

Socioeconomic Status, Food Security, and Obesity:

Lessons from NHANES III



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Poverty, U.S.: 2001



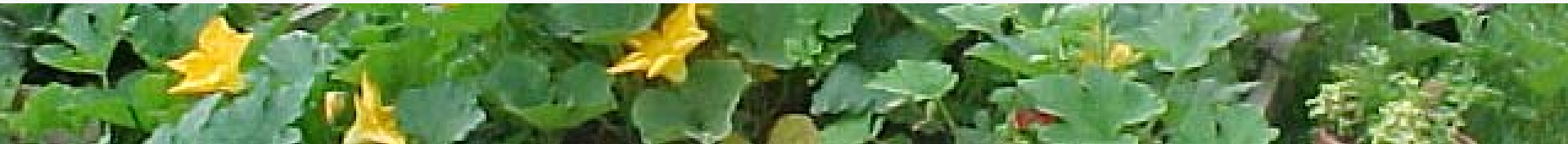
- **Poverty**

Prevalence in U.S. = 11.7% (33 million people)

- **Child Poverty**

Prevalence in U.S. = 16.3% (12 million children)

Food Insecurity and Hunger, U.S.: 2001



- **Food insecurity**

Limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways.

Prevalence in U.S. = 10.7% (11.5 million families)

- **Hunger**

The recurrent and involuntary lack of access to food.

Prevalence in U.S. = 3.3% (3.5 million families)

Third National Health and Nutrition Examination Survey (NHANES III)



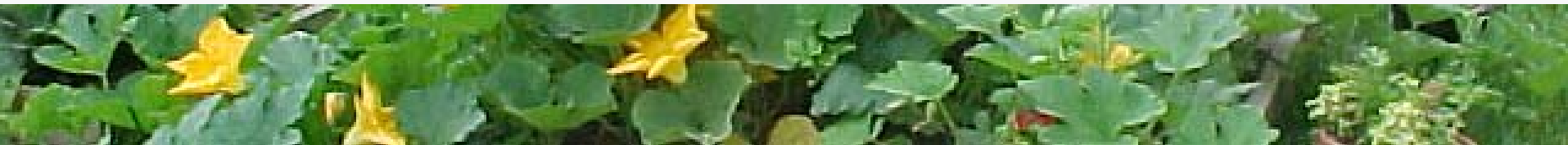
- Conducted by NCHS, CDC
- 1988-94
- Interviews and medical examinations
- Cross-sectional representation of civilian non-institutionalized U.S. population

NHANES III: Family food insufficiency



An inadequate amount of food intake
due to a lack of resources.

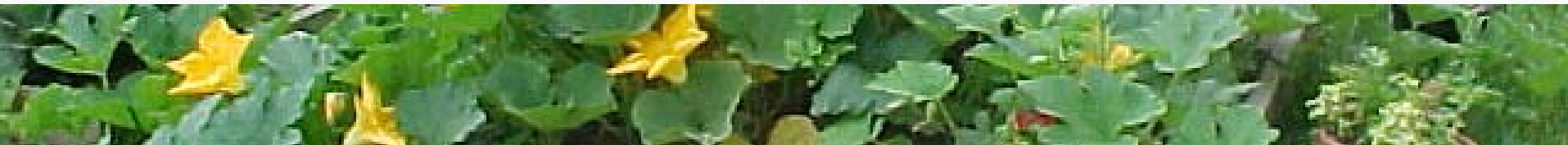
NHANES III: Family food insufficiency



Which of the following best describes the food eaten by your family? Do you have. . . ?

