Obesity in the US: beyond the data

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NHANES Analysis Branch Chief and Epidemiologist
US NATIONAL OBESITY DATA
National Survey of Children's Health

YRBSS
Youth Risk Behavior Surveillance System

BRFSS
Behavioral Risk Factor Surveillance System

SLAITS
State and Local Area Integrated Telephone Survey
Prevalence* of Self-Reported Obesity Among U.S. Adults by State and Territory, BRFSS, 2013

*Prevalence estimates reflect BRFSS methodological changes started in 2011. These estimates should not be compared to prevalence estimates before 2011.

National Health and Nutrition Examination Survey (NHANES)

Complex multi-stage probability sample of the US civilian non-institutionalized population, all estimates have confidence intervals

Approximately 5,000 people surveyed each year
Anthropometry
## Survey periods

<table>
<thead>
<tr>
<th>Survey</th>
<th>Dates</th>
<th>Ages</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHES I</td>
<td>1960-62</td>
<td>18-79 years</td>
</tr>
<tr>
<td>NHES II</td>
<td>1963-65</td>
<td>6-11 years</td>
</tr>
<tr>
<td>NHES III</td>
<td>1966-70</td>
<td>12-17 years</td>
</tr>
<tr>
<td>NHANES I</td>
<td>1971-75</td>
<td>1-74 years</td>
</tr>
<tr>
<td>NHANES II</td>
<td>1976-80</td>
<td>6 mo.-74 years</td>
</tr>
<tr>
<td>HHANES</td>
<td>1982-84</td>
<td>6 mo.-74 years</td>
</tr>
<tr>
<td>NHANES III</td>
<td>1988-94</td>
<td>2 mo. +</td>
</tr>
</tbody>
</table>

Note: NHES, National Health Examination Survey
## Continuous NHANES, all ages

### Dates

<table>
<thead>
<tr>
<th>Year Range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1999-2000</td>
</tr>
<tr>
<td>2001-2002</td>
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<tr>
<td>2003-2004</td>
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<tr>
<td>2005-2006</td>
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<tr>
<td>2007-2008</td>
</tr>
<tr>
<td>2009-2010</td>
</tr>
<tr>
<td>2011-2012</td>
</tr>
</tbody>
</table>
Obesity: Analytic decisions*

- What definition of obesity is being used?
- Total or subgroups?
  - What is the sample size?
- Trends: what year to start?
- What test of trend?
  - Linear, quadratic?
  - Use all data or only the point estimates?
  - Unadjusted or adjusted?

*With special focus on NHANES
Prevalence of obesity in the US, 2011-2012

- 16.9% of children & teens 2-19 y
- 34.9% of adults ≥20 y

90+ million obese individuals in the US

Source: CDC/NCHS, National Health and Nutrition Examination Survey, 2011-2012; Ogden et al. NCHS Data Brief 2013
http://www.cdc.gov/nchs/data/databriefs/db131.htm and Ogden et al. JAMA 2014
OBESITY DEFINITIONS
Obesity: how is it defined?

- Obesity refers to excess body fat
- Proxy: body mass index (BMI)
  - Weight (kg)/height(m)^2
  - Adults, adolescents, and children
  - Does not distinguish between fat and muscle
Cut points for adults

- Underweight: BMI < 18.5
- Normal weight: BMI 18.5-<25
- Overweight: BMI 25-<30
- Obesity: BMI 30 +

<table>
<thead>
<tr>
<th>Height</th>
<th>BMI 18.5 (kg)</th>
<th>BMI 25 (kg)</th>
<th>BMI 30 (kg)</th>
</tr>
</thead>
<tbody>
<tr>
<td>162 cm (64 in)</td>
<td>49 (107)</td>
<td>66 (145)</td>
<td>79 (174)</td>
</tr>
<tr>
<td>178 cm (70 in)</td>
<td>59 (129)</td>
<td>79 (174)</td>
<td>95 (209)</td>
</tr>
</tbody>
</table>
Cut points for youth

