Changes in obesity rates for young children: Interpretations using different data sources and statistical methods

Duke Clinical Research Institute

Child obesity rates may finally be falling

Study finds small, but significant, reductions in Southern California

By Paul Sisson | 7:57 a.m. Sept. 25, 2015

Obesity Rate for Young Children Plummets 43% in a Decade

By SABRINA TAVERNISE   FEB. 25, 2014

JUNE 26, 2016

Philadelphia recognized for progress in reducing childhood obesity

Robert Woods Johnson Foundation records 6.5 percent decline from 2006-2013

CHILDREN   OBESITY   PHILADELPHIA   UNITED STATES

BY **MICHAEL TANENBAUM**
PhillyVoice Staff

Philadelphia reported a 6.5 relative decline in childhood obesity during the period between 2006-2007 and 2012-13, earning the city praise and recognition in the "Signs of Progress" report recently released by the Robert Woods Johnson Foundation.

The largest declines in obesity were found among boys, particularly African-American and Asian children. In fact, Philadelphia was alone among more than 30 cities in

More Health News

· Food Trust statement on soda tax advocates more water fountains in Philly schools

Health

A closer look at childhood obesity: In many groups, it's still on the rise

Reports of a slowdown don't tell the whole story, USC analysis shows
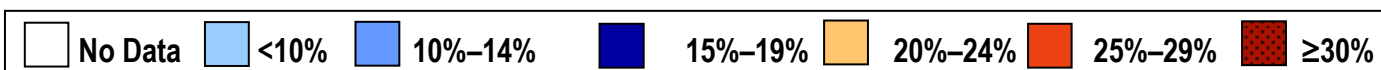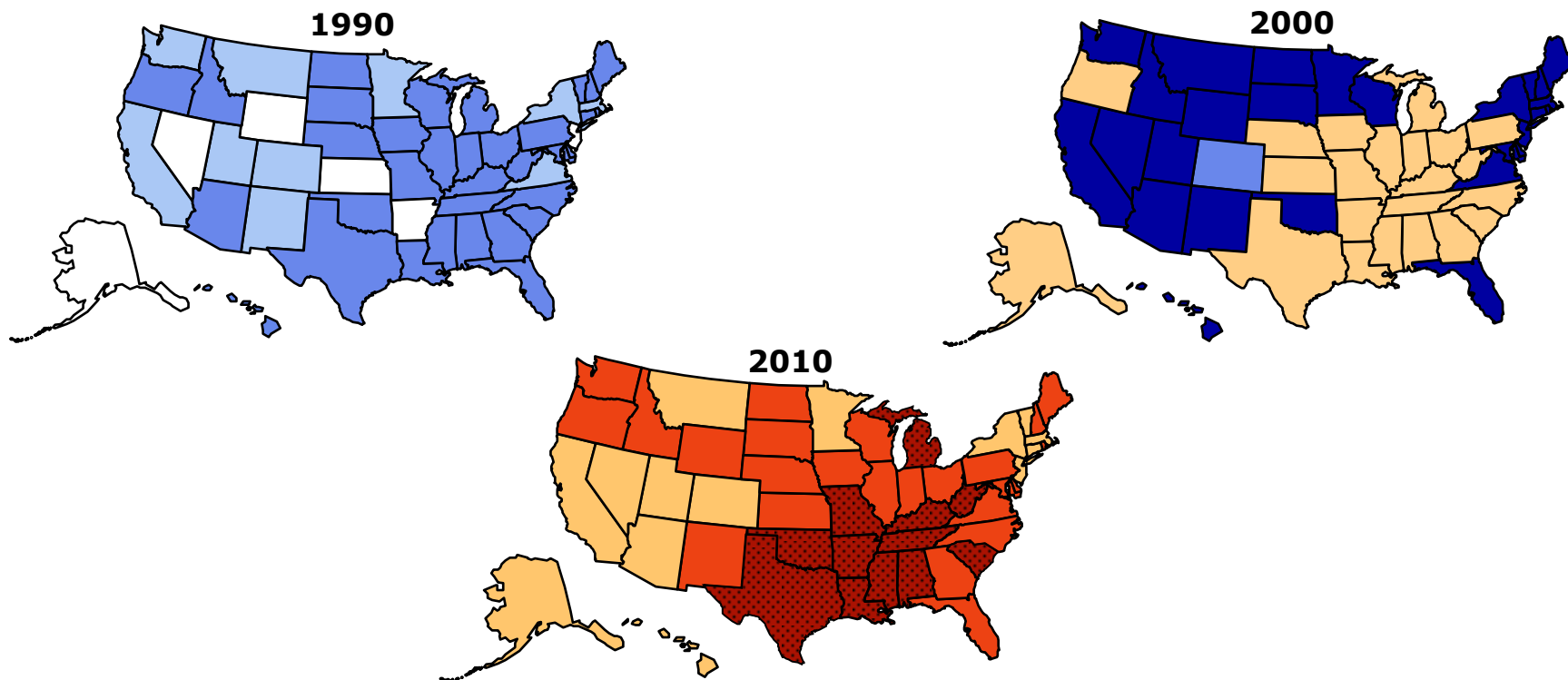
BY **Emily Gersema** · JUNE 10, 2015

