Trends in prevalence of childhood obesity and racial and ethnic disparities in California

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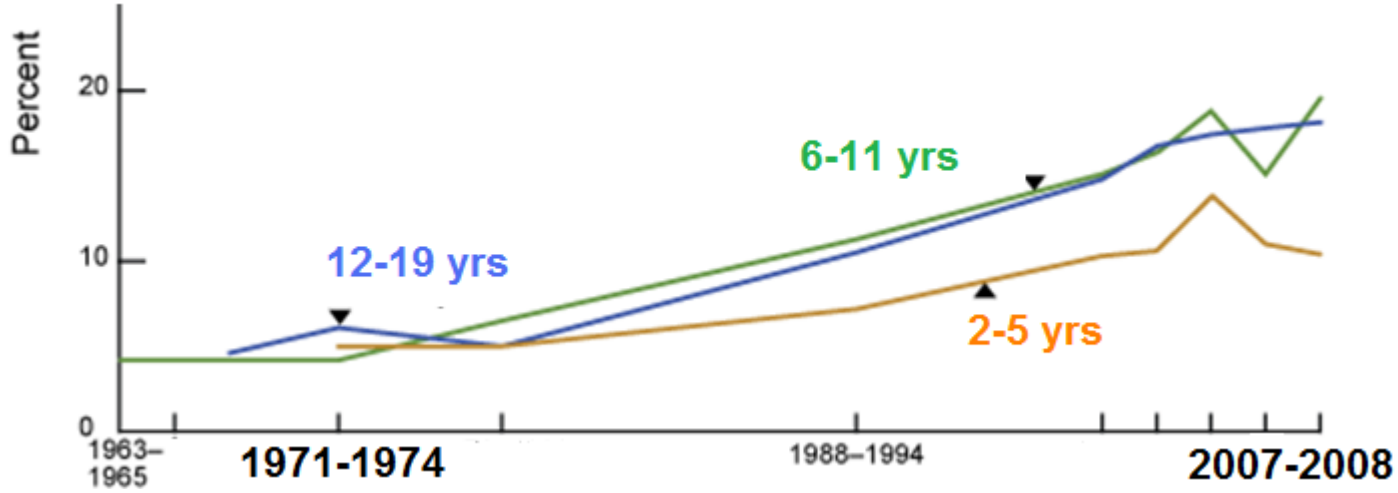
Background

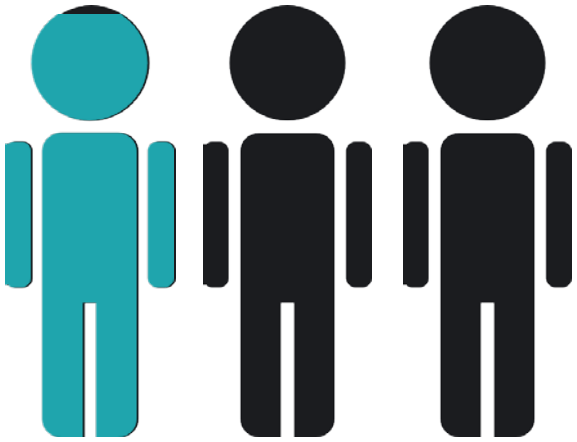
National trends overall: Rapid increase in prevalence of childhood obesity between 1971-2000 appears to be leveling off



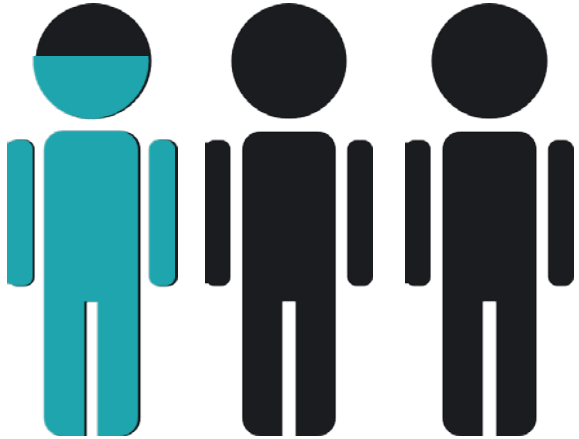
JAMA. 2012;307(5):483-490 and CDC/NCHS, NHANES I-III, 1999-2001, 2003-2004, 2005-2006, 2007-2008; Ogden, C. L., M. D. Carroll, et al. (2014). JAMA 311(8): 806-814.

