Obesity and diet among US adolescents

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Prevalence of obesity in the US, 2011-2012

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

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 and Ogden et al. JAMA
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
<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>NHANES</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
<table>
<thead>
<tr>
<th>Dates</th>
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<tr>
<td>1999-2000</td>
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<td>2001-2002</td>
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<td>2007-2008</td>
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<td>2009-2010</td>
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<td>2011-2012</td>
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Anthropometry
Dietary information collected in interviews
DEFINITION OF OBESITY IN YOUTH
Obesity cut points for children and teens

- BMI (kg/m²) proxy for body fat
- 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

- **Overweight**
  - OBMI-for-age 85<sup>th</sup>-<95<sup>th</sup> percentile
- **Obesity**
  - BMI for age ≥ 95<sup>th</sup> 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
OBESITY PREVALENCE: ADOLESCENTS 12-19 YEARS
One in 5 adolescents obese

SOURCE: CDC/NCHS, NHANES 2011-2012, Ogden et al. JAMA 2014
OBESITY TRENDS: ADOLESCENTS 12-19 YEARS
American teens on average ~16 pounds heavier in 2007-2010 than in early 1970s

14 years:
- Males: 14 pounds heavier
- Females: 17 pounds heavier

16 years:
- Males: 16 pounds heavier
- Females: 18 pounds heavier

18 years:
- Males: 16 pounds heavier
- Females: 18 pounds heavier

The distribution of BMI among adolescents shifted slightly to the right and became more skewed between 1976-80 and 2003-2006.

Increase in obesity among teens in 1980s, 1990s and early 2000s


1 p=.03 for linear trend

SOURCE: CDC/NCHS, National Health and Nutrition Examination Surveys; Ogden et al. 2014 JAMA
DISPARITIES IN OBESITY PREVALENCE AMONG US TEENS
Prevalence of obesity by race/Hispanic origin, 12-19 years, 2011-2012

SOURCE: CDC/NCHS, NHANES 2011-2012, Ogden et al. JAMA 2014
HOW DOES THE US COMPARE TO CANADA?
Trends in childhood obesity prevalence, Canada and the United States, ages 3-19 years

Notes: Pregnant girls are excluded. Statistically significant difference compared to Canada p<.001
Prevalence of childhood obesity, by age, 3-19 years, Canada (2009-2013) and the United States (2009-2012)

Notes: Pregnant girls are excluded. \(^1\)Statistically significant difference compared to Canada \(p<.001\). Sources: CDC/NCHS, National Health and Nutrition Examination Survey, 2009-2012; Canadian Health Measures Survey 2009-2013. Carroll et al NCHS Data Brief 2015
Prevalence of childhood obesity, by sex and age, 3-19 years, Canada (2009-2013) and the United States (2009-2012)

Notes: Pregnant girls are excluded.\(^1\) Statistically significant difference compared to Canada \(p<.001\).\(^2\) Use with caution (coefficient of variation 16.6% - 33.3%, For the Canadian Health Measures Survey). Sources: CDC/NCHS, National Health and Nutrition Examination Survey, 2009-2012; Canadian Health Measures Survey 2009-2013; Carroll et al NCHS Data Brief 2015
Prevalence of childhood obesity, non-Hispanic whites, by sex and age, 3-19 years, Canada (2009-2013) and the United States (2009-2012)

Notes: Pregnant girls are excluded. ¹Statistically significant difference compared to Canada p<.001 ²Use with caution (coefficient of variation 16.6% 33.3%). Sources: CDC/NCHS, National Health and Nutrition Examination Survey, 2009-2012; Canadian Health Measures Survey 2009-2013; Carroll et al NCHS Data Brief 2015
Per capita availability of calories

Trends in mean kilocalories, 12-19 years

http://www.cdc.gov/nchs/data/databriefs/db113.htm;
http://www.ars.usda.gov/SP2UserFiles/Place/80400530/pdf/1112/Table_1_NIN_GEN_11.pdf; NHANES/WWEIA
Non-Hispanic white adolescents consume more than 40% of calories away from home.

NHANES/WWEIA 2011-2012; [http://www.ars.usda.gov/SP2UserFiles/Place/80400530/pdf/1112/Table_10_AWY_RAC_11.pdf](http://www.ars.usda.gov/SP2UserFiles/Place/80400530/pdf/1112/Table_10_AWY_RAC_11.pdf)
Figure 2. Mean percent of kilocalories from added sugars among children and adolescents aged 2–19 years, by sex and age group: United States, 2005–2008

1Significantly different from females, $p < 0.05$.
2Significant linear trend by age, $p < 0.05$.


http://www.cdc.gov/nchs/data/databriefs/db87.htm
On average male teens consume 278 kcal a day from sugar sweetened beverages – almost 2 cans of cola.

Source: CDC/NCHS, National Health and Nutrition Examination Survey, 2009-2010; Kit et al. 2013 AJCN; http://ajcn.nutrition.org/content/98/1/180/T1.expansion.html
One quarter of adolescent males consume pizza on a given day.
obesity and diet

• Obesity
  – One in 5 teens
  – Disparities, prevalence lowest among Asian Americans
  – Trends: since 1980 large increases
  – NHANES 2013-2014 will help clarify recent trends
    • 2 year data are limited for subgroup analysis

• Diet
  – Not much change in calories recently
  – High consumption of added sugars, SSB, pizza
The findings and conclusions in this presentation are those of the author and not necessarily of CDC
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Brian Kit, MD
Margaret Carroll, MSPH

THANK YOU TO MY COLLEAGUES