Why are there discrepancies?

- What is actually being measured?
- Are the time periods comparable?
- Are the populations similar?
- What are the comparisons?

Obesity Trends* Among U.S. Adults
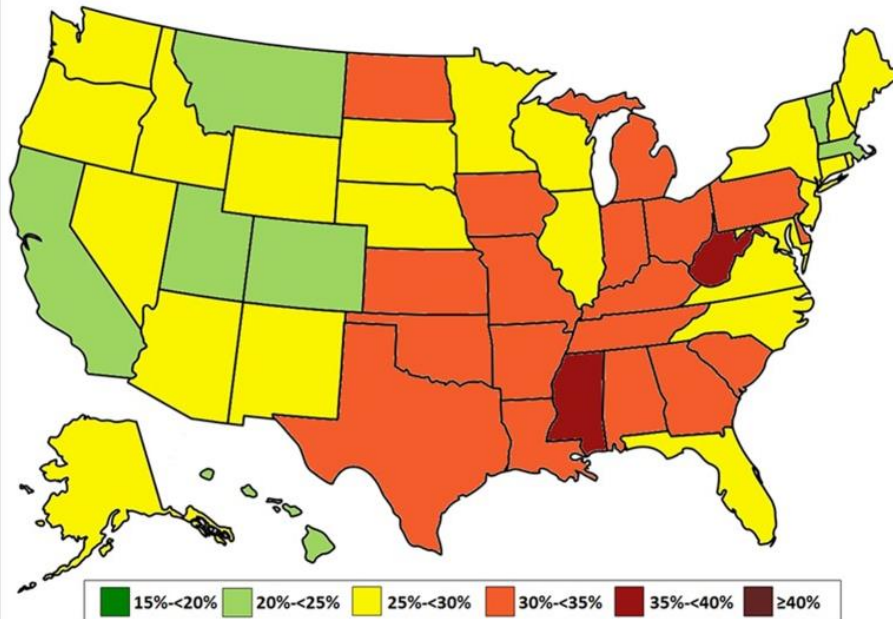## BRFSS, 1990, 2000, 2010
(*BMI ≥30, or about 30 lbs. overweight for 5'4" person)

