



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

Cynthia Ogden, PhD

NHANES Analysis Branch Chief and Nutritional Epidemiologist

National Center for Health Statistics

Division of Health and Nutrition Examination Surveys



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

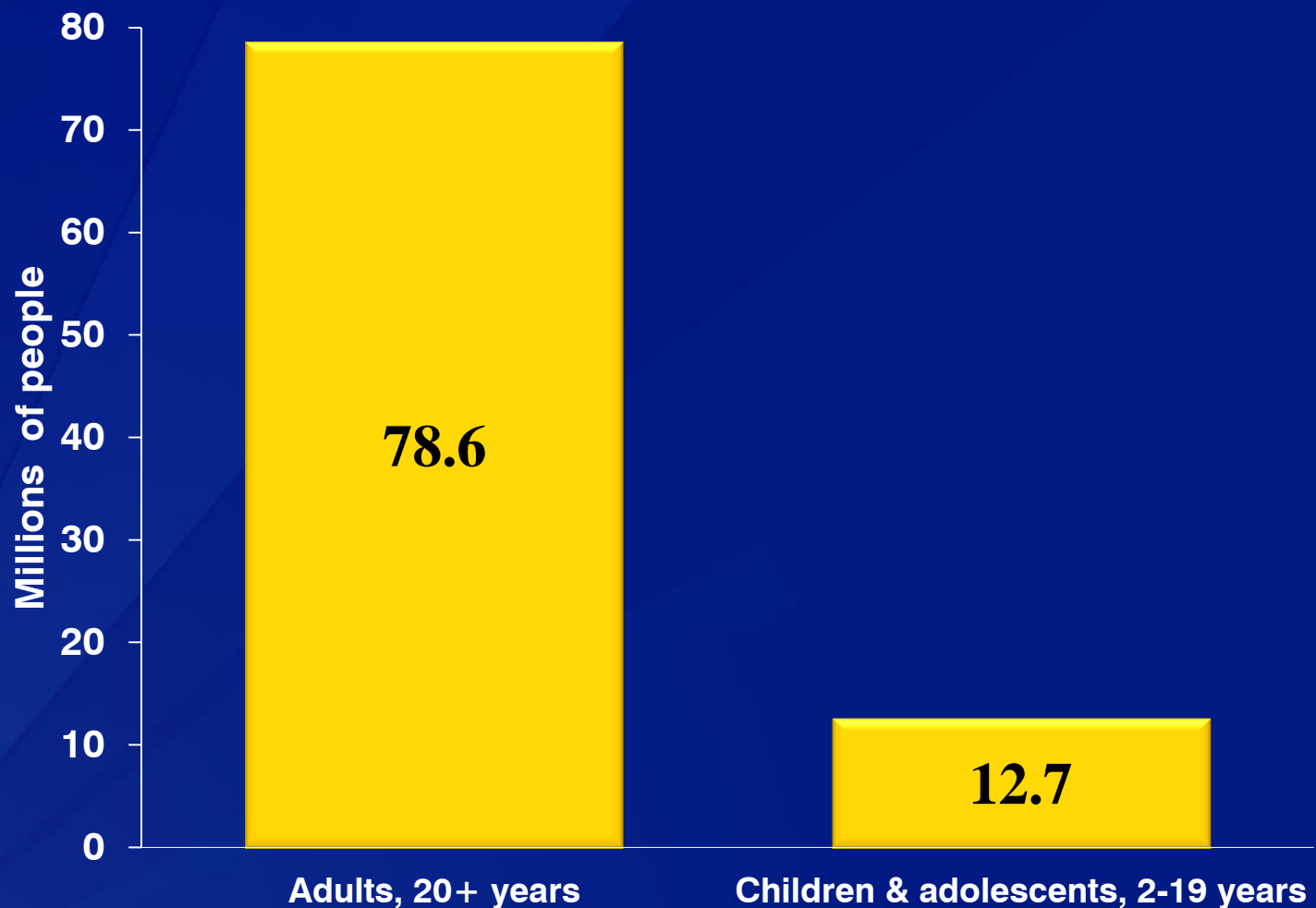
DISCLAIMER

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



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

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

Continuous NHANES, All ages

Dates

1999-2000

2001-2002

2003-2004

2005-2006

2007-2008

2009-2010

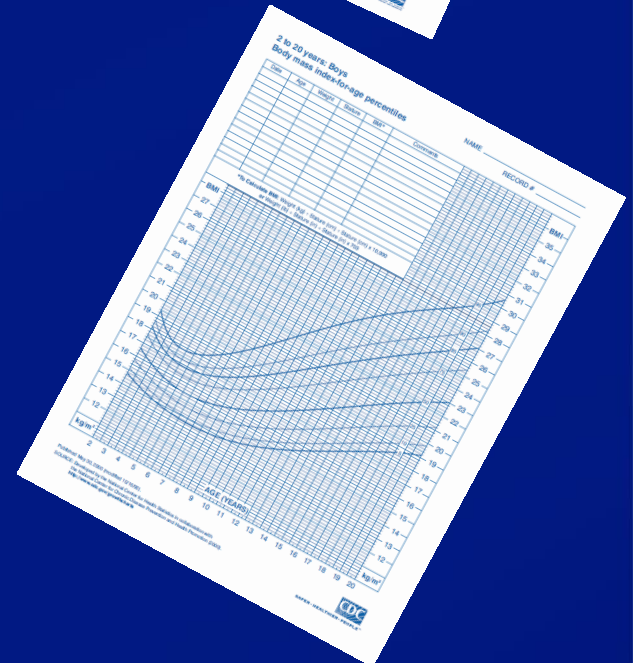
2011-2012

Anthropometry



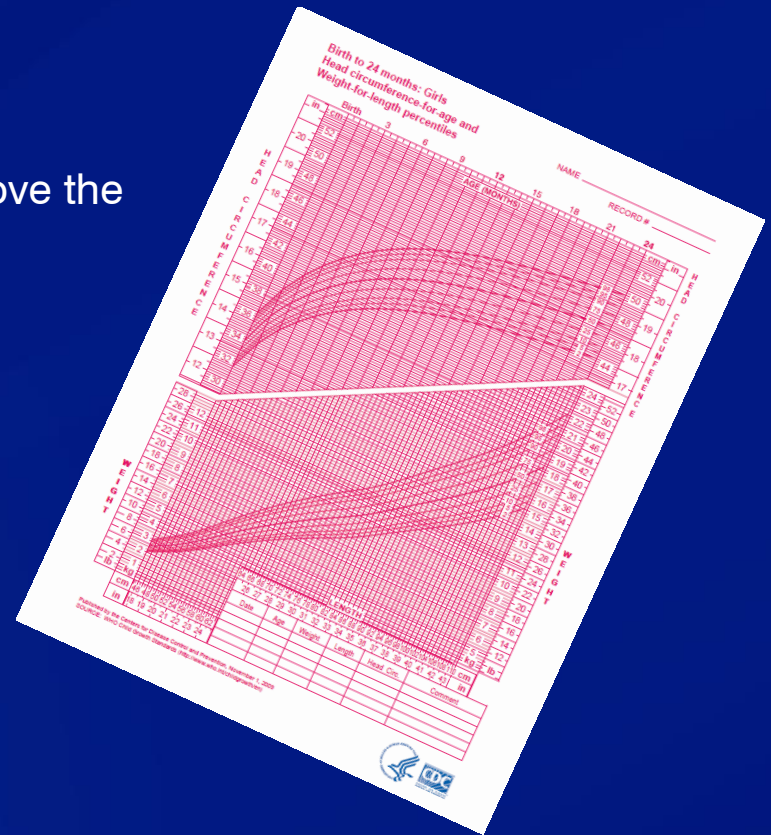
Definitions

- **Children**
 - Comparison to a reference population
- **<24 months**
 - Weight-for-recumbent length
- **2-5 years**
 - BMI-for-age
 - $\text{BMI} = \text{kg/m}^2$