- No set risk-based cutoffs exist
- BMI varies with age and sex
- Statistical definition of obesity
  - Based on BMI-for-age
  - Comparison to a reference population
Reference population:
CDC growth charts

- **Underweight**
  - BMI-for-age < 5th percentile
- **Normal weight**
  - BMI-for-age 5th-<85th percentile
- **Overweight**
  - BMI-for-age 85th-<95th percentile
- **Obesity**
  - BMI-for-age ≥ 95th percentile
- **Extreme obesity**
  - BMI-for-age ≥ 120% of the 95th percentile

In US, sex specific CDC growth charts are reference
CDC growth charts

- Data from US national surveys

- By definition:
  - 5% of youth each sex*age in 1960, 70, 80s were obese
A visualization

3 year old girls

6 year old girls

95th percentile
## Changes in weight: changes in BMI categories

<table>
<thead>
<tr>
<th></th>
<th>Weight (lb)</th>
<th>BMI percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Girl, 2 years, 2 feet, 9 inches</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>27</td>
<td>75th</td>
</tr>
<tr>
<td></td>
<td>28</td>
<td>85th</td>
</tr>
<tr>
<td></td>
<td>29</td>
<td>92nd</td>
</tr>
<tr>
<td></td>
<td>30</td>
<td>96th</td>
</tr>
<tr>
<td><strong>Boy, 10 years, 4 feet 7 inches</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>80</td>
<td>78th</td>
</tr>
<tr>
<td></td>
<td>85</td>
<td>87th</td>
</tr>
<tr>
<td></td>
<td>95</td>
<td>94th</td>
</tr>
</tbody>
</table>
Reference population: International Obesity Task Force (IOTF)

- Data from Brazil, Hong Kong, the Netherlands, Singapore, United Kingdom, United States
- Statistical definitions linked to adult standards BMI 25 and 30 age 18 averaged over countries

Comparison of CDC and IOTF Cutpoints

IOTF 30 (at 18y) > CDC 95P > (IOTF 25 ~ CDC 85 P)

Source: Freedman, D
Reference population: WHO

- Growth standard, birth – 4 years
  - Multicentre growth reference study (MGRS)
    - Pelotas, Brazil; Accra, Ghana; South Delhi, India; Oslo, Norway; Muscat, Oman; Davis, CA, USA
  - Optimal nutrition, environment, care

- Growth reference, 5-19 years
  - From 1978 WHO charts: US data
  - Exclusions, smooth transition between standard and reference

**Cut-offs for obesity**

<table>
<thead>
<tr>
<th></th>
<th>CDC</th>
<th>WHO</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>&gt;=95&lt;sup&gt;th&lt;/sup&gt; percentile (1.645 z-score)</td>
<td>&gt;2 z-score (97.7&lt;sup&gt;th&lt;/sup&gt; percentile)</td>
</tr>
</tbody>
</table>

Prevalence of obesity, children 24-59 months, 1999-2004

BMI AND BODY FAT
Normal weight, overweight and obese children

Source: Huang JS et al, Pediatrics 2007;120:e1128–e119
Direct measure of body fat

dual x-ray absorptiometry (DXA)
Figure 1. Mean percentage body fat, by sex and age: United States, 1999–2004.
Various definitions of high body fat

Often a sex and age specific percentile for youth

Prevalence of high adiposity\(^a\) among US girls by BMI-for-age category, 8-19 years, 1999-2004

Percent

<table>
<thead>
<tr>
<th>Category</th>
<th>Non-Hispanic white</th>
<th>Non-Hispanic black</th>
<th>Mexican American</th>
</tr>
</thead>
<tbody>
<tr>
<td>normal BMI</td>
<td>*</td>
<td></td>
<td></td>
</tr>
<tr>
<td>overweight</td>
<td>*</td>
<td>*</td>
<td></td>
</tr>
<tr>
<td>obese</td>
<td></td>
<td></td>
<td>*</td>
</tr>
</tbody>
</table>