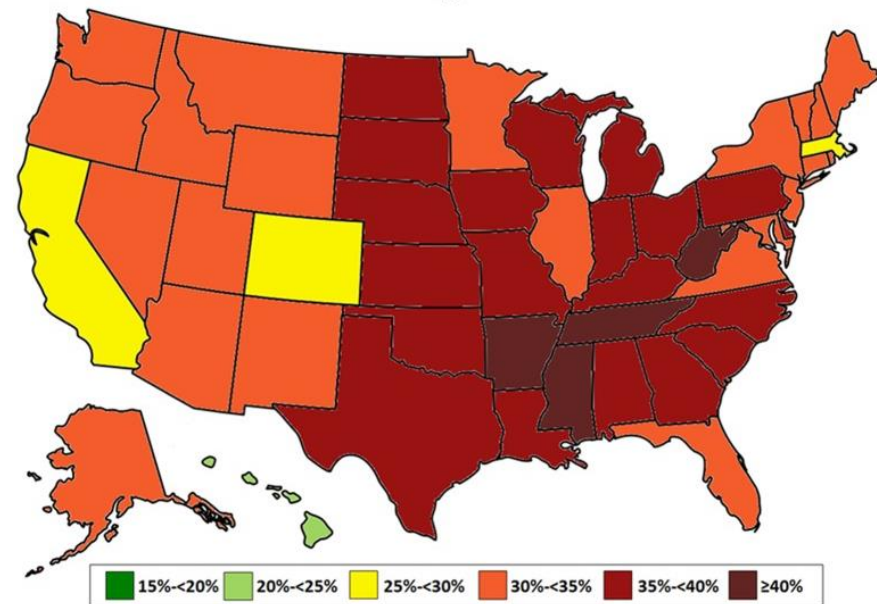| No Data | <10% | 10%–14% | 15%–19% | 20%–24% | 25%–29% | ≥30% |

Source: Behavioral Risk Factor Surveillance System, CDC.

Implications of Self-Report

- Virtually all "map" data are from self-reported height and weight.
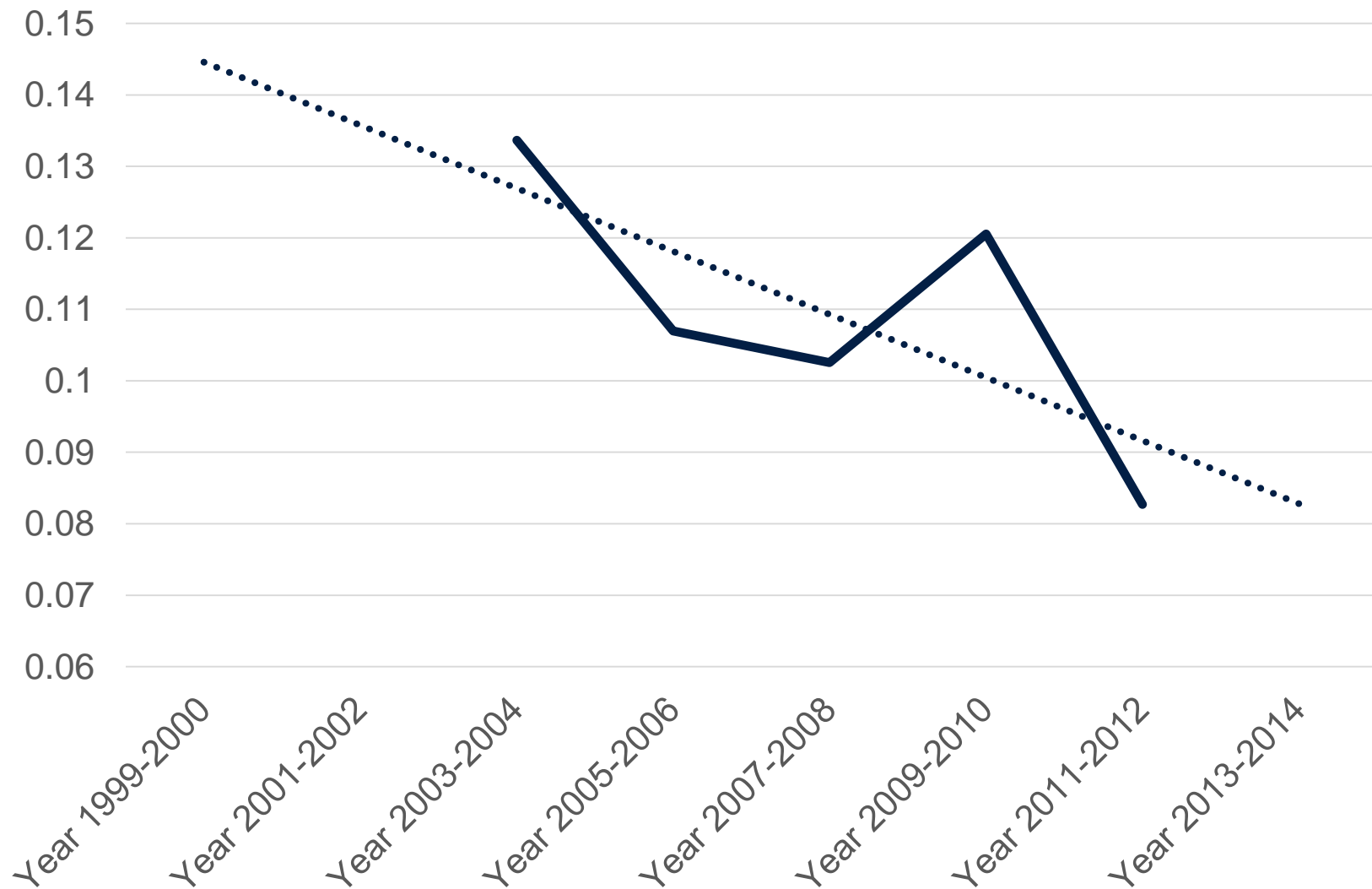
Parent report