Background

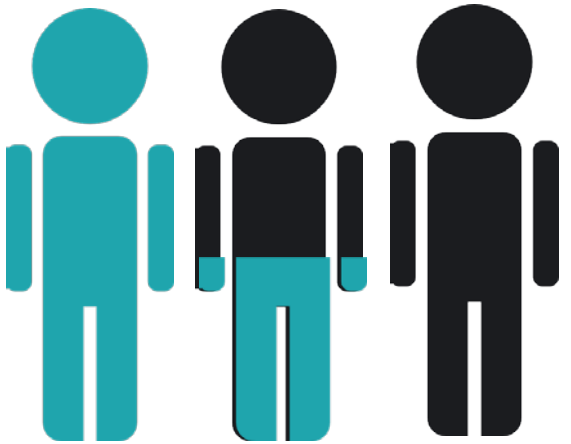
Prevalence of childhood overweight & obesity remains high at the national level with **large disparities** (NHANES 2011-12, 2-19 year olds)



All race/ethnicities (32%)



Non-Hispanic white boys (28%)



Hispanic boys (41%)

Ogden, C. L., M. D. Carroll, et al. (2014). JAMA 311(8): 806-814.

Background

NHANES (National Health and Nutrition Examination Survey)

Strengths: Nationally representative, researcher measured height and weight

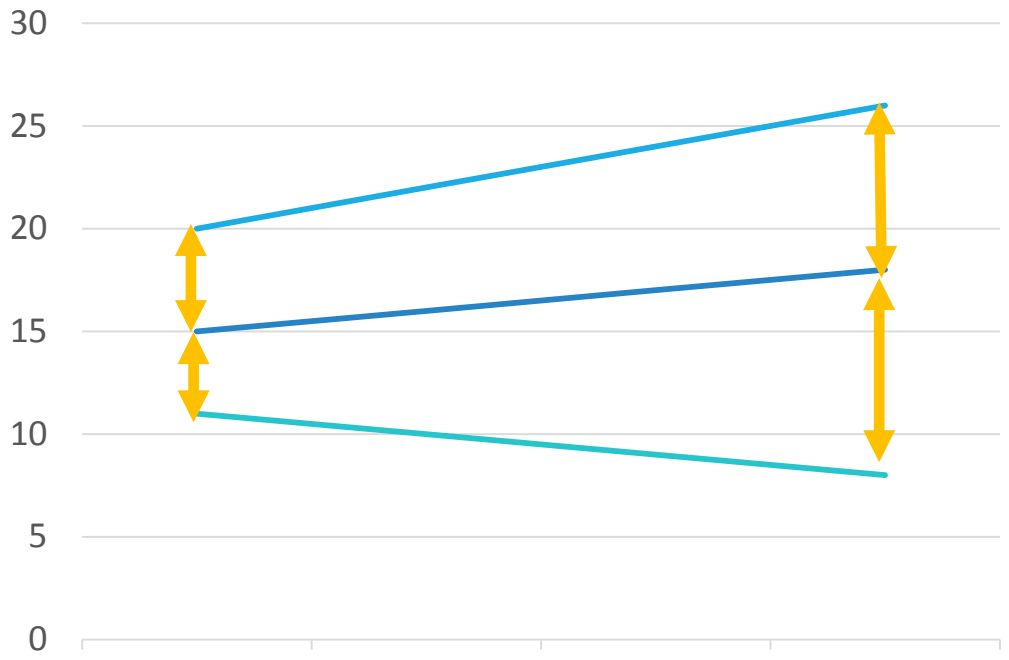
Limitations: Relatively small sample size with large SE for prevalence of high BMI

→ difficult to detect differences in trends by race

Background

DISPARITIES MATTER, BUT SO DO DISPARITIES IN TRENDS

- Are some groups being reached by/responding to interventions more slowly or later in time?
- What is our progress thus far toward meeting the *Healthy People 2020* goal, to "achieve health equity and eliminate health disparities?"
- Need to look beyond NHANES and use larger datasets
- Several studies using other datasets have indicated growing disparities over time