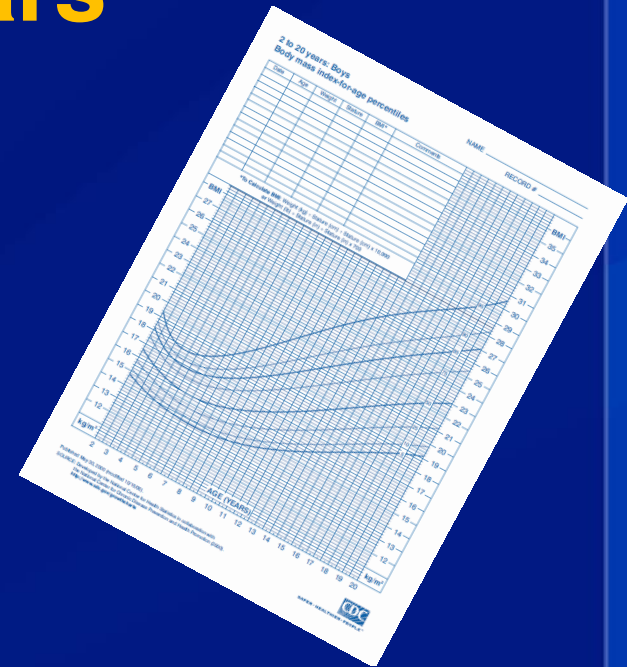
Infants and toddlers <24 months

- 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

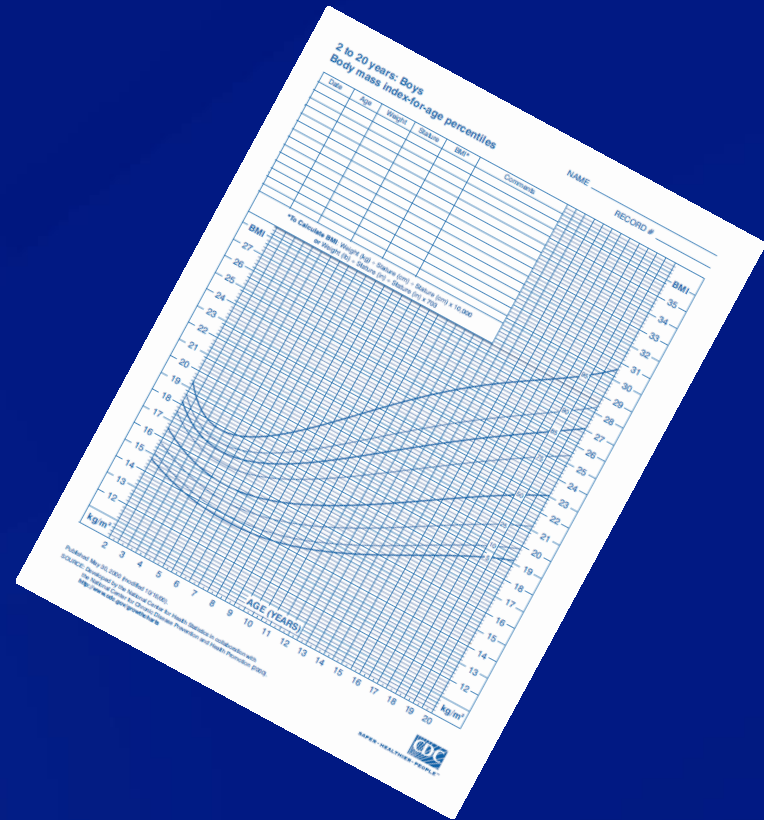
- **Overweight:**
BMI-for-age 85th to 95th percentile
- **Obesity:**
BMI-for-age at or above 95th percentile
- **Severe obesity:**
BMI-for-age at or above 120% of the 95th percentile



CDC growth charts

■ For children 2-5 years

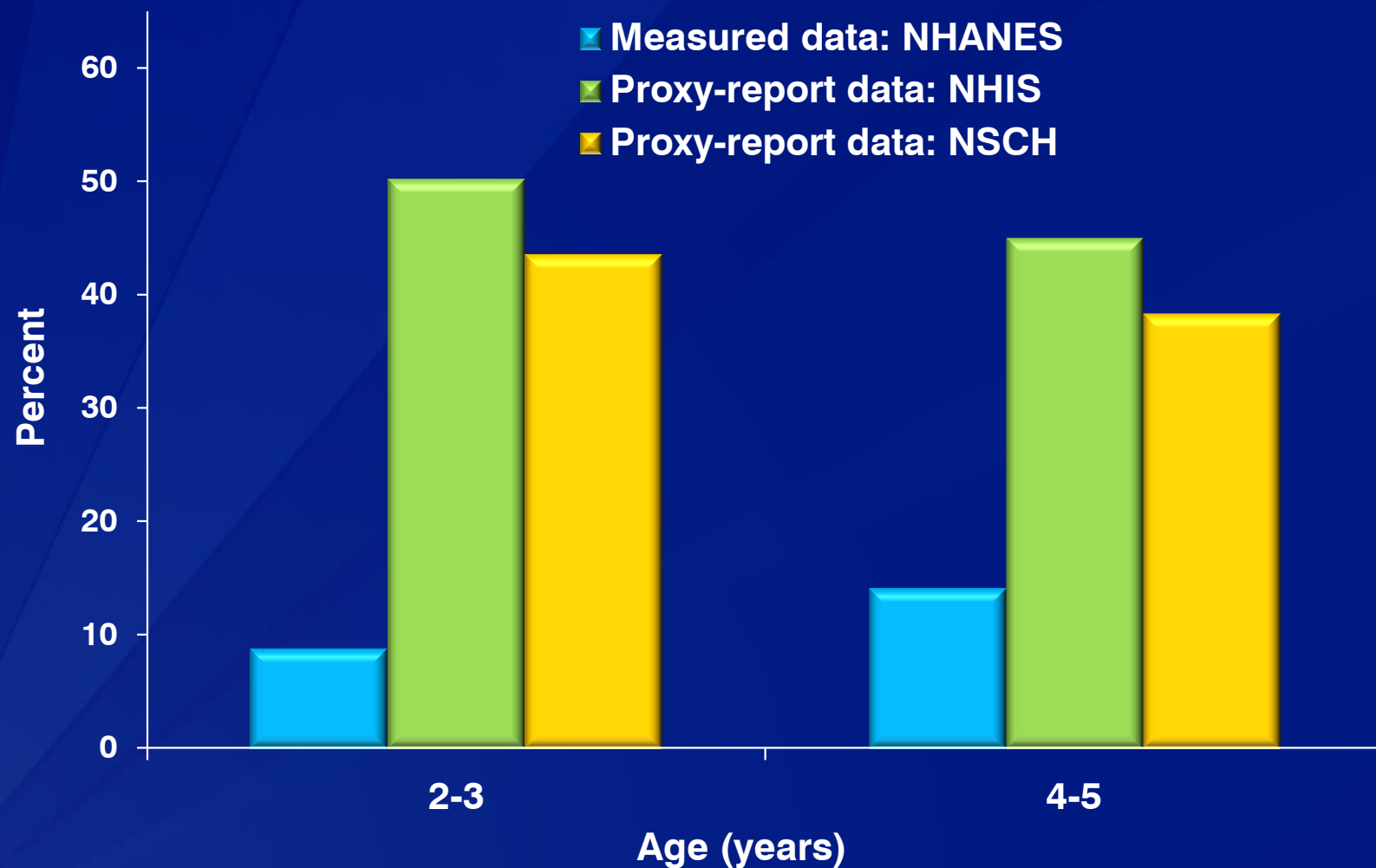
- Based on NHANES data from 1971-1994
- At those time points, by definition, obesity prevalence of 5%