- The effect of parent report is not so straightforward
  - Parent report yields OVER estimates of obesity in young children
  - Parent report yields UNDER estimates of obesity in older children

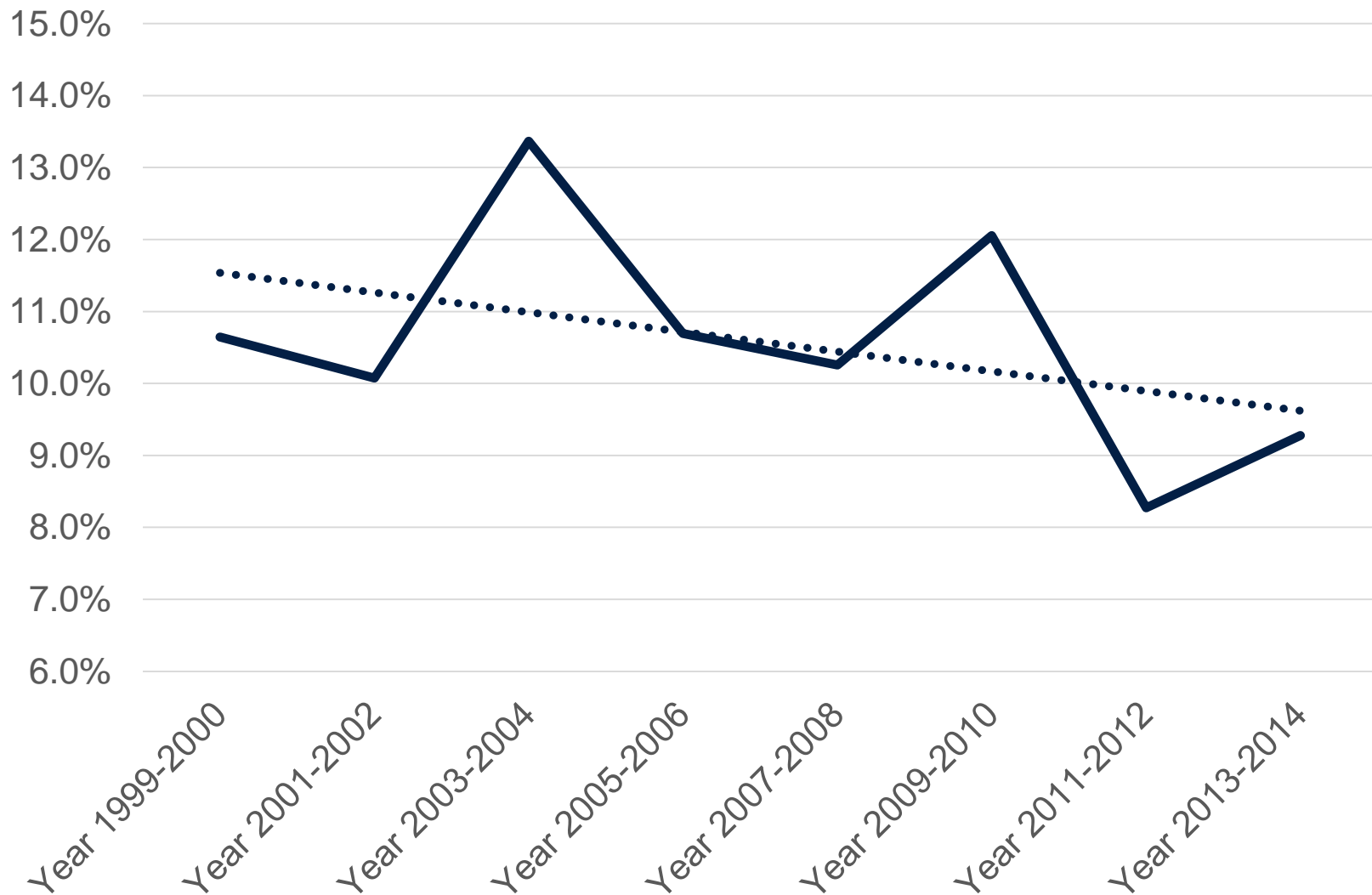|	Parent Report	Measured	Difference
Age 2-5	32.3	13.8	18.5
Age 6-8	21.9	13.5	8.4
Age 9-11	18.2	16.2	2.0
Age 12-13	12.8	17.3	-4.5