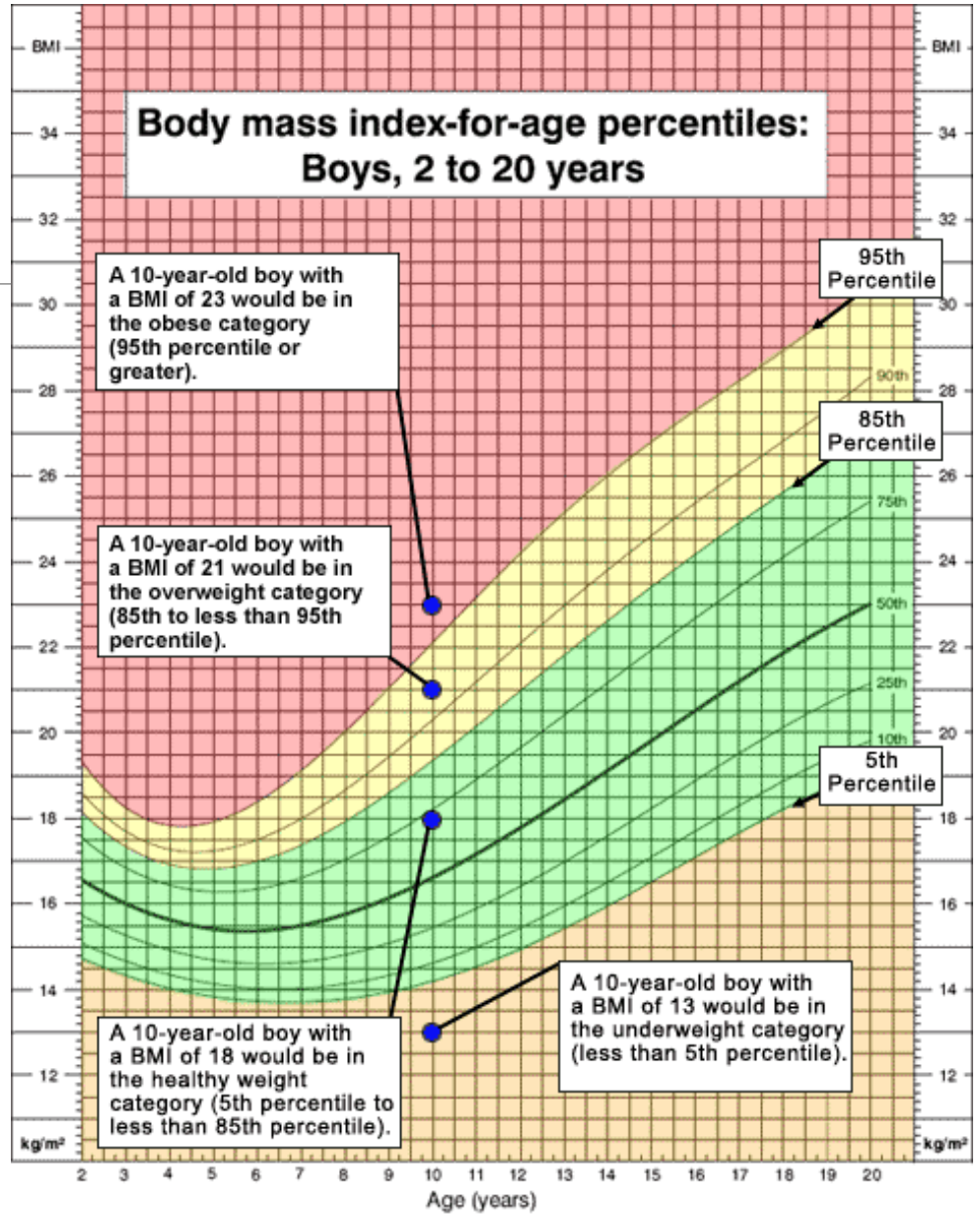
Objective

To examine **trends** in high BMI among children in California from 2003-2012, by race/ethnicity, using the state's school-based Fitnessgram dataset

Objective

Obesity trends: Prevalence peaked, declined, and/or plateaued between 2003 and 2012

- 3 high BMI cut-offs:
  - **BMI ≥85th %tile** (CDC definition of "overweight or obese")
  - **BMI ≥95th %tile** (CDC definition of "obese")
  - **BMI ≥97th %tile**
    - Added health risks
    - Previously examined in NHANES



Why California (CA)?

