Obesity prevalence, disparities, trends and persistence among US children <5 y

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

DISCLAIMER
Prevalence of obesity in the US, 2011-2012

- **Children & teens 2-19 y**
  - 16.9%
- **Adults ≥20 y**
  - 34.9%

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
DATA SOURCE
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
## Survey periods

<table>
<thead>
<tr>
<th>Survey</th>
<th>Dates</th>
<th>Ages</th>
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<tbody>
<tr>
<td>NHES I</td>
<td>1960-62</td>
<td>18-79 years</td>
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<tr>
<td>NHES II</td>
<td>1963-65</td>
<td>6-11 years</td>
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<td>NHES III</td>
<td>1966-70</td>
<td>12-17 years</td>
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<tr>
<td>NHANES I</td>
<td>1971-75</td>
<td>1-74 years</td>
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<td>NHANES II</td>
<td>1976-80</td>
<td>6 mo.-74 years</td>
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<td>HHANES</td>
<td>1982-84</td>
<td>6 mo.-74 years</td>
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<tr>
<td>NHANES III</td>
<td>1988-94</td>
<td>2 mo. +</td>
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Note: NHES, National Health Examination Survey
<table>
<thead>
<tr>
<th>Dates</th>
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<td>1999-2000</td>
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<td>2009-2010</td>
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<td>2011-2012</td>
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Anthropometry
Definitions

• **Children**
  - Comparison to a reference population

• **<24 months**
  - Weight-for-recumbent length

• **2-5 years**
  - BMI-for-age
  - $\text{BMI} = \frac{\text{kg}}{\text{m}^2}$
Infants and toddlers <24 months

• CDC recommendation:
  – Weight-for-recumbent length at or above the 97.7th percentile (+2 SD) WHO charts

• Sometimes see:
  – Weight-for-recumbent length at or above the 95th percentile CDC charts

Children 2-5 years

- **Overweight:**
  BMI-for-age 85\textsuperscript{th} to 95\textsuperscript{th} percentile

- **Obesity:**
  BMI-for-age at or above 95\textsuperscript{th} percentile

- **Severe obesity:**
  BMI-for-age at or above 120\% of the 95\textsuperscript{th} percentile

For children 2-5 years

- Based on NHANES data from 1971-1994
- At those time points, by definition, obesity prevalence of 5%
MEASURED VERSUS PARENT REPORT
Prevalence of obesity, 1999-2004
Measured versus proxy weight & height

Measured data: NHANES
Proxy-report data: NHIS
Proxy-report data: NSCH

SOURCE: Akinbami and Ogden, *Obesity* 2009
PREVALENCE
Prevalence of high weight-for-recumbent length, birth-<24 months, 2011-2012

Prevalence of overweight and obesity, 2-5 years, 2011-2012

DISPARITIES
Prevalence of high weight-for-recumbent length by race/Hispanic origin, birth-<24 mo, 2011-2012

No significant differences

Prevalence of obesity by race/Hispanic origin, 2-5 years, 2011-2012

- Non-Hispanic whites and Non-Hispanic Asians generally lower
- Pattern somewhat different for boys and girls


Prevalence of obesity among the states/territories ranged from 9.2% to 17.9%
CHANGES IN MEAN BODY WEIGHT
Change in mean weight among US girls

Source: CDC/NCHS, National Health and Nutrition Examination Survey
US TRENDS

Most recent obesity trends in youth 2-19 y: 2-year surveys

No significant linear trend over the last 10 years 2003-2004 to 2011-2012 overall or in boys or girls

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


Weight-for-length>=97.7th percentile WHO growt charts


SOURCE: CDC/NCHS, National Health and Nutrition Examination Surveys

5.5 percentage point decrease (95% confidence interval of 1.4 to 9.6 percentage point decrease)

1. p=.03 for linear trend
2. p=.21 for linear trend
3. p=.07 for linear trend

SOURCE: CDC/NCHS, National Health and Nutrition Examination Surveys, estimates are weighted


OTHER TRENDS IN PRESCHOOL AGE CHILDREN
2-4 year olds, slight drop from 2008-2011
Pediatric Nutrition Surveillance System
Obesity trends, Southern California, Kaiser Permanente, 2-5 years

DISTRIBUTION CHANGES
Figure 3. Changes in the distribution of body mass index (BMI) between 1976–1980 and 2005–2006, adults aged 20–74 years: United States

SOURCE: CDC/NCHS, National Health and Nutrition Examination Survey (NHANES).
Distribution of BMI 1999-2000 and 2009-2010, by sex, 2-5 years

1999-2000 2009-2010

Boys

Girls

Percent

Body Mass index (BMI)

Body Mass index (BMI)

Percent

BMI: body mass index
SOURCE: CDC/NCHS, National Health and Nutrition Examination Surveys; Ogden et al JAMA 2012
PERSISTENCE
Select studies: Association of childhood obesity with adult obesity

- **Bogalusa, 2-5 years (Freedman)**
  - Moderately associated with adult obesity (correlation .33-.41)
  - Kids with obesity 4 times likely obese as adults v <50th P

- **Fels, 3-4 years (Guo)**
  - Probability of adult obesity if child with obesity 14-25%

- **Young Finns, age 3 years (Juhola)**
  - Moderately associated with adult obesity (correlation .29-.36)

**Note:** These are examples and not the only studies

Select studies: Association of childhood obesity with adult or adolescent obesity

• Washington HMO, 1-5 years (Whitaker)
  – Odds of adult obesity if child with obesity
  – 1-2 y OR 1.3 (0.6-3.0)
  – 3-5 y OR 4.7 (2.5-8.8)
  – Risk depends upon whether child has parent with obesity

• ECLS-K, 1998-1999, mean 5.6 years (Cunningham)
  – 47% probability of being obese in 8th grade if obese in K

Note: These are examples and not the only studies
Sources: Whitaker et al NEJM 1997; Cunningham et al NEJM 2014
Young children (<5 years): Persistence of obesity

• Little published on children < 5 years
  – Different birth cohorts
  – Different years of follow-up
  – Different methodologies and measures

• Magnitude increases with age
US Children <5 years

- 7-8% with excess weight
- Disparities: Patterns differ
  - Race/ethnic differences among 2-5 y but not among <24 mo
- Trends last 10 years
  - No change among <24 months
  - Decline in 2-5 year olds
    - NHANES 2013-2014 will help clarify trends
    - Other data sources show similar trends
- Persistence
  - Weaker in youngest children, increases with age
Thank you to my colleagues

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Margaret Carroll, MSPH