MEASURED VERSUS PARENT REPORT

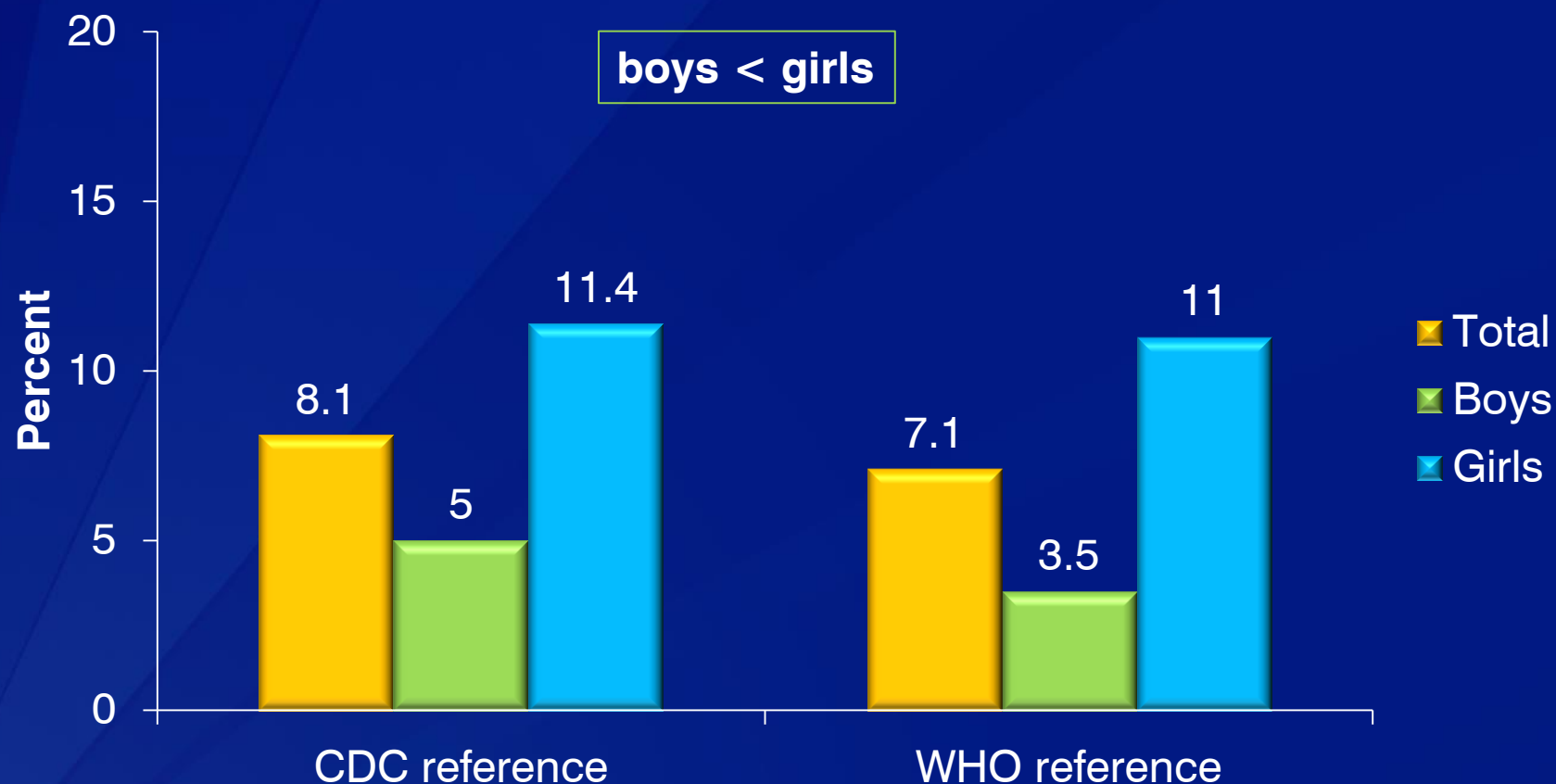
Prevalence of obesity, 1999-2004

Measured versus proxy weight & height

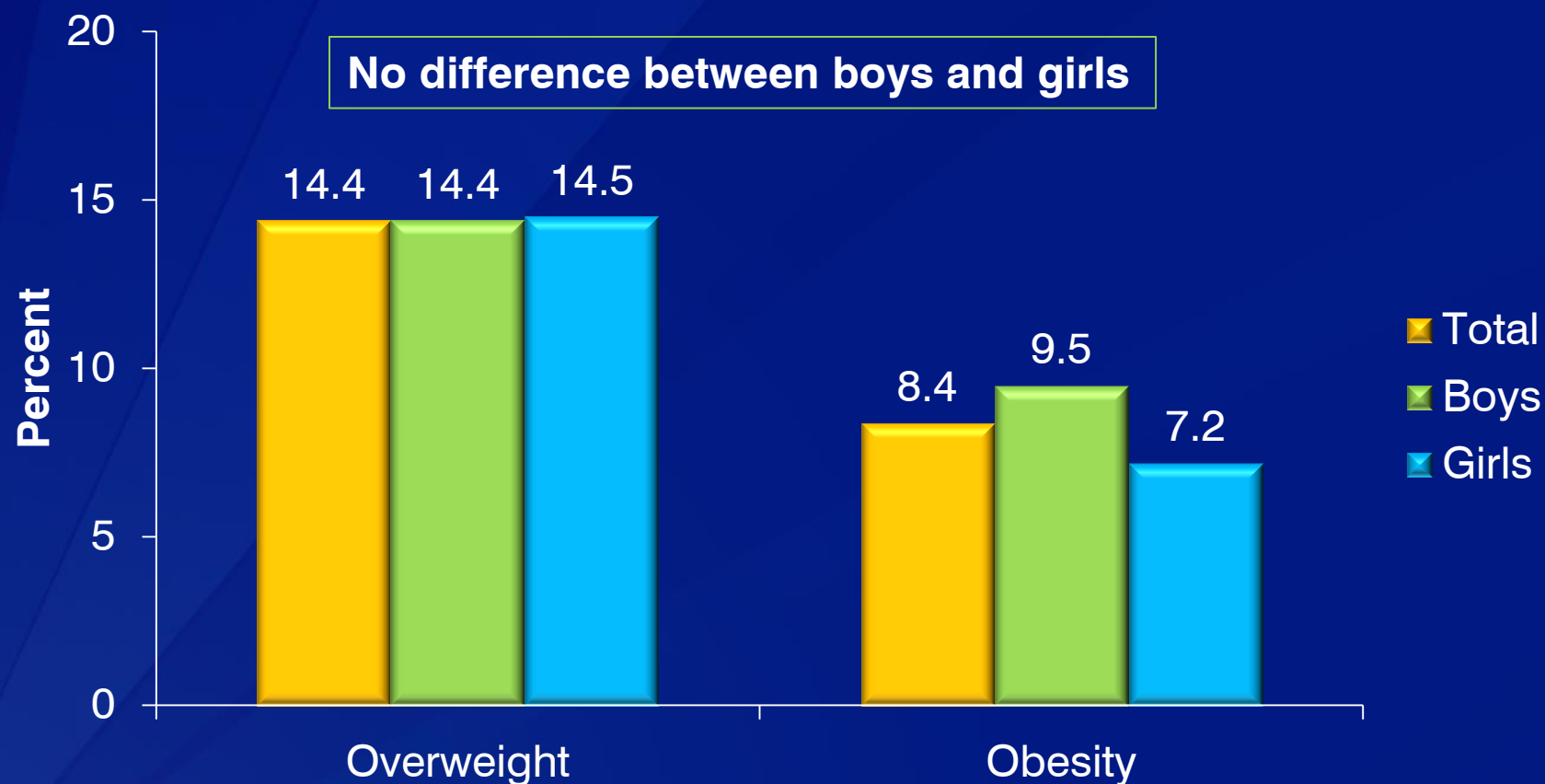


PREVALENCE

Prevalence of high weight-for-recumbent length, birth-<24 months, 2011-2012

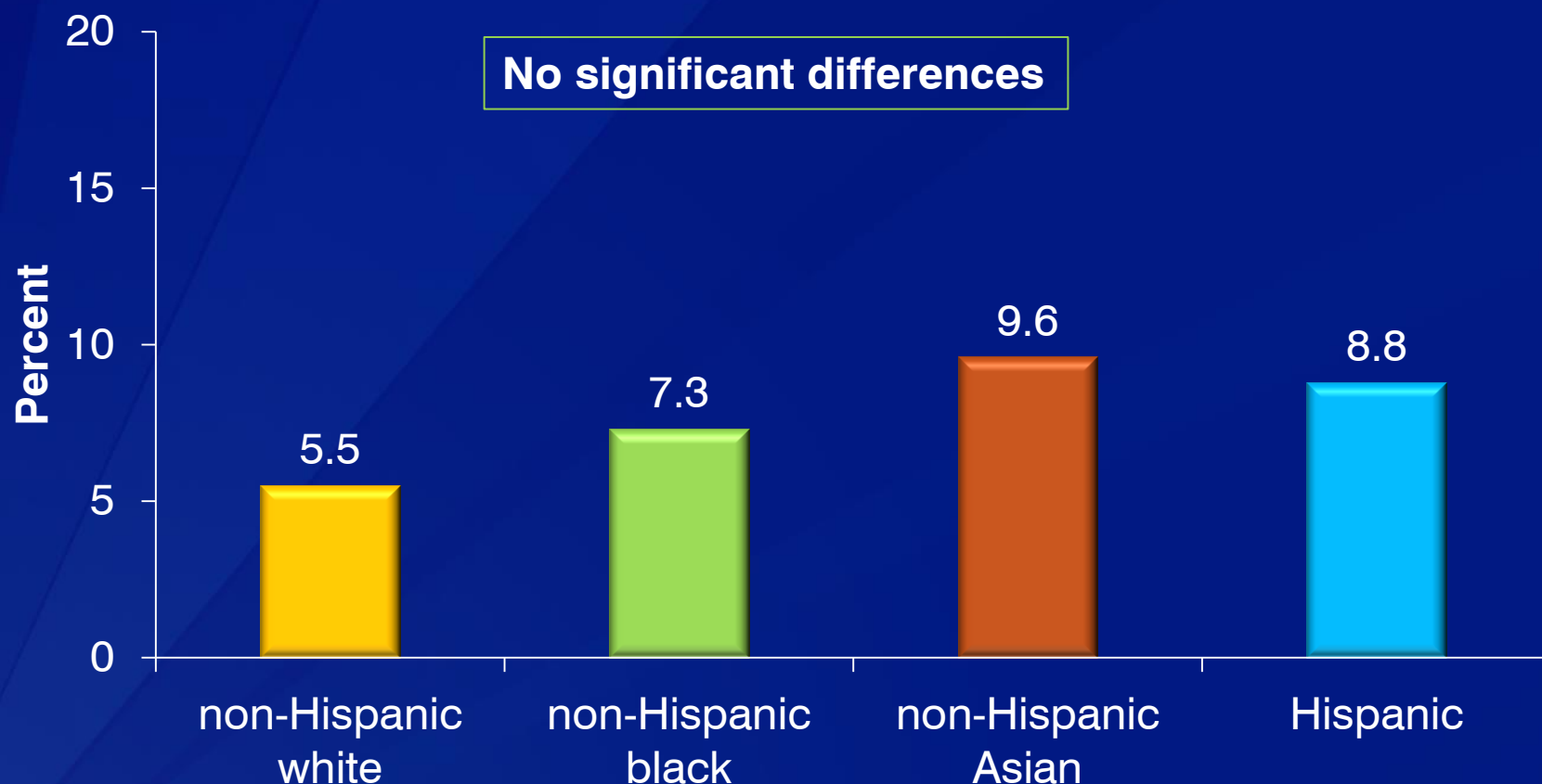


Prevalence of overweight and obesity, 2-5 years, 2011-2012