- Annual BMI screening of 5th, 7th, & 9th graders in public schools as part of FitnessGram
- Home to 13% of children in the U.S.
- Includes understudied Asian and American Indian youth
- Home to considerable proportions of the country's racial/ethnic minority youth:
  - >25% of Hispanic youth
  - ~30% of Asian youth
  - >10% of American Indian youth
- Ample power to examine differences in trends by race/ethnicity
- Highest Medicaid & CHIP spending

FitnessGram

Fitnessgram: 6 fitness areas established by Cooper Institute

- Aerobic capacity
- Abdominal strength & endurance
- Upper body strength & endurance
- **Body composition**
- Trunk extensor strength & flexibility
- Flexibility

Reported to CA Dept of Education (CDE)

http://www.cde.ca.gov/ta/tg/pf/

Methods

Repeated cross-sectional data

Data sources

- Student records from CDE: gender, grade, age in months, height, weight, and race/ethnicity
  - African American, American Indian/Alaskan Native, Asian [including Filipino and Pacific Islander], Hispanic/Latino, and white not of Hispanic origin
- Enrollment data from CDE website

Methods

Population

- 13,945,046 student records from 2003-2012, representing 93.5% of 5th, 7th, and 9th graders enrolled

Exclusions

- 17% of records had missing/invalid/implausible data on height, weight, age, BMI, and/or BMI z-scores
- Students with unknown , missing, or multiple race designations

Analytic sample: 11, 624, 865 (78% of total enrollment from 2003-2012)

Recoding of race/ethnicity

- In 2011, ≥2 races (4% in 2011-2012)
- ~1/2 had a prior single race designation, to which the record was assigned
- Beginning in 2008, CDE student records could be linked using a random id

Statistical Analysis

Sex- & race-specific logistic regression models adjusting for age

Robust SEs: clustering within school district

Statistical Analysis

Peaks (increases) between 2003-2012

"Peak year": year prevalence was highest

To identify significant increases in prevalence (i.e., peaks), year was a categorical predictor with 2003 as reference

Significant if OR comparing peak prevalence to that in 2003 was significantly >1.0 ($P < 0.05$)