\(^a\)High adiposity defined as internal age and sex specific 70\(^{th}\) percentile of percent body fat. *Significantly different from non-Hispanic whites and Mexican Americans. Source: CDC/NCHS, National Health and Nutrition Examination Surveys 1999-2004; Flegal et al AJCN 2010
MEASURED VS REPORTED BMI
Prevalence of obesity is lower based on self report compared to measured data.
Obesity higher in young children based on parental report compared to measured data

US TRENDS IN OBESITY
Americans heavier in 2007-2010 than in the 1960s

- Average man: 30 pounds heavier
- Average 11 year old boy: 19 pounds heavier

Obesity but not overweight increased in 1980s and 1990s in adults; more recently obesity levels have plateaued.

Change in BMI distribution, adults 20-74 y

Linear trends in obesity, adults 20+ y, continuous NHANES

Increase in men, but not women, between 1999-2000 and 2009-2010

Source: CDC/NCHS, National Health and Nutrition Examination Survey; Ogden et al. 2012, NCHS data brief; Ogden et al 2014 JAMA.
Linear trends in obesity, adults 20+y, continuous NHANES

For both men and women 2009-2010 did not differ significantly from the previous 6 years: 2003-2004, 2005-2006 and 2007-2008

Source: CDC/NCHS, National Health and Nutrition Examination Survey; Ogden et al. 2012, NCHS data brief; Ogden et al 2014 JAMA.
Linear trends in obesity, adults 20+y, continuous NHANES

No significant linear trend over last 10 years 2003-2004 to 2011-2012, overall or in men or women

Source: CDC/NCHS, National Health and Nutrition Examination Survey; Ogden et al. 2012, NCHS data brief; Ogden et al 2014 JAMA.
**Trends in obesity among children and adolescents 2-19 years, by sex: US, 1971-74 through 2011-12**

![Graph showing trends in obesity among children and adolescents by sex from 1971-74 to 2011-12.](image)


<table>
<thead>
<tr>
<th>Year Interval</th>
<th>Mean</th>
<th>Median</th>
</tr>
</thead>
<tbody>
<tr>
<td>1976-80</td>
<td>21.2</td>
<td>20.6</td>
</tr>
<tr>
<td>2003-06</td>
<td>23.5</td>
<td>22.0</td>
</tr>
</tbody>
</table>

Linear trends in obesity, youth 2-19 y, continuous NHANES

Increase in boys, but not girls, between 1999-2000 and 2009-2010

Source: CDC/NCHS, National Health and Nutrition Examination Survey; Ogden et al. 2012, NCHS data brief; Ogden et al. 2014 JAMA
Linear trends in obesity, youth 2-19 y, continuous NHANES

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*With special focus on NHANES*
ANALYTIC DECISIONS: COMBINING SURVEY YEARS
## Small sample sizes

<table>
<thead>
<tr>
<th>2011-2012</th>
<th>Total</th>
<th>Obese</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total youth 2-19 years</td>
<td>3355</td>
<td>565</td>
</tr>
<tr>
<td>Non-Hispanic white</td>
<td>728</td>
<td>109</td>
</tr>
<tr>
<td>Non-Hispanic black</td>
<td>1008</td>
<td>197</td>
</tr>
<tr>
<td>Non-Hispanic Asian</td>
<td>404</td>
<td>33</td>
</tr>
<tr>
<td>Hispanic</td>
<td>1035</td>
<td>226</td>
</tr>
</tbody>
</table>

Trend tests using more data points


Individual estimates with 4 years for 1999-02, 2003-06 and 2007-10

ANALYTIC DECISIONS: DIFFERENT TIME FRAMES
Prevalence of Childhood and Adult Obesity in the United States, 2011-2012

Cynthia L. Ogden, PhD; Margaret D. Carroll, MSPH; Brian K. Kit, MD, MPH; Katherine M. Flegal, PhD

Original Investigation

Importance: More than one-third of adults and 17% of youth in the United States are obese, although the prevalence remained stable between 2003-2004 and 2009-2010.