DISPARITIES

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



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

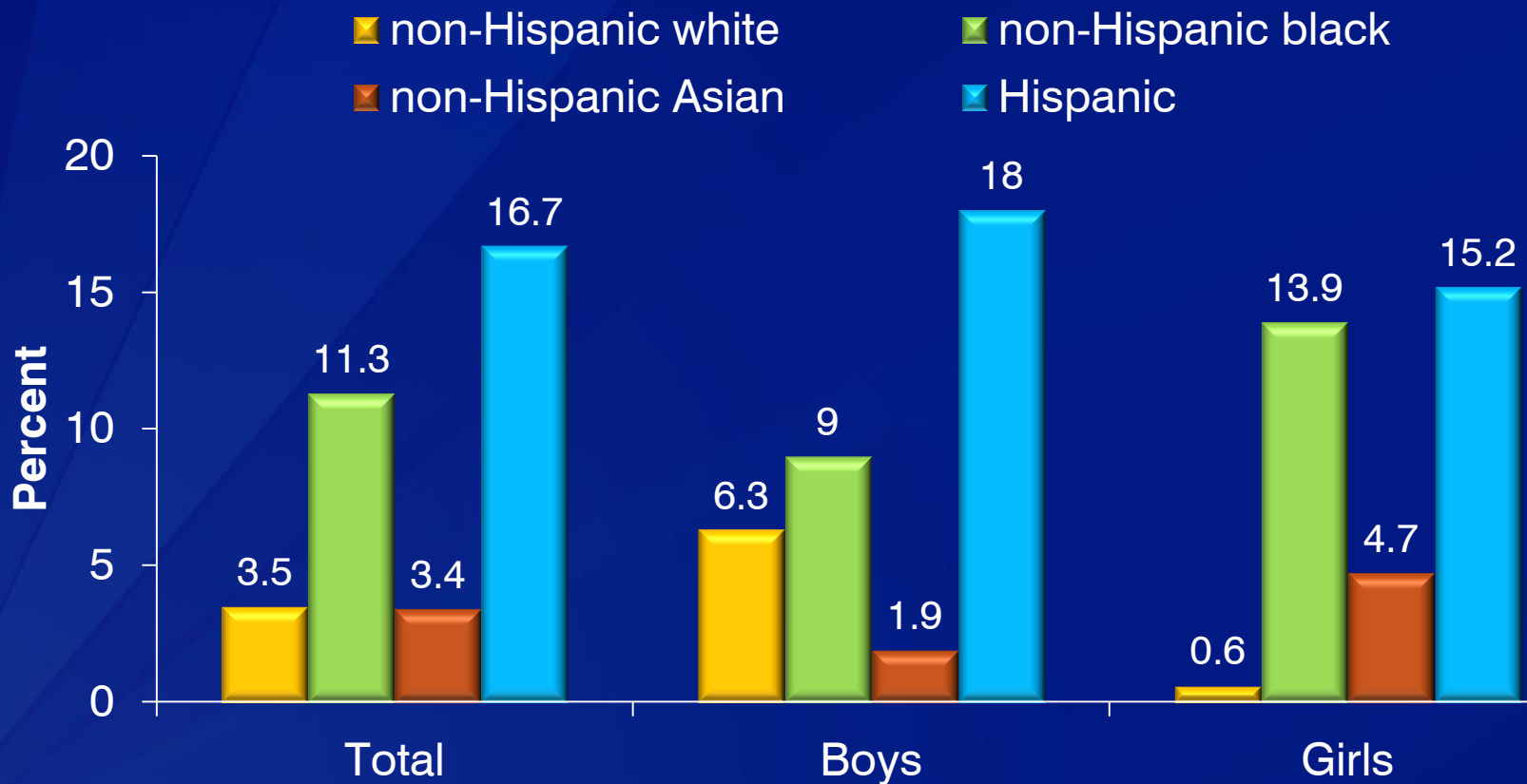
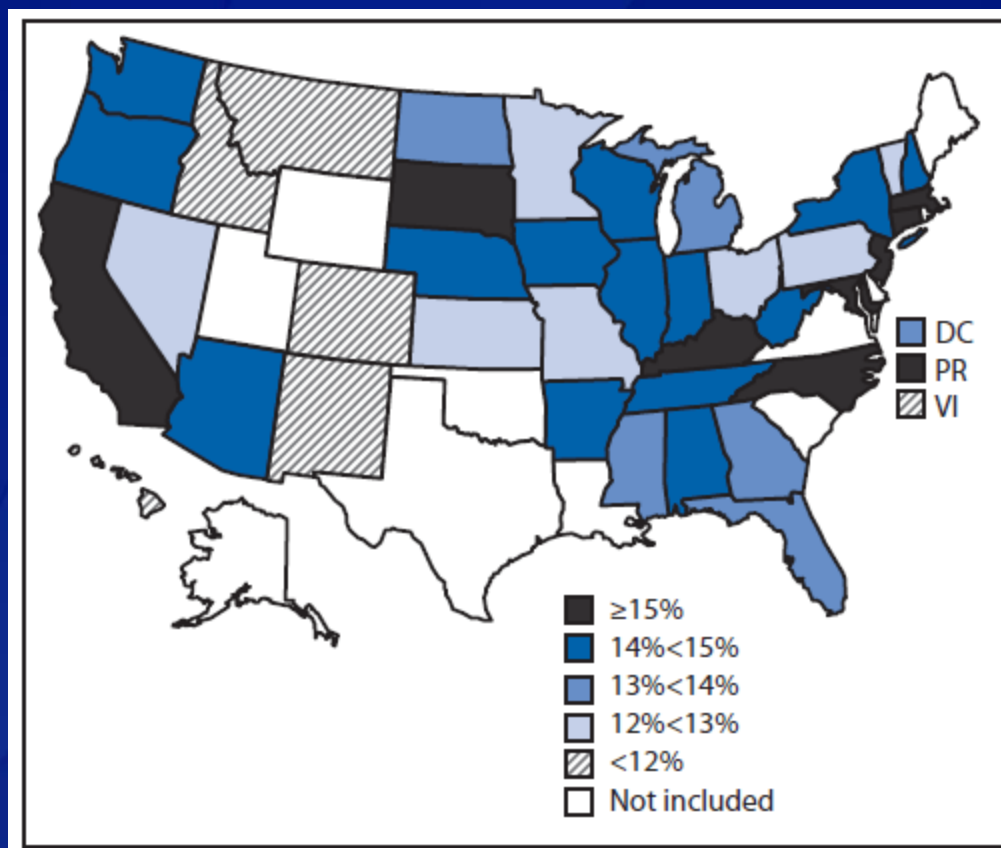


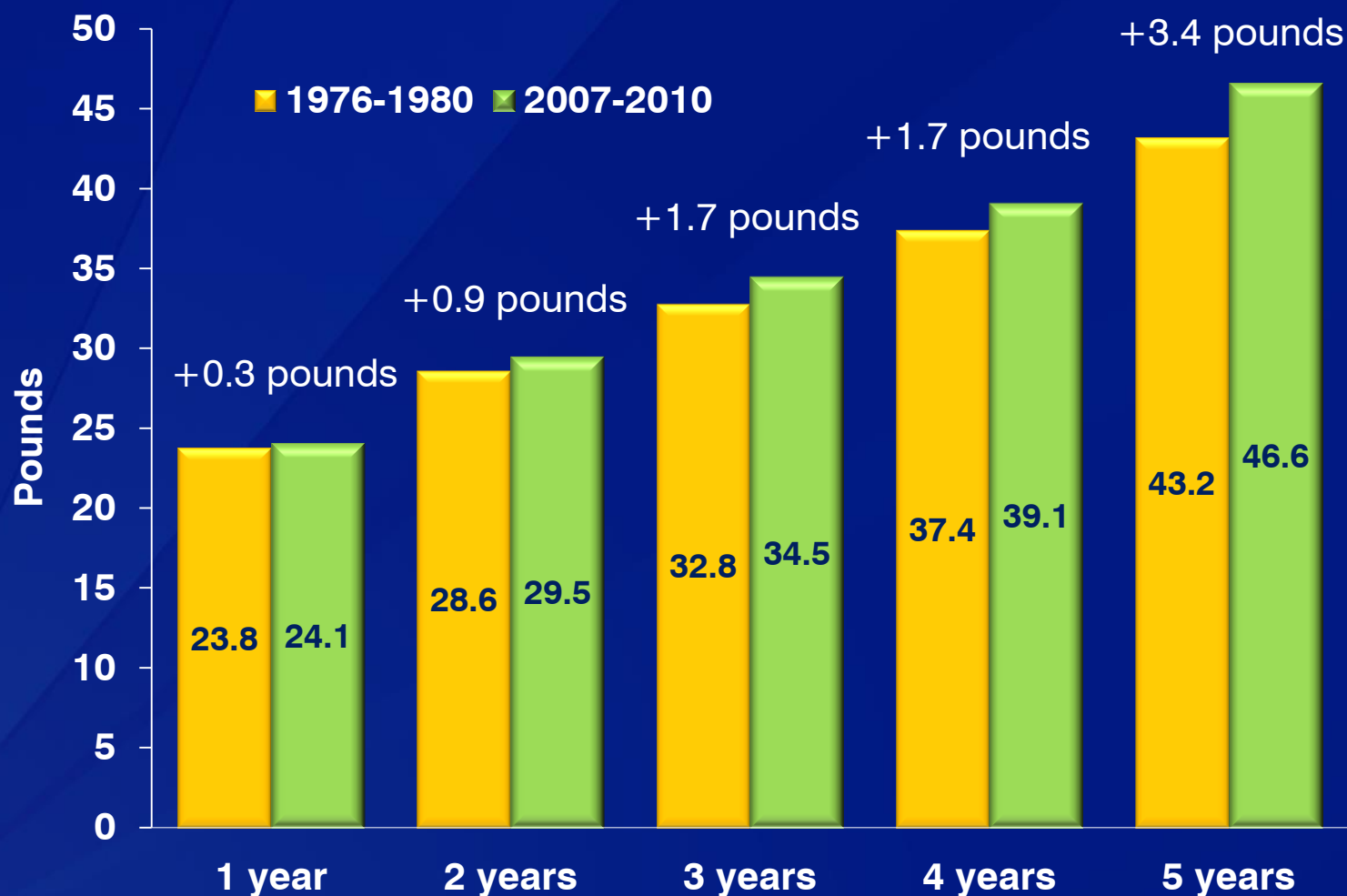
FIGURE 2. Prevalence of obesity among low-income, preschool-aged children — Pediatric Nutrition Surveillance System, United States, 2011