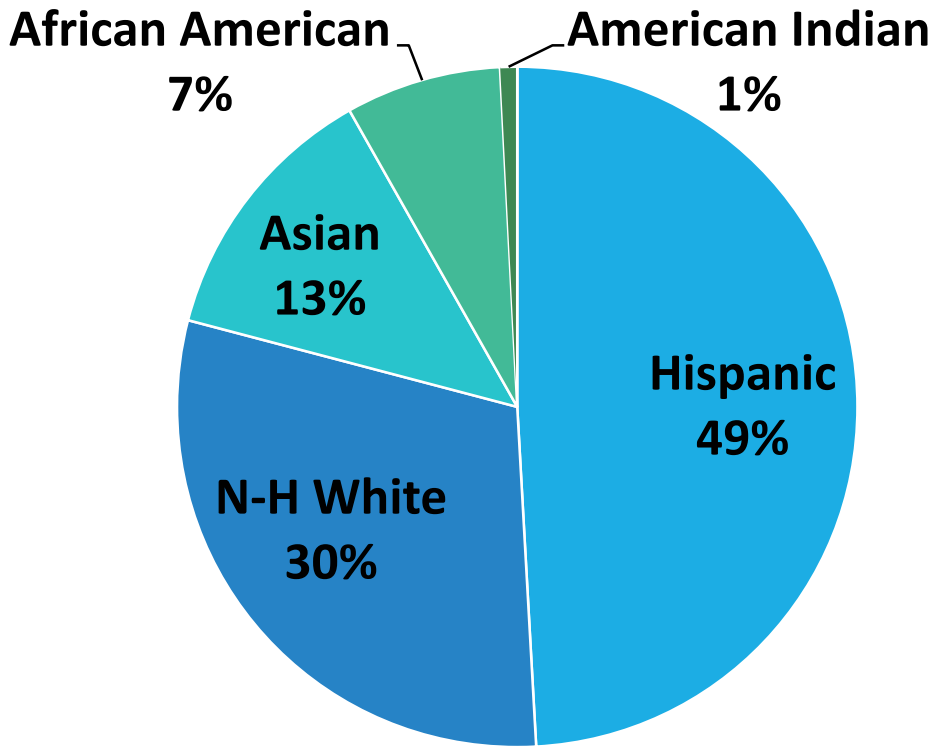
Statistical Analysis

Decline or Plateau from peak year to 2012

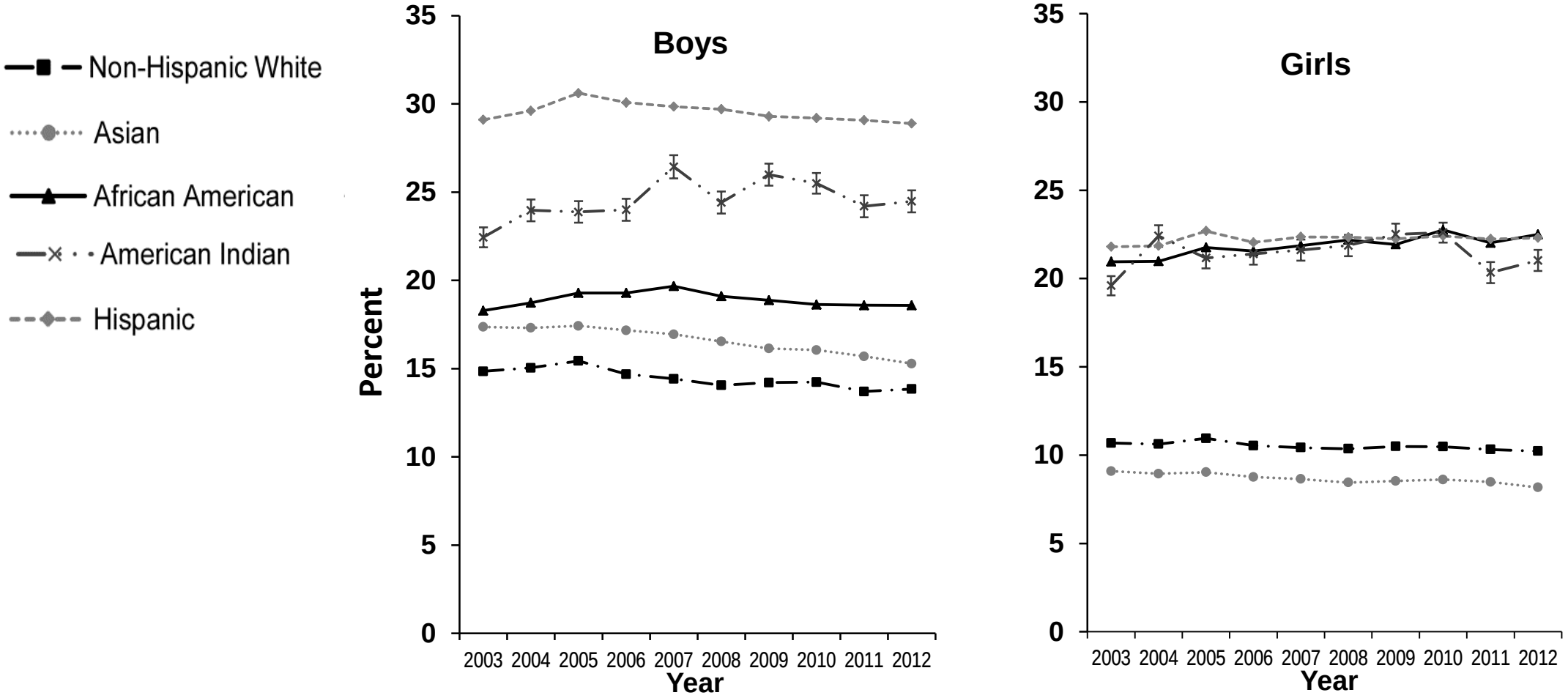
Separate logistic regression models with peak year as reference were used to determine if the prevalence **declined** or plateaued from the peak year to 2012

“Plateau”: Pattern of change wherein prevalence peaked after 2003 but did not decline thereafter