Objective: To provide the most recent national estimates of childhood obesity, analyze trends in childhood obesity between 2003 and 2012, and provide detailed obesity trend analyses among adults.

Design, Setting, and Participants: Weight and height were measured in 9120 participants in the 2011-2012 nationally representative National Health and Nutrition Examination Survey.

Main Outcomes and Measures: In infants and children, obesity was defined as a weight-for-length or weight-for-age greater than or equal to the 95th percentile. In adolescents aged 2 to 19 years, obesity was defined as a body mass index (BMI) at or above the 85th percentile.

Prevalence and Trends in Obesity and Severe Obesity Among Children in the United States, 1999-2012

Ashley Cockrell Skinner, PhD; Joseph A. Skelton, MD, MS

Original Investigation

Importance: Childhood obesity is the focus of public health efforts and accurate estimates of the prevalence and severity of obesity are needed for policy decisions and directions for future research.

Objective: To examine the prevalence of obesity and severe obesity over time for 14 years of the continuous National Health and Nutrition Examination Survey, 1999 to 2012, and to examine differences in the trends by age, race/ethnicity, and sex.

Design, Setting, and Participants: Representative sample (N = 26,690) of children in the United States, ages 2 to 19 years, in repeated cross-sections of the National Health and Nutrition Examination Survey, 1999 to 2012.

Main Outcomes and Measures: Prevalence of overweight (body mass index [BMI] > 85th percentile), obesity (BMI ≥ 95th percentile for age and sex), class 2 obesity (BMI ≥ 120% of the 95th percentile of BMI ≥ 85), and class 3 obesity (BMI ≥ 150% of the 95th percentile of BMI ≥ 85).
CONCLUSIONS AND RELEVANCE Overall, there have been no significant changes in obesity prevalence in youth or adults between 2003-2004 and 2011-2012. Obesity prevalence remains high and thus it is important to continue surveillance.

CONCLUSIONS AND RELEVANCE Nationally representative data do not show any significant changes in obesity prevalence in the most recently available years, although the prevalence of obesity may be stabilizing. Continuing research is needed to determine which, if any, public health interventions can be credited with this stability. Unfortunately, there is an upward trend of more severe forms of obesity and further investigations into the causes of and solutions to this problem are needed.

Ogden et al JAMA. 2014; Skinner and Skelton JAMA Pediatr 2014
Table 6. Unadjusted Tests of Linear Trends of High Weight for Length<sup>a</sup> and Obesity<sup>b,c</sup> by Age, United States, 2003-2012<sup>d</sup>