Prevalence of obesity among the states/territories ranged from 9.2% to 17.9%

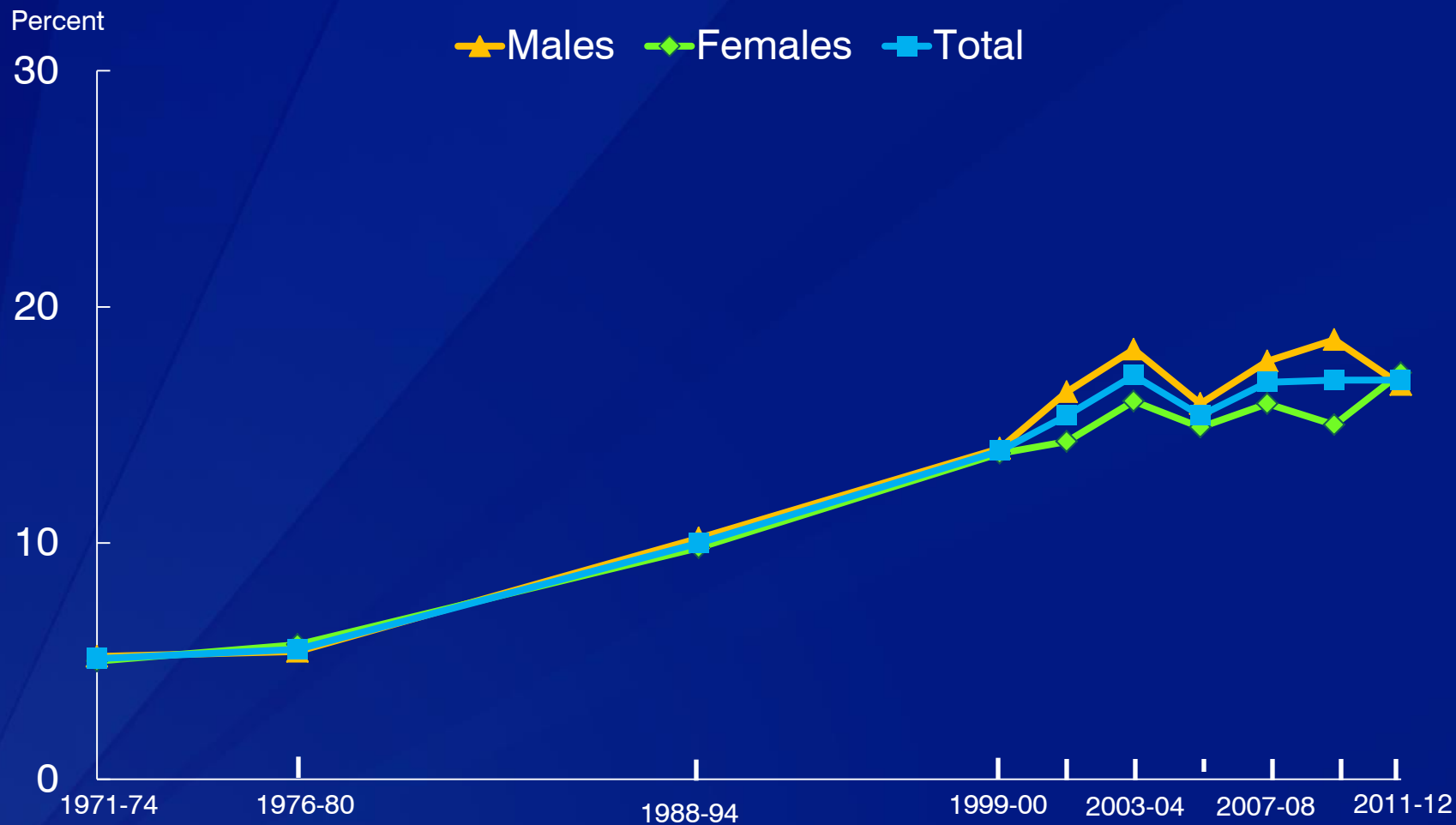
CHANGES IN MEAN BODY WEIGHT

Change in mean weight among US girls



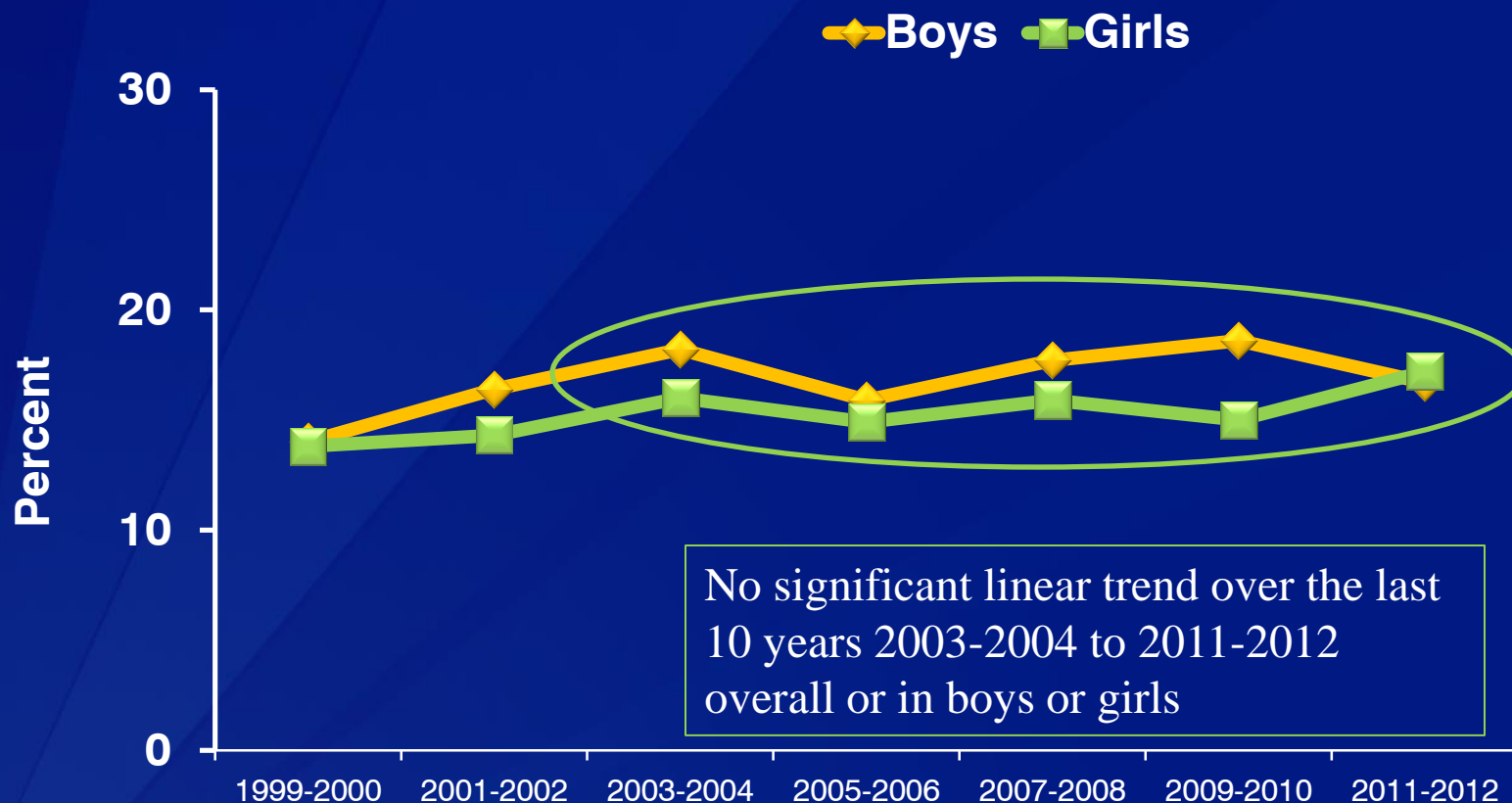
US TRENDS

Trends in obesity among children and adolescents 2-19 years, by sex: US, 1971-74 through 2011-12

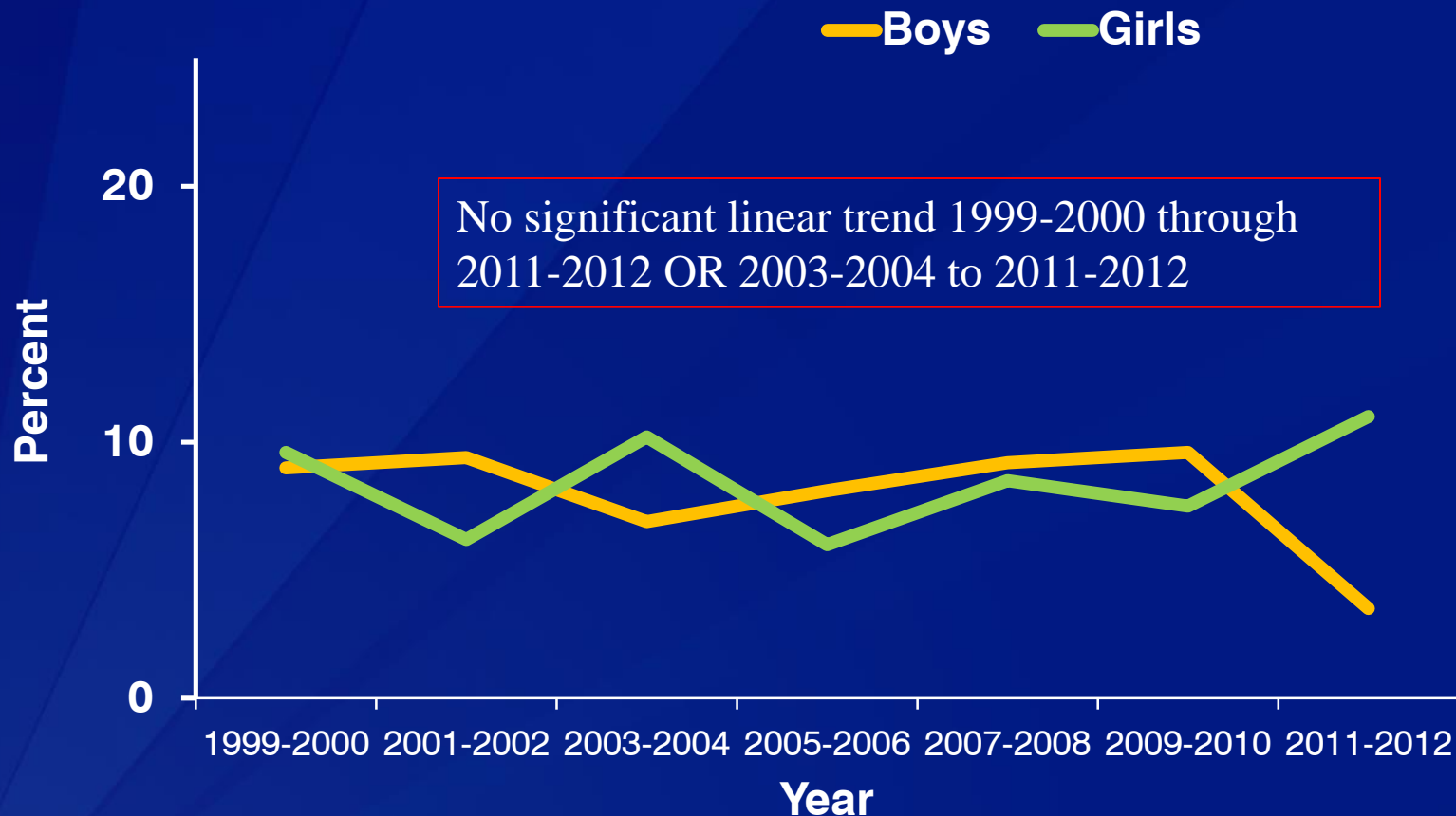


Source: CDC/NCHS. National Health Examination Surveys II (ages 6-11), III (ages 12-17), and National Health and Nutrition Examination Surveys (NHANES) I-III, and NHANES 1999-2000, 2001-2002, 2003-2004, 2005-2006, 2007-2008, 2009-2010 and 2011-2012.