Results: Race/ethnicity of sample



Results: BMI≥95th %tile



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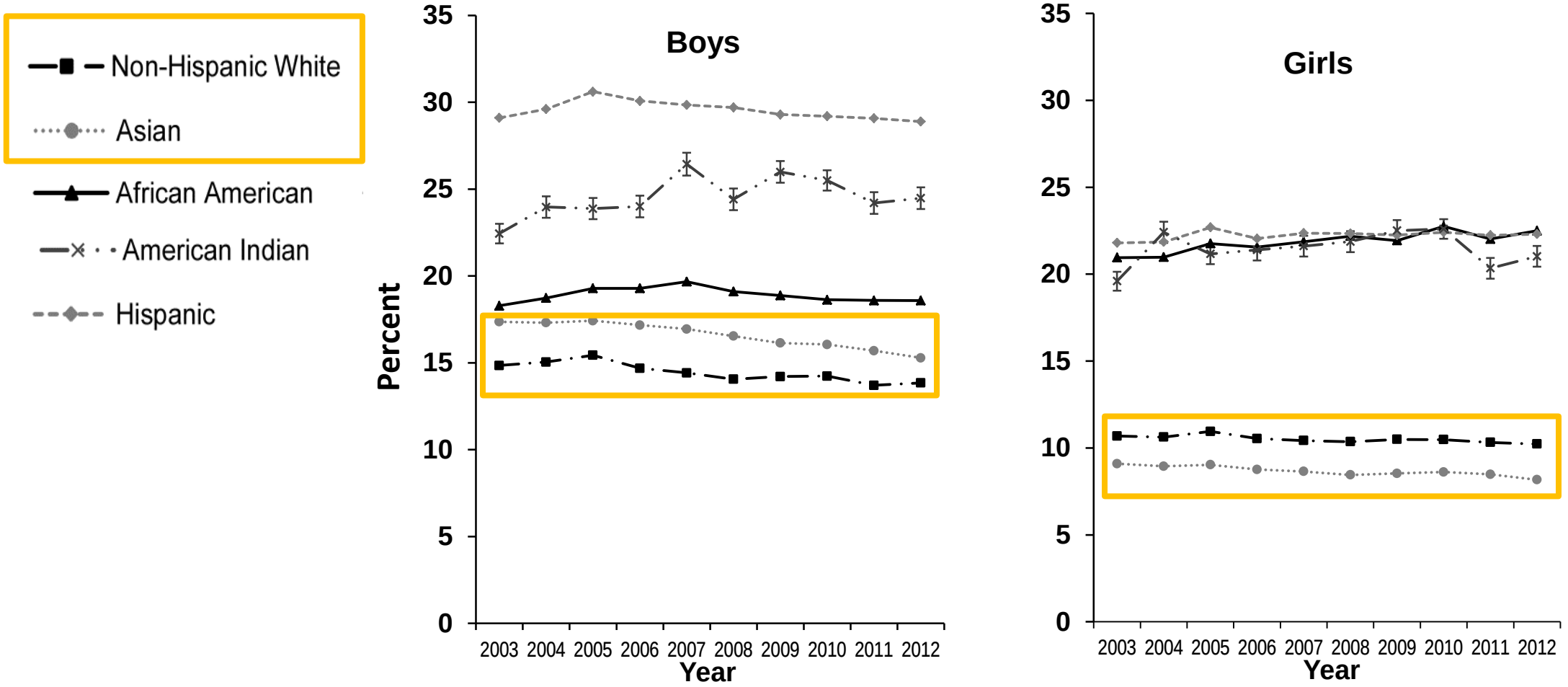