<table>
<thead>
<tr>
<th></th>
<th>2003-2004</th>
<th>2005-2006</th>
<th>2007-2008</th>
<th>2009-2010</th>
<th>2011-2012</th>
<th>Change 2003-2004 to 2011-2012, Point (95% CI)&lt;sup&gt;e&lt;/sup&gt;</th>
<th>P Value&lt;sup&gt;f&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High weight for length (birth–&lt;2 y)</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>All</td>
<td>9.5 (7.1 to 12.7)</td>
<td>8.2 (6.1 to 10.9)</td>
<td>9.5 (7.5 to 12)</td>
<td>9.7 (7.6 to 12.3)</td>
<td>8.1 (5.8 to 11.1)</td>
<td>-1.4 (-4.9 to 2.1)</td>
<td>.72</td>
</tr>
<tr>
<td><strong>Childhood obesity, 2-19 y</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>2-5</td>
<td>13.9 (10.8 to 17.0)</td>
<td>10.7 (8.3 to 13.3)</td>
<td>10.1 (7.8 to 12.5)</td>
<td>12.1 (9.9 to 14.3)</td>
<td>8.4 (5.9 to 11.6)</td>
<td>-5.5 (-9.6 to -1.4)</td>
<td>.03</td>
</tr>
<tr>
<td>6-11</td>
<td>18.8 (16.2 to 21.7)</td>
<td>15.1 (11.3 to 20.1)</td>
<td>19.6 (17.2 to 22.4)</td>
<td>18.0 (16.3 to 19.8)</td>
<td>17.7 (14.5 to 21.4)</td>
<td>-1.1 (-5.2 to 3.0)</td>
<td>.88</td>
</tr>
<tr>
<td>12-19</td>
<td>17.4 (14.1 to 21.3)</td>
<td>17.8 (14.2 to 22)</td>
<td>18.1 (14.7 to 22)</td>
<td>18.4 (15.8 to 21.3)</td>
<td>20.5 (17.1 to 24.4)</td>
<td>3.1 (-1.7 to 7.9)</td>
<td>.20</td>
</tr>
<tr>
<td><strong>Adult obesity, ≥20 y</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≥20</td>
<td>32.2 (29.7 to 34.8)</td>
<td>34.3 (31.5 to 37.3)</td>
<td>33.7 (31.5 to 36.1)</td>
<td>35.7 (33.8 to 37.7)</td>
<td>34.9 (32 to 37.9)</td>
<td>2.8 (-0.8 to 6.4)</td>
<td>.09</td>
</tr>
<tr>
<td>20-39</td>
<td>28.5 (25.3 to 31.9)</td>
<td>29.1 (25 to 33.7)</td>
<td>30.7 (26.6 to 35.1)</td>
<td>32.6 (29 to 36.4)</td>
<td>30.3 (26.6 to 34.4)</td>
<td>1.9 (-2.8 to 6.6)</td>
<td>.20</td>
</tr>
<tr>
<td>40-59</td>
<td>36.8 (33 to 40.8)</td>
<td>40.4 (36.1 to 44.7)</td>
<td>36.2 (32.8 to 39.8)</td>
<td>36.6 (34.5 to 38.7)</td>
<td>39.5 (36.1 to 43)</td>
<td>2.7 (-2.1 to 7.5)</td>
<td>.78</td>
</tr>
<tr>
<td>≥60</td>
<td>31.0 (28.2 to 33.9)</td>
<td>33.4 (31.1 to 35.9)</td>
<td>35.1 (32.9 to 37.3)</td>
<td>39.7 (36.6 to 42.9)</td>
<td>35.4 (31.3 to 39.6)</td>
<td>4.4 (-0.3 to 9.1)</td>
<td>.004</td>
</tr>
</tbody>
</table>

<sup>a</sup> High weight for length defined as at or above the 95th percentile on the sex-specific Centers for Disease Control and Prevention (CDC) 2000 growth charts.

<sup>b</sup> Obesity for youth aged 2 to 19 years defined as body mass index (BMI) at or above the 95th percentile on the CDC sex-specific BMI for age growth charts.

<sup>c</sup> Obesity in adults defined as BMI ≥30.

<sup>d</sup> Data from the National Health and Nutrition Examination Survey.

<sup>e</sup> Percentage points.

<sup>f</sup> From the t test.
Table 2. Obesity Prevalence for All Children 2 to 19 Years of Age by National Health and Nutrition Examination Survey Year