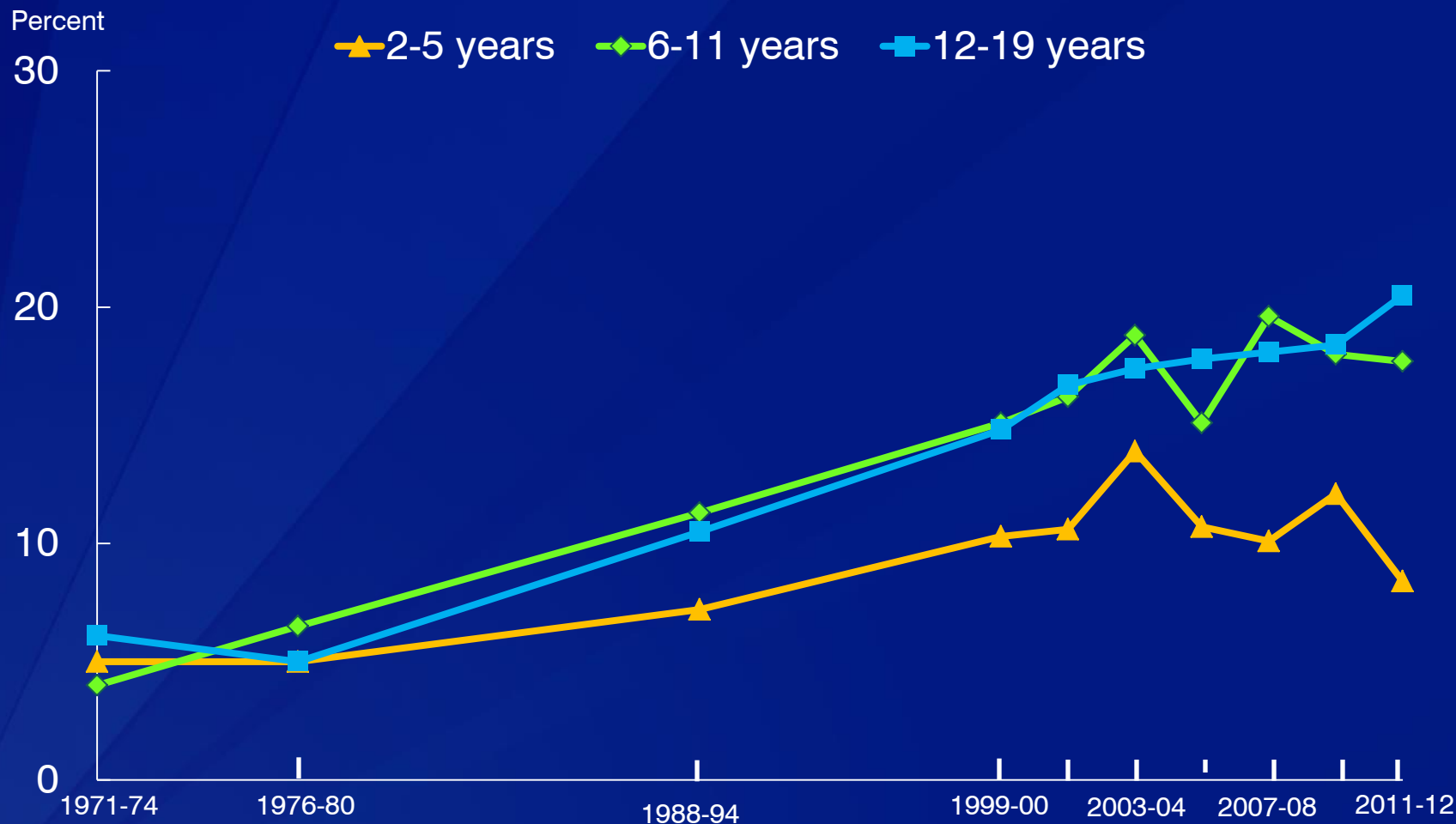
Most recent obesity trends in youth 2-19 y: 2-year surveys



Excess weight, children birth-<24 months of age, US, 1999-2009

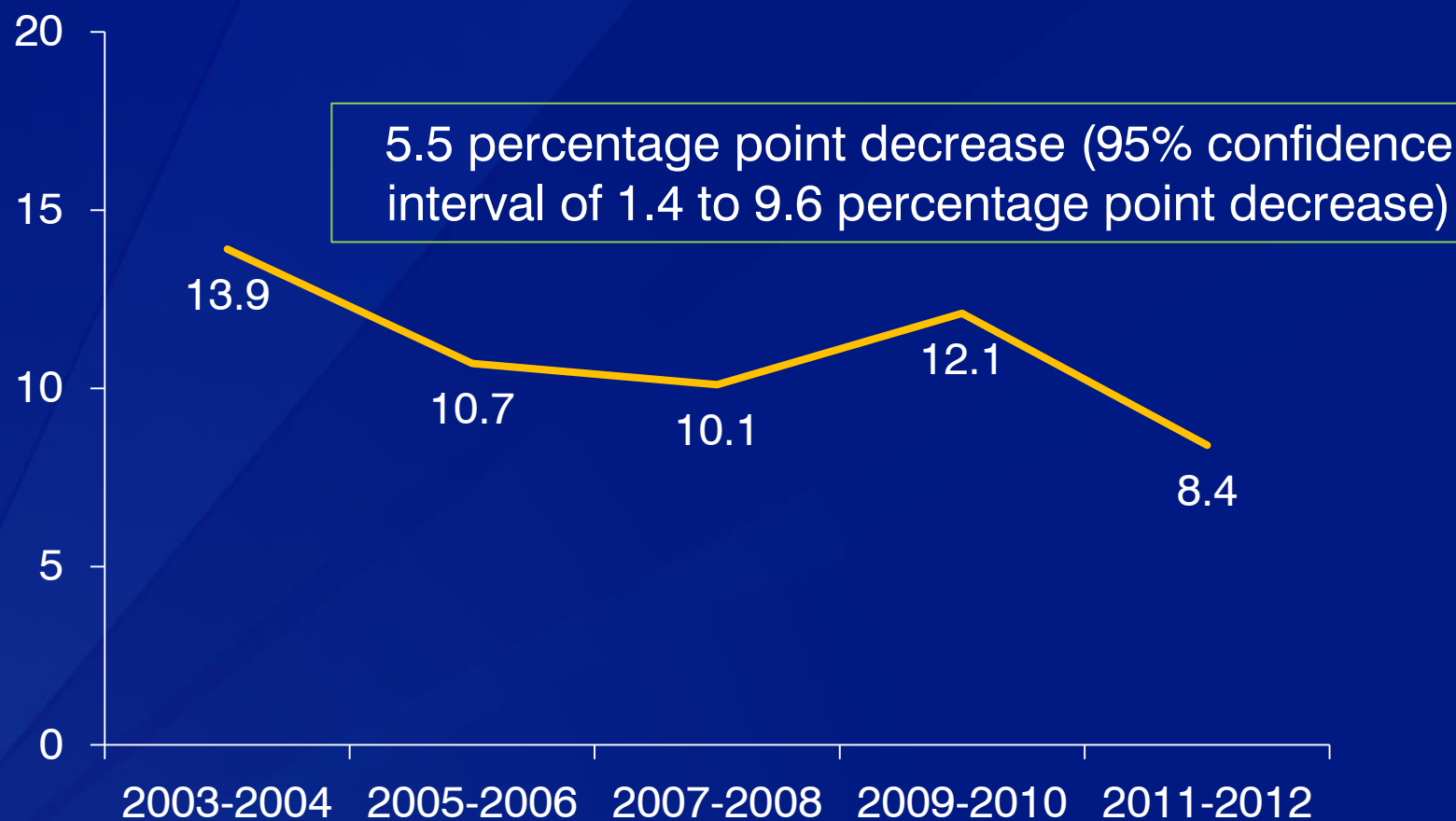


Trends in obesity among children and adolescents 2-19 years, by age: US, 1971-74 through 2011-12



Source: CDC/NCHS. National Health Examination Surveys II (ages 6-11), III (ages 12-17), and National Health and Nutrition Examination Surveys (NHANES) I-III, and NHANES 1999-2000, 2001-2002, 2003-2004, 2005-2006, 2007-2008, 2009-2010 and 2011-2012.

Trends in obesity prevalence among youth 2-5 years, by age, US, 2003-2004 to 2011-2012