Conclusion: In all children, but especially in young children, we can only rely on research that employs measured height and weight.

Are the time periods comparable?

| | 0.15 |
| 0.14 |
| 0.13 |
| 0.12 |
| 0.11 |
| 0.10 |
| 0.09 |
| 0.08 |
| 0.07 |
| 0.06 |

Year 1999-2000 | Year 2001-2002 | Year 2003-2004 | Year 2005-2006 | Year 2007-2008 | Year 2009-2010 | Year 2011-2012 | Year 2013-2014

Are the time periods comparable?

Conclusions: All prevalence estimates must be considered in the context of larger trends, with time periods limited for theoretical reasons only.
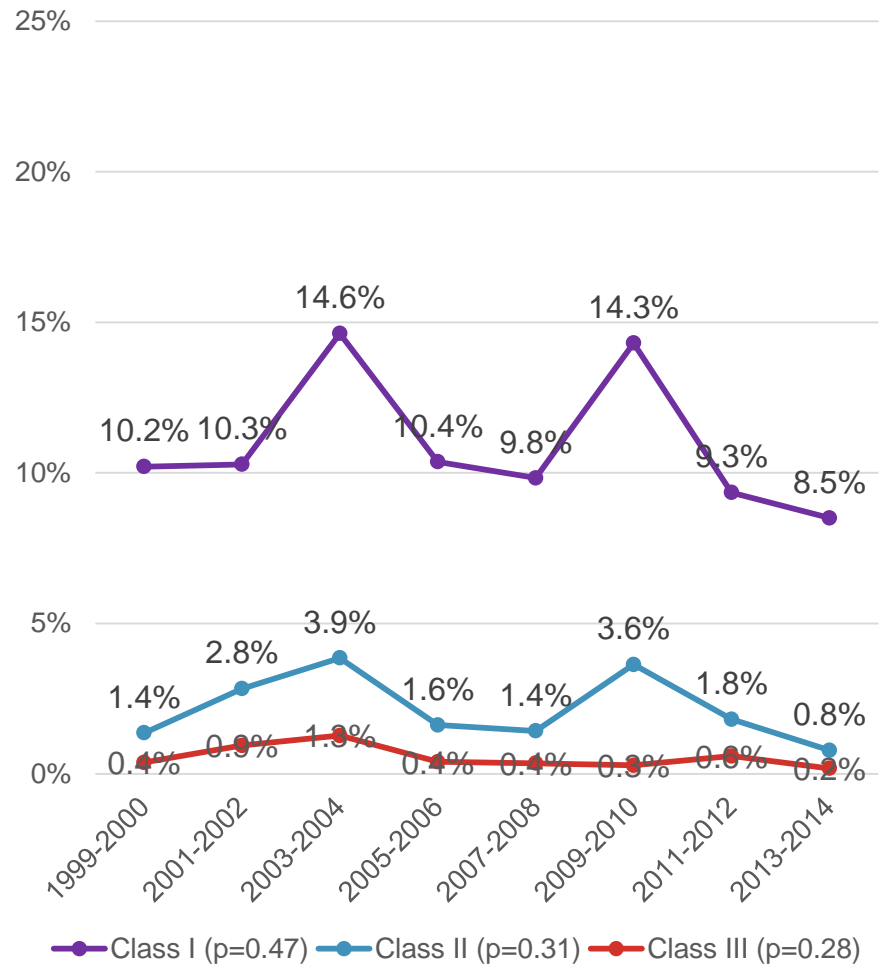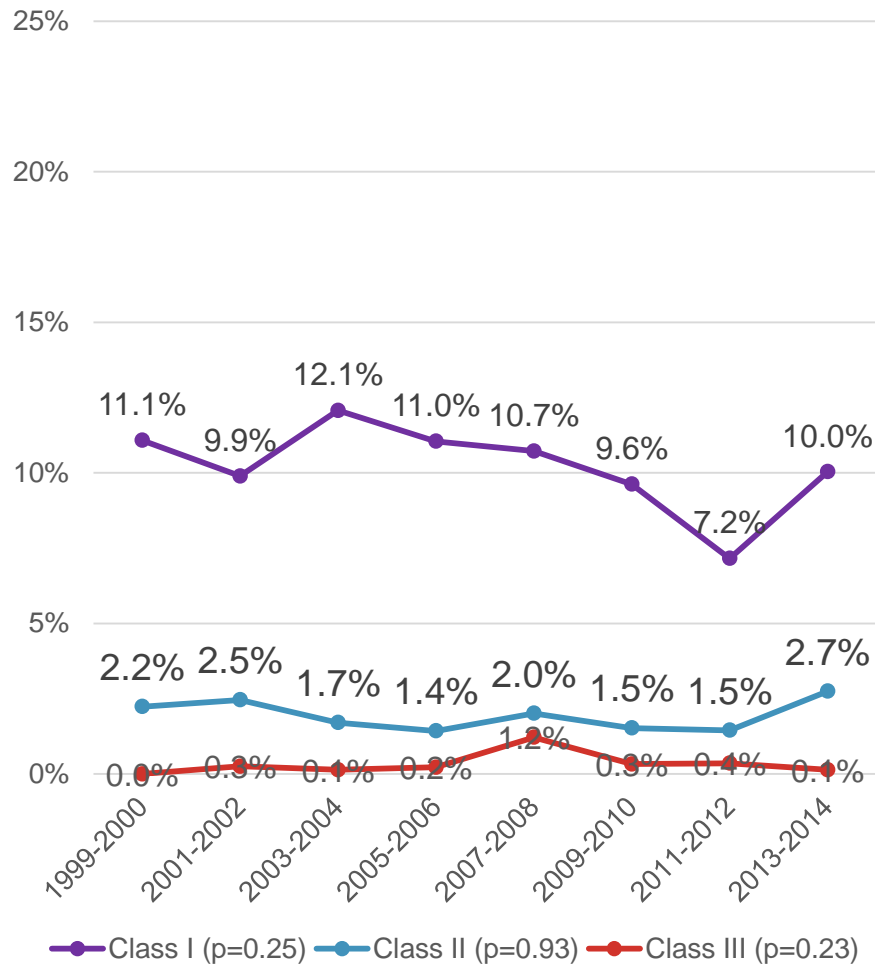
Are the populations similar?

- Gold Standard
  - National—National Health and Nutrition Examination Survey
  - State—Similar state level representative data (data do not exist)
- Additional options for measured height and weight
  - Pediatric Nutrition Surveillance System
  - School-based measures

NHANES—Children Ages 2-5 Years

Girls

## Boys

What NHANES can't tell us

- Wide confidence intervals, even when examining the full population.
  - ~800 children 2-5 per cycle
- Subgroups beyond sex almost impossible
  - Example: In 2013-2014, only n=53 African-American children with BMI >85th percentile—30 boys and 23 girls
- State level estimates
  - Because most changes happen at state levels (or smaller), NHANES is not helpful here