<table>
<thead>
<tr>
<th>Category</th>
<th>% (95% CI)</th>
<th>P Value&lt;sup&gt;a&lt;/sup&gt;</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Overweight</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999-2000</td>
<td>28.7 (25.8-31.6)</td>
<td></td>
</tr>
<tr>
<td>2001-2002</td>
<td>29.8 (27.2-32.4)</td>
<td></td>
</tr>
<tr>
<td>2003-2004</td>
<td>33.5 (29.8-37.1)</td>
<td></td>
</tr>
<tr>
<td>2005-2006</td>
<td>30.2 (27.2-33.2)</td>
<td>.07</td>
</tr>
<tr>
<td>2007-2008</td>
<td>31.6 (29.3-33.8)</td>
<td></td>
</tr>
<tr>
<td>2009-2010</td>
<td>32.0 (30.2-33.7)</td>
<td></td>
</tr>
<tr>
<td>2011-2012</td>
<td>32.2 (29.6-34.7)</td>
<td></td>
</tr>
<tr>
<td><strong>Obesity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999-2000</td>
<td>14.5 (12.6-16.5)</td>
<td>.03</td>
</tr>
<tr>
<td>2001-2002</td>
<td>15.2 (13.2-17.1)</td>
<td></td>
</tr>
<tr>
<td>2003-2004</td>
<td>17.3 (14.9-19.7)</td>
<td></td>
</tr>
<tr>
<td>2005-2006</td>
<td>15.9 (13.3-18.5)</td>
<td></td>
</tr>
<tr>
<td>2007-2008</td>
<td>17.3 (14.7-20.0)</td>
<td></td>
</tr>
<tr>
<td>2009-2010</td>
<td>17.0 (15.6-18.4)</td>
<td></td>
</tr>
<tr>
<td>2011-2012</td>
<td>17.3 (15.3-19.3)</td>
<td></td>
</tr>
<tr>
<td><strong>Class 2 obesity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999-2000</td>
<td>3.8 (2.7-4.9)</td>
<td>.04</td>
</tr>
<tr>
<td>2001-2002</td>
<td>5.1 (4.1-6.1)</td>
<td></td>
</tr>
<tr>
<td>2003-2004</td>
<td>5.1 (3.8-6.4)</td>
<td></td>
</tr>
<tr>
<td>2005-2006</td>
<td>4.8 (3.5-6.1)</td>
<td>.04</td>
</tr>
<tr>
<td>2007-2008</td>
<td>5.0 (3.8-6.2)</td>
<td></td>
</tr>
<tr>
<td>2009-2010</td>
<td>5.7 (4.5-7.0)</td>
<td></td>
</tr>
<tr>
<td>2011-2012</td>
<td>5.9 (4.4-7.4)</td>
<td></td>
</tr>
<tr>
<td><strong>Class 3 obesity</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1999-2000</td>
<td>0.9 (0.6-1.3)</td>
<td>.002</td>
</tr>
<tr>
<td>2001-2002</td>
<td>1.3 (0.9-1.7)</td>
<td></td>
</tr>
<tr>
<td>2003-2004</td>
<td>1.6 (0.9-2.2)</td>
<td></td>
</tr>
<tr>
<td>2005-2006</td>
<td>1.2 (0.6-1.8)</td>
<td>.002</td>
</tr>
<tr>
<td>2007-2008</td>
<td>1.5 (1.0-2.0)</td>
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</tr>
<tr>
<td>2009-2010</td>
<td>1.6 (1.1-2.1)</td>
<td></td>
</tr>
<tr>
<td>2011-2012</td>
<td>2.1 (1.6-2.7)</td>
<td></td>
</tr>
</tbody>
</table>

<sup>a</sup> P values represent tests of linear trends across year.

Increase in boys, but not girls, between 1999-2000 and 2009-2010; but no change 2003-2004 to 2011-2012

Source: CDC/NCHS, National Health and Nutrition Examination Survey; Ogden et al. 2012, NCHS data brief; Ogden et al. 2014 JAMA

No linear trend last 10 years
P-value for last 10 years .346

Linear trend over 14 years p .046

SOURCE: CDC/NCHS, National Health and Nutrition Examination Surveys, “extreme” obesity defined as 120% of the 95th percentile
ANALYTIC DECISIONS: ALL DATA OR POINT ESTIMATES? LINEAR? QUADRATIC?
How to test for trend?

• Model all the data
  – Linear model
  – Quadratic term?