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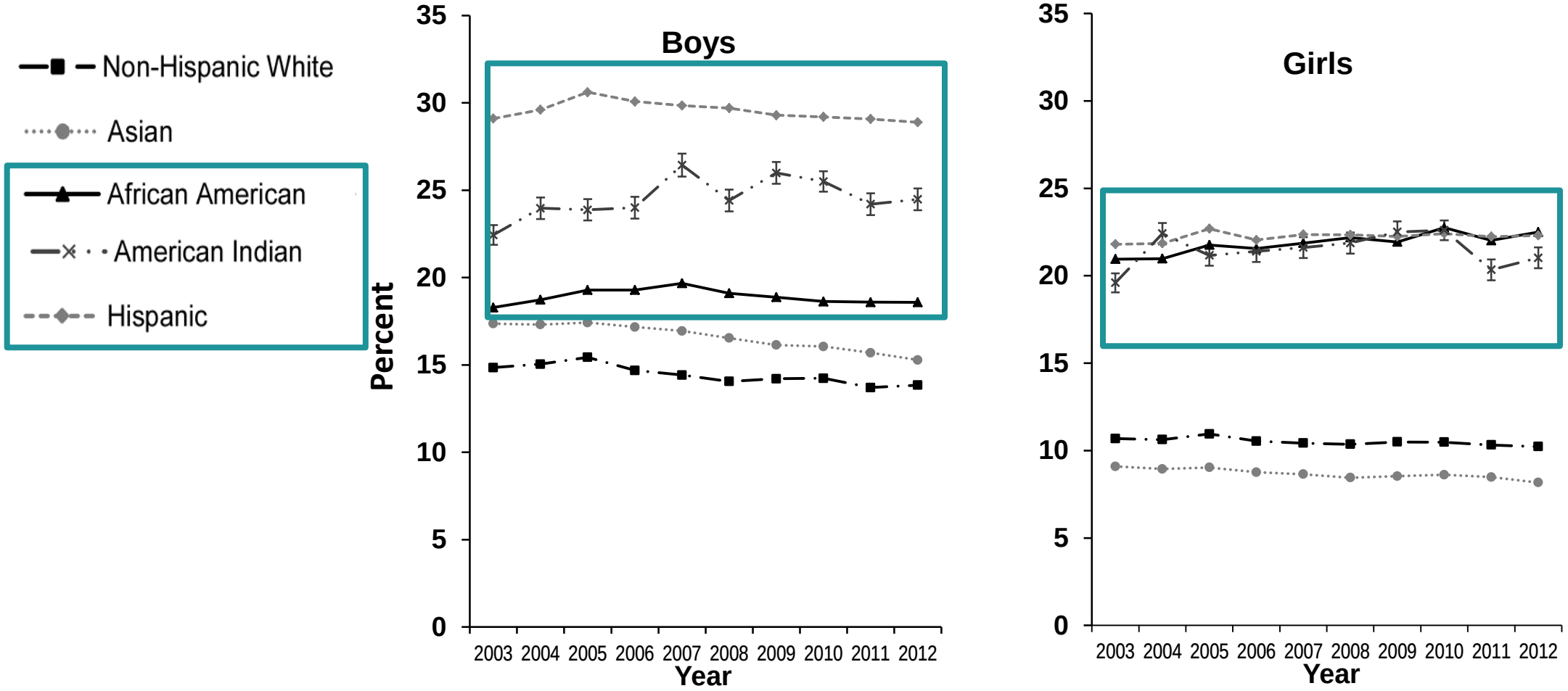

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Amer Indian & Afri Amer

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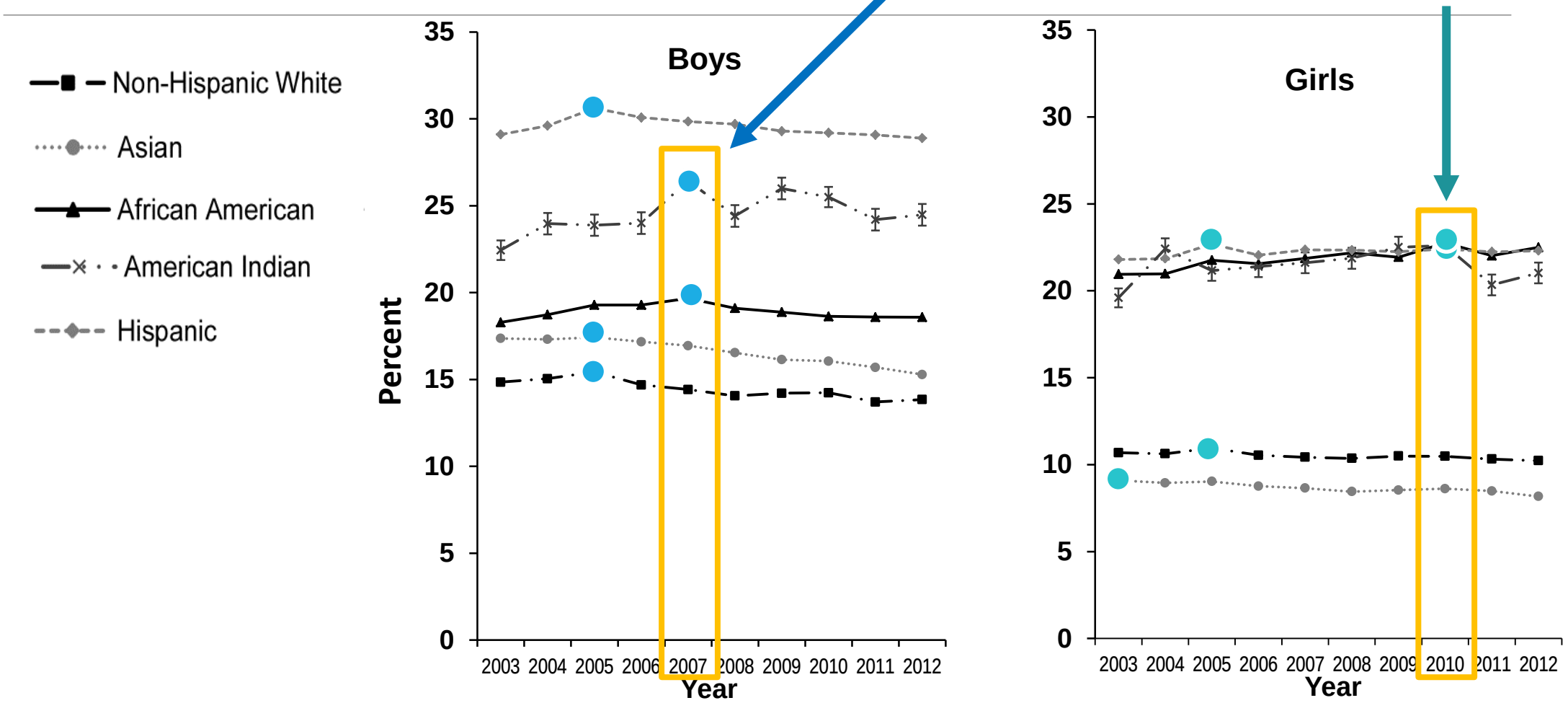