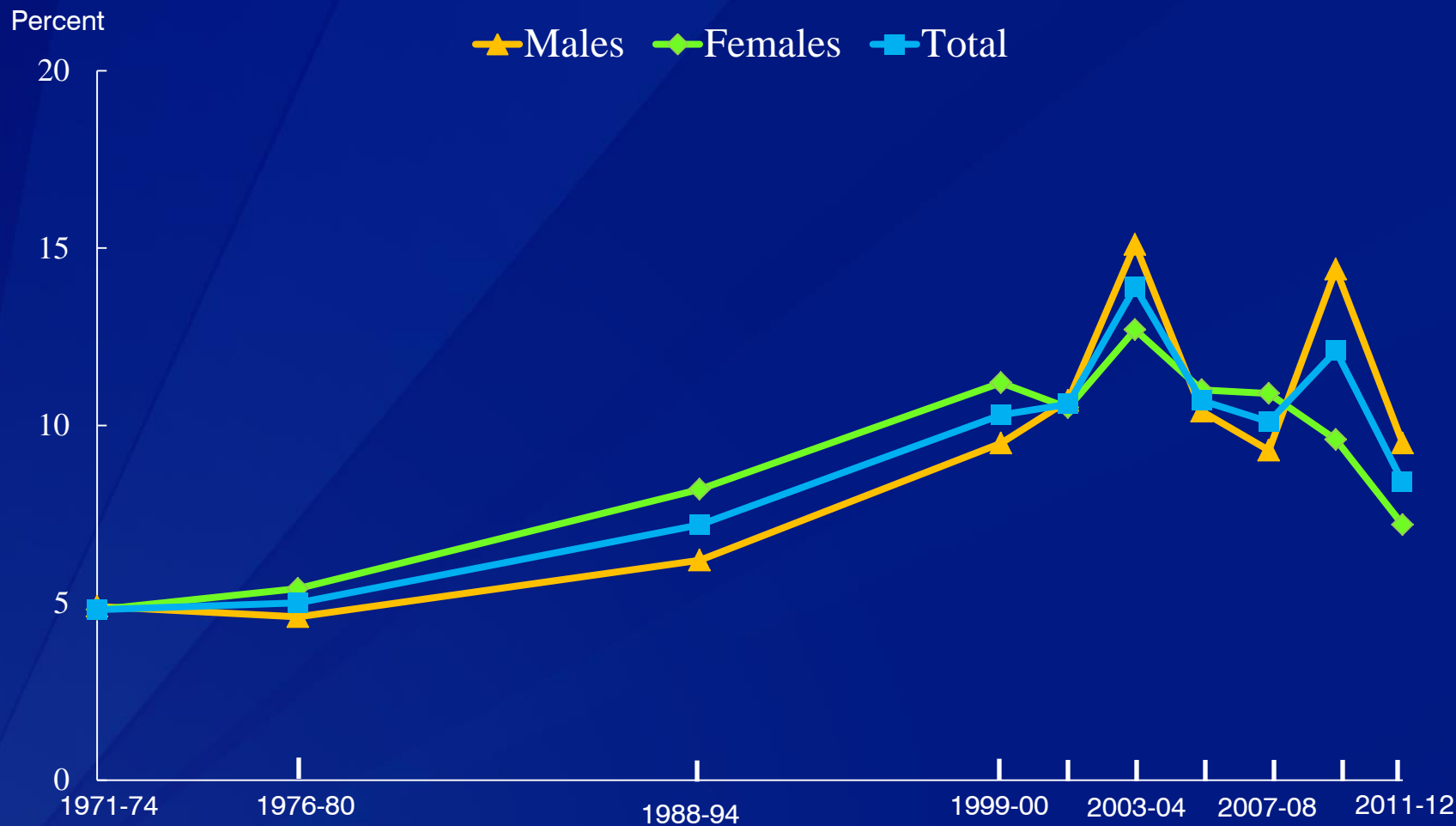


Trends in obesity prevalence among children 2-5 years, US, 2003-2004 to 2011-2012

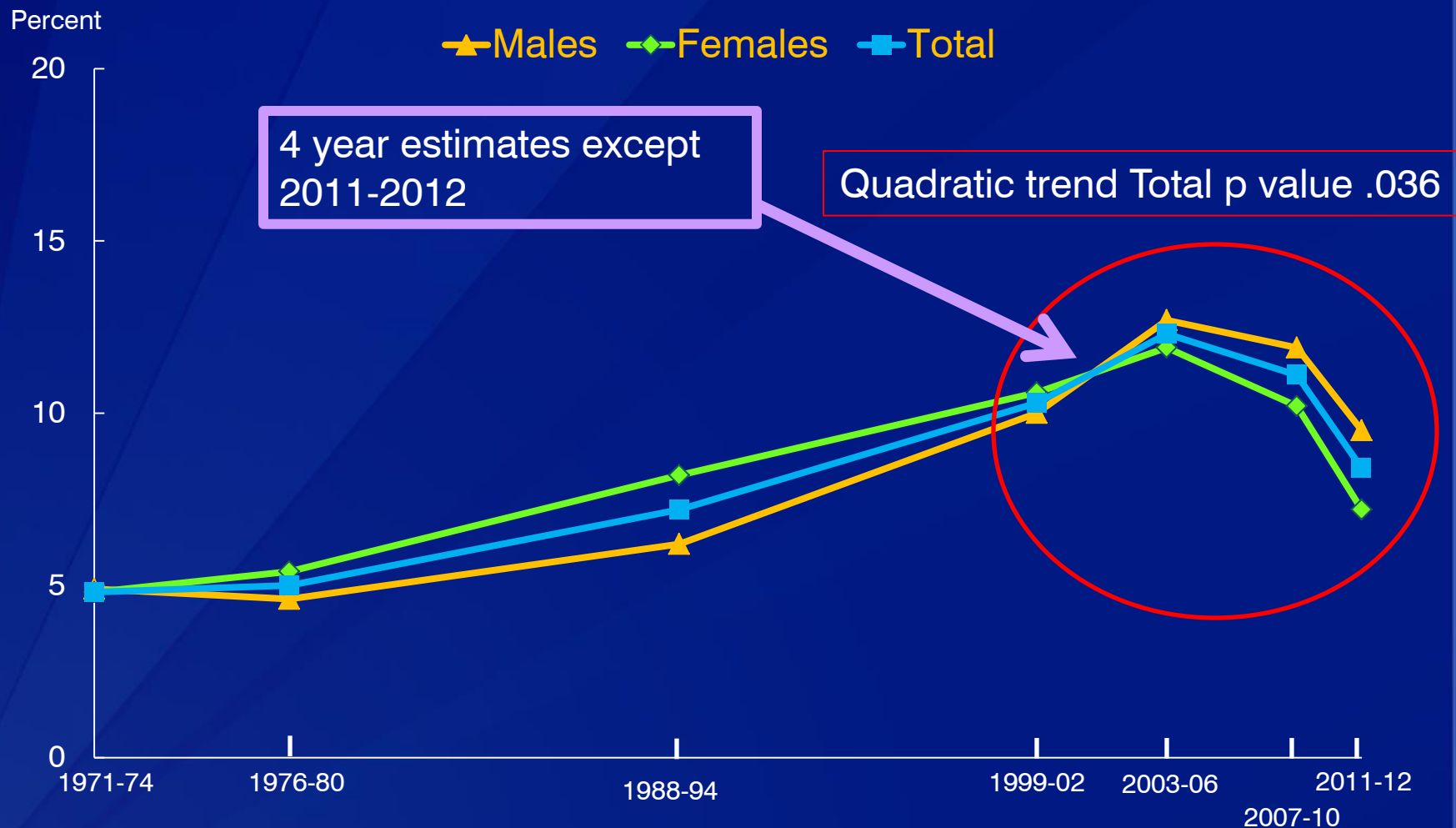


1. $p=.03$ for linear trend
2. $p=.21$ for linear trend
3. $p=.07$ for linear trend

Trends in obesity among children and adolescents 2-5 years, by sex: US, 1971-74 through 2011-12

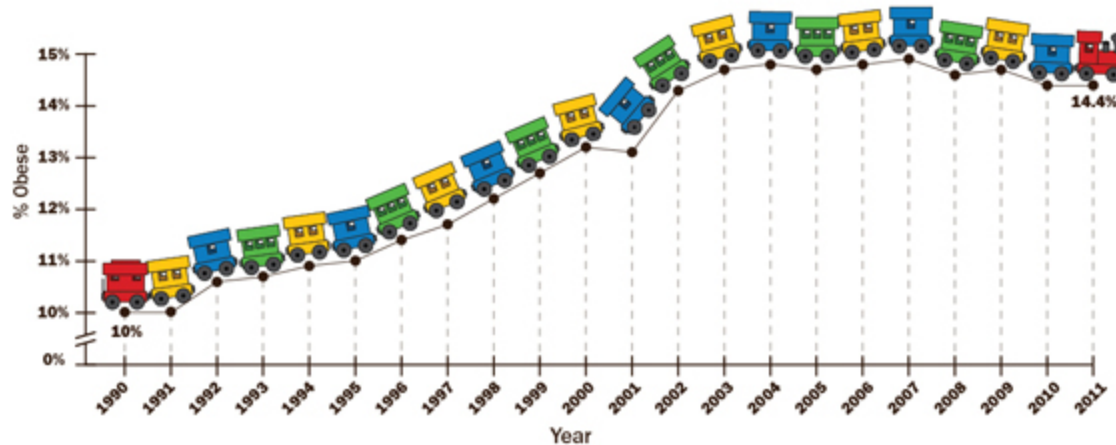


Trends in obesity among children and adolescents 2-5 years, by sex: US, 1971-74 through 2011-12



OTHER TRENDS IN PRESCHOOL AGE CHILDREN

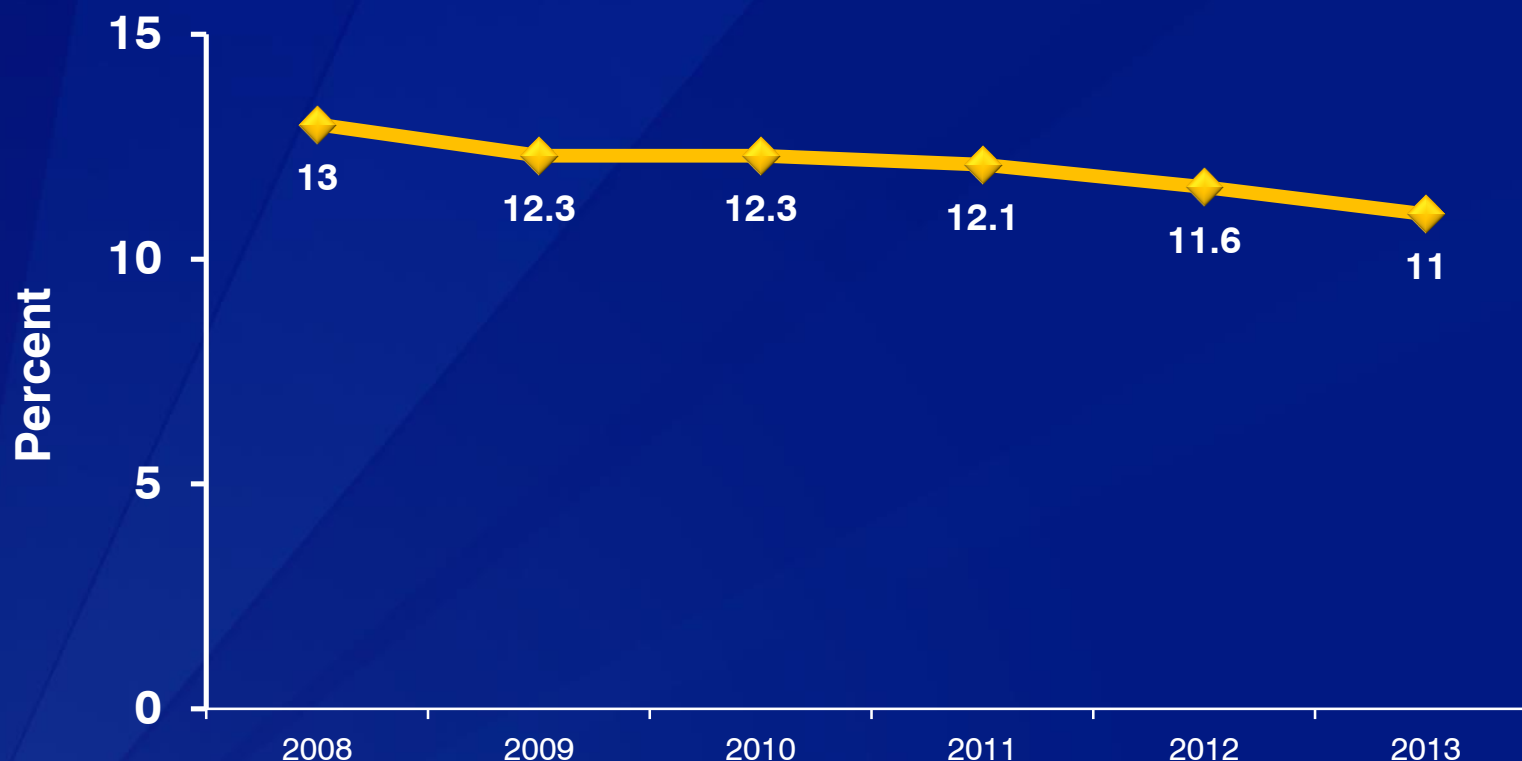
Obesity rates among low-income preschoolers starting to decrease