• Using point estimates/standard errors from table
  – Find where changes may occur
  – Estimate linear change before and after change
  – Go back to all data to estimate slopes
  – Need many time points
ANALYTIC DECISIONS: UNADJUSTED OR ADJUSTED TRENDS
Test for linear trend in obesity among US women, 2003-2006 through 2011-2012

<table>
<thead>
<tr>
<th></th>
<th>Unadjusted trend</th>
<th>Adjusted trend*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Absolute change</td>
<td>P-value</td>
</tr>
<tr>
<td>All</td>
<td>+2.9</td>
<td>0.21</td>
</tr>
<tr>
<td>20-39 years</td>
<td>+2.9</td>
<td>0.26</td>
</tr>
<tr>
<td>40-59 years</td>
<td>+0.7</td>
<td>0.63</td>
</tr>
<tr>
<td>60 years and older</td>
<td>+6.6</td>
<td>0.005</td>
</tr>
</tbody>
</table>

*Adjusted for race/Hispanic origin; all also adjusted for age

Source: CDC/NCHS, National Health and Nutrition Examination Survey; Ogden et al. 2014 JAMA
New CDC data show encouraging development in obesity rates among 2 to 5 year olds

Though overall obesity rates remain unchanged, rates in young children improve

The latest CDC obesity data, published in the February 26 issue of the Journal of the American Medical Association, show a significant decline in obesity among children aged 2 to 5 years. Obesity prevalence for this age group went from nearly 14 percent in 2003-2004 to just over 8 percent in 2011-2012 – a decline of 43%

THE WHITE HOUSE
Office of the First Lady

FOR IMMEDIATE RELEASE
February 26, 2014

OBESITY RATES ON THE DECLINE AMONG YOUNG CHILDREN

New CDC study shows significant decline in prevalence of obesity over a sustained period of time

Washington, DC – As the First Lady’s Let’s Move! initiative celebrates its fourth anniversary, we are seeing real progress in combating childhood obesity. Believing that childhood obesity is on the decline is only part of the battle; the focus must be on ensuring that this trend continues.

Severe obesity on the rise among children in the U.S.

A new analysis led by a UNC researcher finds that all classes of obesity in children have increased over the last 14 years. In addition, there is a troubling upward trend in the more severe forms of childhood obesity.

Embargoed until 4 p.m. EDT Monday, April 7, 2014

CHAPEL HILL, N.C. – A new study led by a University of North Carolina School of Medicine researcher finds little to cheer about in the fight against childhood obesity, despite a recent report to the contrary. The study, published April 7 in JAMA Pediatrics, found that all classes of obesity in U.S. children have increased over the last 14 years. Perhaps most troubling, the study found an upward trend in the more severe forms of obesity – those in which children have a body mass index (BMI) that is 120 to 140 percent higher than their peers.
Obesity Rate for Young Children Plummets 43% in a Decade

By SABRINA TAVERNISE  FEB. 25, 2014

Obesity Studies Tell Two Stories, Both Right

By SABRINA TAVERNISE  APRIL 14, 2014

WASHINGTON — Researchers at the University of North Carolina published a paper last week that introduced another wrinkle into the debate about childhood obesity. They disputed recent findings that obesity

Defining and measuring obesity

• BMI not perfect measure of body fat
  – No universal definition of too much fat

• Measuring is better than asking
  – Small errors can affect estimates in young children

• Definition in children
  – Statistical
  – Various reference populations
• Gold standard for **national** estimates
  – Quality of data
  – Nationally representative

• **Publically available**
  – Different analyses
  – Overlapping publications
NHANES - Limitations

• Released every 2 years
• Small sample sizes
  – Demographic subgroups
  – Rare events e.g. very high cut points for obesity
Trends

- Over what time period??
- Linear? Quadratic?
- All data or point estimates
- Unadjusted and adjusted
Thank you to my colleagues

Katherine Flegal, PhD
Brian Kit, MD
Margaret Carroll, MSPH
Hannah Lawman, PhD
Deanna Kruszon-Moran, MSPH

Disclaimer

The findings and conclusions in this presentation are those of the author and not necessarily of CDC