Results: BMI≥95th %tile

	Boys				Girls		
Race/ethnicity	Prevalence in 2003, %	Increase 2003 to Peak[a], %	Decrease peak to 2012[b],%		Prevalence in 2003, %	Increase 2003 to Peak[a], %	Decrease, Peak to 2012[b],%
African American	18.3	1.4***	1.1***		20.9	1.8***	0.3
Hispanic	29.1	1.5***	1.7***		21.8	0.9***	0.4
Asian	17.4	0.1	2.1***		9.1	--	0.9*
American Indian	22.4	4.0***	2.0		19.6	3.0***	1.6
N-H White	14.8	0.6***	1.6***		10.7	0.3*	0.7**

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Results: Trends by cut-points (BMI≥85th, 95th, & 97th %tiles)

The magnitude of proportional increases from 2003-peak year (prevalence increase ÷ prevalence in 2003) rose with higher BMI cut-points (except for Asians)

E.g., for American Indian girls…

BMI cut-point	Proportional increase
BMI ≥85th %tile	7.5%
BMI ≥95th %tile	15.4%
BMI ≥97th %tile	21.3%

Highest proportional increases for all cut-points:

- American Indian > African American > Hispanic

Results for trends in obesity prevalence 2003-2012

Higher increases in prevalence for American Indian, African American, and Hispanic compared to White and Asian youth

American Indian and African American youth had later peaks

While most groups declined in obesity prevalence after peak year, American Indian youth and African American girls plateaued

2012 prevalence remained > 2003 prevalence for American Indian and African American youth and Hispanic girls

Discussion

- No single group had a steady increase in obesity through 2012, unlike in a previous analysis of CA (Madsen KA, 2010, Pediatrics)
- Some improved: White & Asian youth and Hispanic boys had a 2012 prevalence that declined to ≤ 2003 levels

- Disparities have continued to widen, with less favorable trends for American Indian and African American youth and Hispanic girls
- Larger proportional increases for higher BMI cut-points → concerning given added risks &“costs”

Discussion

Strengths

- Large dataset (>11 million records)
- Inclusion of understudied groups
- Representative of CA public school children

Limitations

- Uncertainty about data collection across schools
- Single category for Asian and PI may mask variation
- Change in 2011 to allow ≥2 races

Discussion

Call to action for policies and programs to accelerate progress for minority youth in CA

Acknowledgements

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The views expressed in this presentation do not represent the positions of the CDE. No official endorsement by the CDE is intended or should be inferred.

Thank you

Contact: Jen Falbe, jfalbe@berkeley.edu

Linear trends

Boys

- + trend for American Indian boys
- - trend for Hispanic, Asian, and White

Girls

- + African American and Hispanic girls
- - For Asian

African American, Hispanic, and American Indian girls and boys had higher slopes than their white counterparts (Ps for interaction <0.05)