SOURCE: Pediatric Nutrition Surveillance 2011 Report. http://www.cdc.gov/pednss/pednss_tables/pdf/national_table12.pdf
Want to learn more? Go to www.cdc.gov/vitalsigns

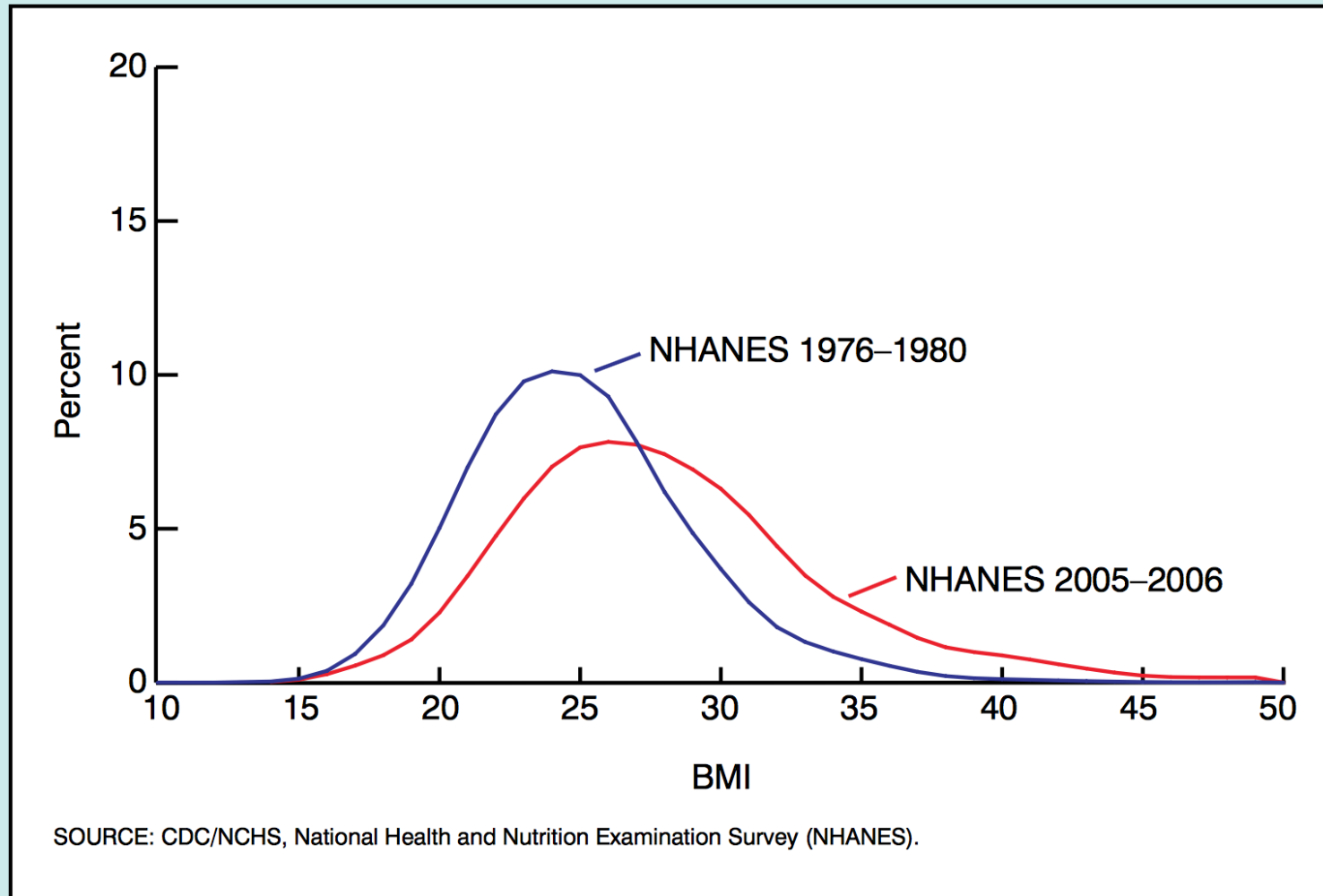
2-4 year olds, slight drop from 2008-2011
Pediatric Nutrition Surveillance System

Obesity trends, Southern California, Kaiser Permanente, 2-5 years

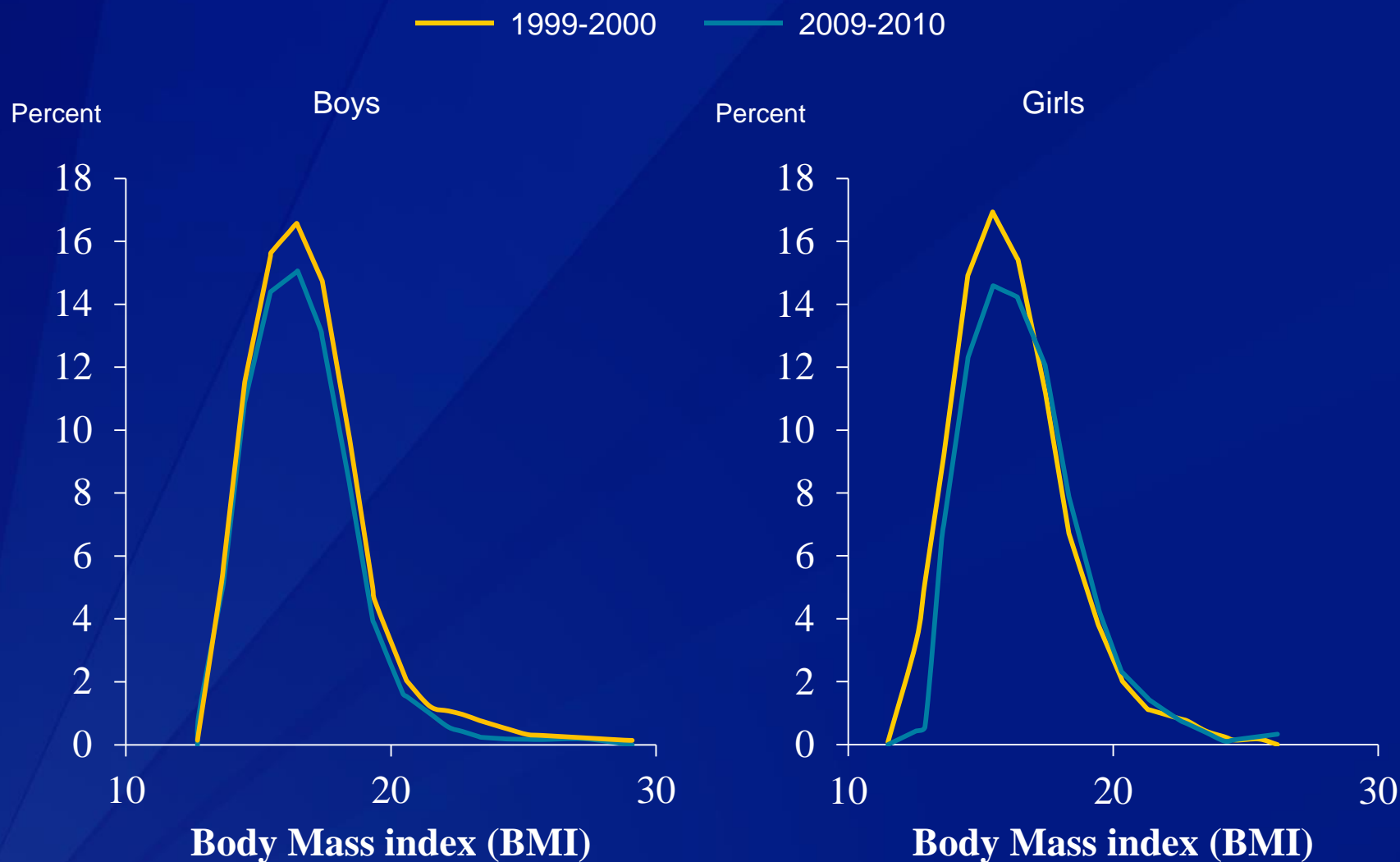


DISTRIBUTION CHANGES

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



Distribution of BMI 1999-2000 and 2009-2010, by sex, 2-5 years



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

Sources: Freedman et al Pediatrics 2005 ; Guo et al AJCN 2002; Juhola, et al. J Peds 2011;

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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