2 days old is much lower than the percentage nationwide (see Figure 28).





In Iowa, there is state legislation related to breastfeeding in public places; nationwide 49 states have similar legislation. However, Iowa does not have state legislation mandating employer lactation support; nationwide, 15 states have such legislation.



References

Bowman SA. Television-viewing characteristics of adults: correlations to eating practices and overweight and health status. *Prevention of Chronic Disease* [serial online] 2006 Apr [date cited]. Available from:

http://www.cdc.gov/pcd/issues/2006/apr/05_0139.htm.

Centers for Disease Control and Prevention. (2007a). National Center for Health Statistics: National Health and Nutrition Examination Survey. Available from:

<http://www.cdc.gov/nchs/nhanes.htm>

Centers for Disease Control and Prevention. Pediatric Nutrition Surveillance System. 2009 Data from the Iowa WIC Program, 2009.

Centers for Disease Control and Prevention. (2006). *Behavioral Risk Factor Surveillance System (BRFSS) Survey Data*. Atlanta, Georgia: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention. (2007). Division of Nutrition and Physical Activity: Research to Practice Series No. 4: Does breastfeeding reduce the risk of pediatric overweight? Atlanta: Centers for Disease Control and Prevention.

Centers for Disease Control and Prevention. (2000). Stature for Age and Weight for Age Percentiles (Growth Charts). Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion.

Centers for Disease Control and Prevention. Preventing Chronic Diseases: Investing Wisely in health, Preventing Obesity and Chronic Diseases through Good Nutrition and Physical Activity. Revised August 2008. Available from: <http://www.cdc.gov/nccdp/publications/factsheets/Prevention/pdf/obesity.pdf>.

Dietz, W.H. (2008). Division of Nutrition and Physical Activity. Annual Update. Centers for Disease Control and Prevention, Division of Nutrition and Physical Activity and Obesity Teleconference, December 11, 2008.

Dietz, W.H. & Bellizzi, C.M. (1999). Introduction: The use of body mass index to assess obesity in children. *American Journal of Clinical Nutrition*, 70, 123-125.

Flegal, K. M., Carroll, M. D., Ogden, C. L., & Johnson, C. L. (2002). Prevalence and trends in obesity among US adults, 1999-2000. *JAMA*, 288(14), 1723-1727.

Fung, T.T., Hu, F.B., Yu, J., Chu, N.F., Spiegelman, D., & Tofler, G.H. (2000). Leisure-time physical activity, television watching, and plasma biomarkers of

obesity and cardiovascular disease risk. *American Journal of Epidemiology*, 152(12):1171-8.

Grummer-Strawn & Mei, Z. (2004). Does Breastfeeding Protect Against Pediatric Overweight? Analysis of Longitudinal Data From the Centers for Disease Control and Prevention Pediatric Nutrition Surveillance System. *Pediatrics*, 113(2). 81-86.

Haskell, W., Lee, I., Pate, R., Powell, K., Blair, K., Franklin, B., Macera, C., Heath, G., Thompson, P., & Bauman, A. (2007). Physical activity and public health: Updated recommendation for adults from the American College of Sports Medicine and the American Heart Association. *Medicine & Science in Sports & Exercise*. 39(8):1423-1434.

Hedley, A. A., Ogden, C. L., Johnson, C. L., Carroll, M. D., Curtin, L. R., & Flegal, K. M. (2004). Prevalence of overweight and obesity among US children, adolescents, and adults, 1999-2002. *JAMA*, 291(23), 2847-2850.

Hu, F.B., Leitzmann, M.F., Stampfer, M.J., Colditz, G.A., Willet, W.C., & Rimm, E.B. (2001). Physical activity and television watching in relation to risk for type 2 diabetes mellitus in men. *Archives of Internal Medicine*, 161(12):1542-8.

Hu, .FB., Li, T.Y., Colditz, G.A., Willet, W.C., & Manson, J.E. (2003). Television watching and other sedentary behaviors in relation to risk of obesity and type 2 diabetes mellitus in women. *JAMA*,289(14):1785-91.

Hu, F.B. (2003). Sedentary lifestyle and risk of obesity and type 2 diabetes. *Lipids* 38(2):103-8.

McCarthy, S.N., Gibney, M.J., & Flynn, A. (2002). Irish Universities Nutrition Alliance. Overweight, obesity, and physical activity levels in Irish adults: evidence from the North/South Ireland food consumption survey. *Proceedings of Nutrition Society*, 61(1):3-7.

National Institutes of Health (NIH), National Heart, Lung, and Blood Institute. (1998). *Clinical Guidelines on the Identification, Evaluation, and Treatment of Overweight and Obesity in Adults*. NIH Publication No. 98-4083.

Ogden, C. L., Carroll, M. D., Curtin, L. R., McDowell, M. A., Tabak, C. J., & Flegal, K. M. (2006). Prevalence of overweight and obesity in the United States, 1999-2004. *JAMA*, 295(13), 1549-1555.

Ogden, C. L., Carroll, M. D., McDowell, M. A., & Flegal, K. M. (2008). Obesity among adults in the United States—no change since 2003-2004. *NCHS data brief*. Available from: <http://www.cdc.gov/nchs/data/databriefs/db01.pdf>

Ogden, C. L., Flegal, K. M., Carroll, M. D., & Johnson, C. L. (2002). Prevalence and trends in overweight among US children and adolescents, 1999-2000. *JAMA*, 288(14), 1728-1732.

Ogden, C. L., Yanovski, S. Z., Carroll, M. D., & Flegal, K. M. (2007). The epidemiology of obesity. *Gastroenterology*, 132(6), 2087-2102.

Penn State (2010, June 9). Early consumption of soda indicator of unhealthy diet, study finds. *ScienceDaily*. Available from:

<file:///E:/burden2010/Early%20consumption%20of%20soda%20indicator%20of%20unhealthy%20diet,%20study%20finds.mht>.

U.S. Department of Health and Human Services. (2000). *Healthy People 2010*. 2nd ed. With Understanding and Improving Health and Objectives for Improving Health. 2 vols. Washington, DC: U.S. Government Printing Office.

U.S. Department of Health and Human Services. (2001). The Surgeon General's Call to Action to Prevent and Decrease Overweight and Obesity. Rockville, MD: Public Health Service, Office of the Surgeon General.

U.S. Department of Health and Human Services and U.S. Department of Agriculture. (2005). *Dietary Guidelines for Americans, 2005*. 6th Edition, Washington, DC: U.S. Government Printing Office.

Update: Prevalence of Overweight among Children, Adolescents, and Adults—United States, 1988-2004. *Morbidity and Mortality Weekly Report*, Vol. 46(9):199-202. March 7, 1997.

U.S. Department of Health and Human Services, Centers for Disease Control and Prevention (2010). State Indicator Report on Physical Activity, 2010 Iowa Action Guide. Available from:

<http://www.nspapph.org/images/resources2/state%20indicator%20reports%202010/PA%20State%20Action%20Guide%20Iowa%204%2028%2010.pdf>