PedNSS

- Surveillance system based on Women, Infants, and Children Program (has been discontinued)
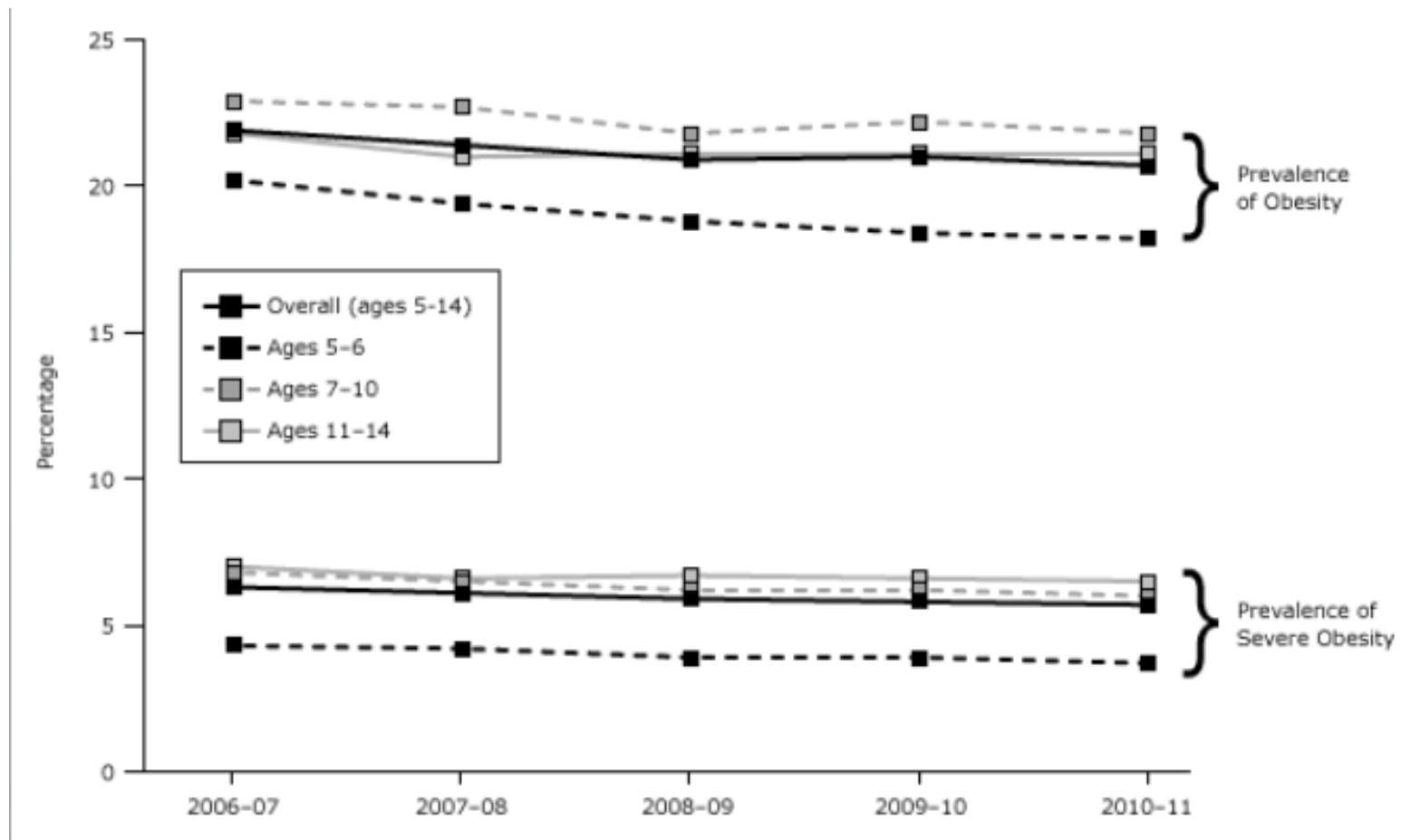- Are WIC children the same over time?

Obesity rates among low-income preschoolers starting to decrease
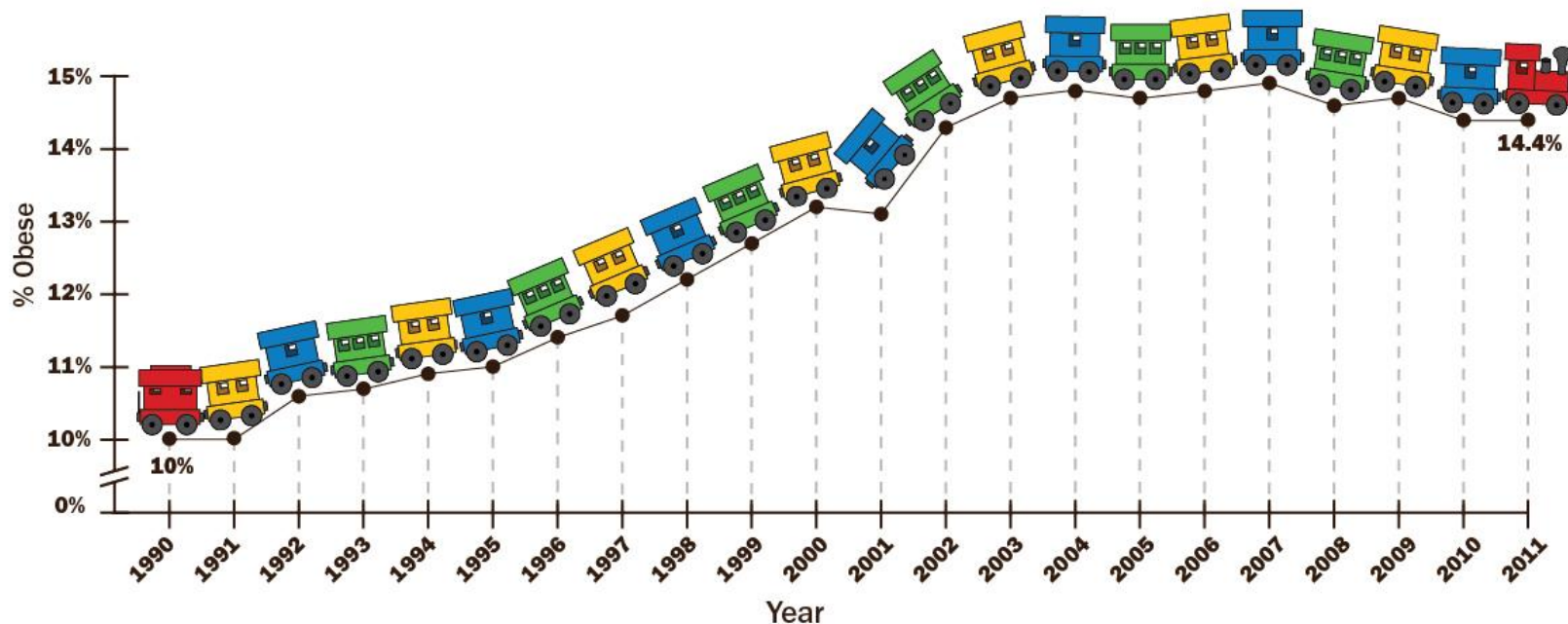
School Based Measures

NYC Public Schools

School-Based Measures

- Upsides
  - Lots of data (NYC had ~630,000 per year)
  - Consistent population, less sensitive to economic changes
  - Permits subgroup analysis
  - Can examine changes around interventions
- Downsides
  - Very messy data; 2% excluded for biologically implausible values
  - Most high BIVs are "real", but harder to know what to include/exclude without gold-standard measurement like NHANES
  - Limited population may not represent others
  - No preschoolers

Conclusion: Population-based data systems that use measured height and weight, and that permit subgroup and state-level estimates, may be the single most important need in child obesity research.

What are the comparisons?

Control Pre	Control Post

Intervention Pre	Intervention Post

Remember, effect size is not the weight change from pre to post for the intervention, but the difference in change between control and intervention.

What are the comparisons?

In policy changes, or school based interventions, this is often difficult.

Intervention Pre	Intervention Post

Why is study design so important?

- Obesity is especially vulnerable to regression to the mean.

- If I do nothing, the average z-score of children with obesity will decline.

- Many reports of childhood obesity "on the decline" do not allow any inferences about policy decisions or interventions.

Conclusion: There must always be a comparison group.

Why does it matter?

- Must consider the potential for harms.

- Interventions are expensive, we need to know what is most effective.

- Don't want to assume there is no longer a problem.

Thanks!