- Enough food to eat
- Sometimes not enough to eat
- Often not enough to eat

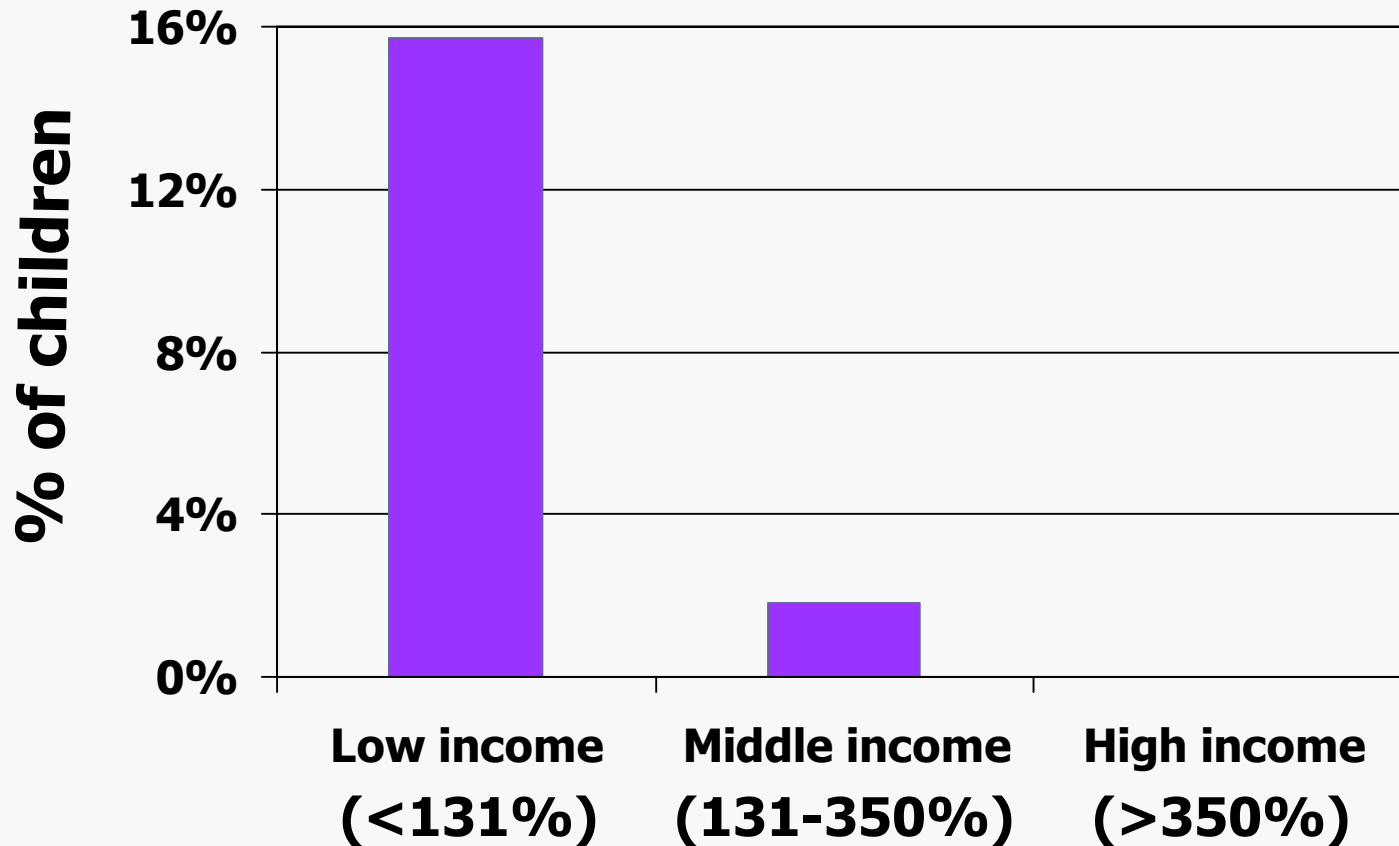
NHANES III: Family food insufficiency



Which of the following best describes the food eaten by your family? Do you have. . . ?

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Food insufficiency



N=10,752 children (1-16 years)

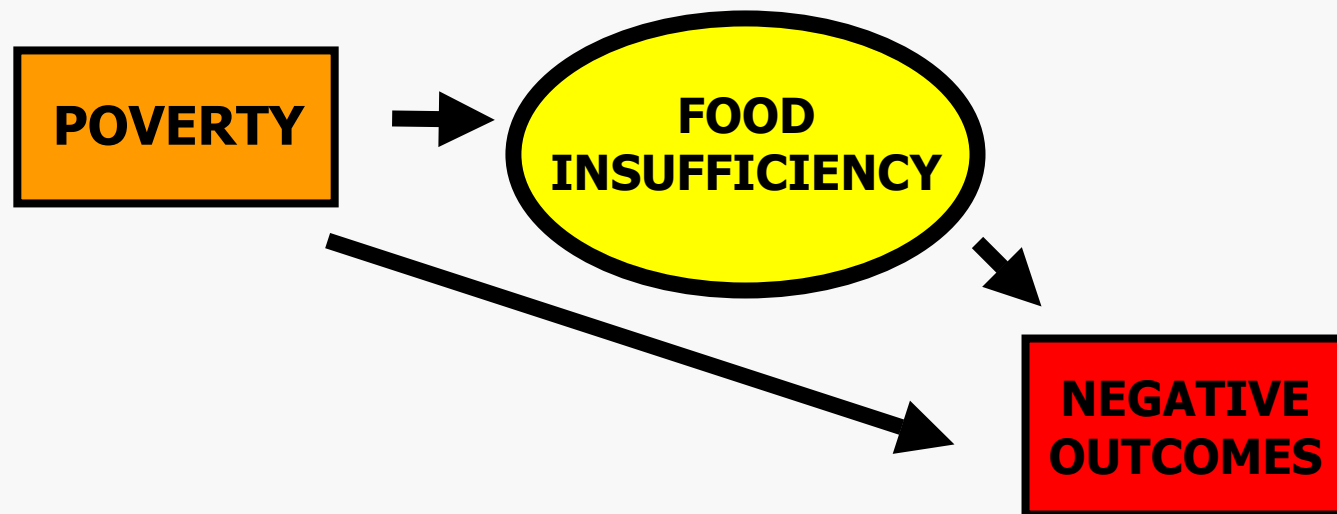
NHANES III: Outcomes



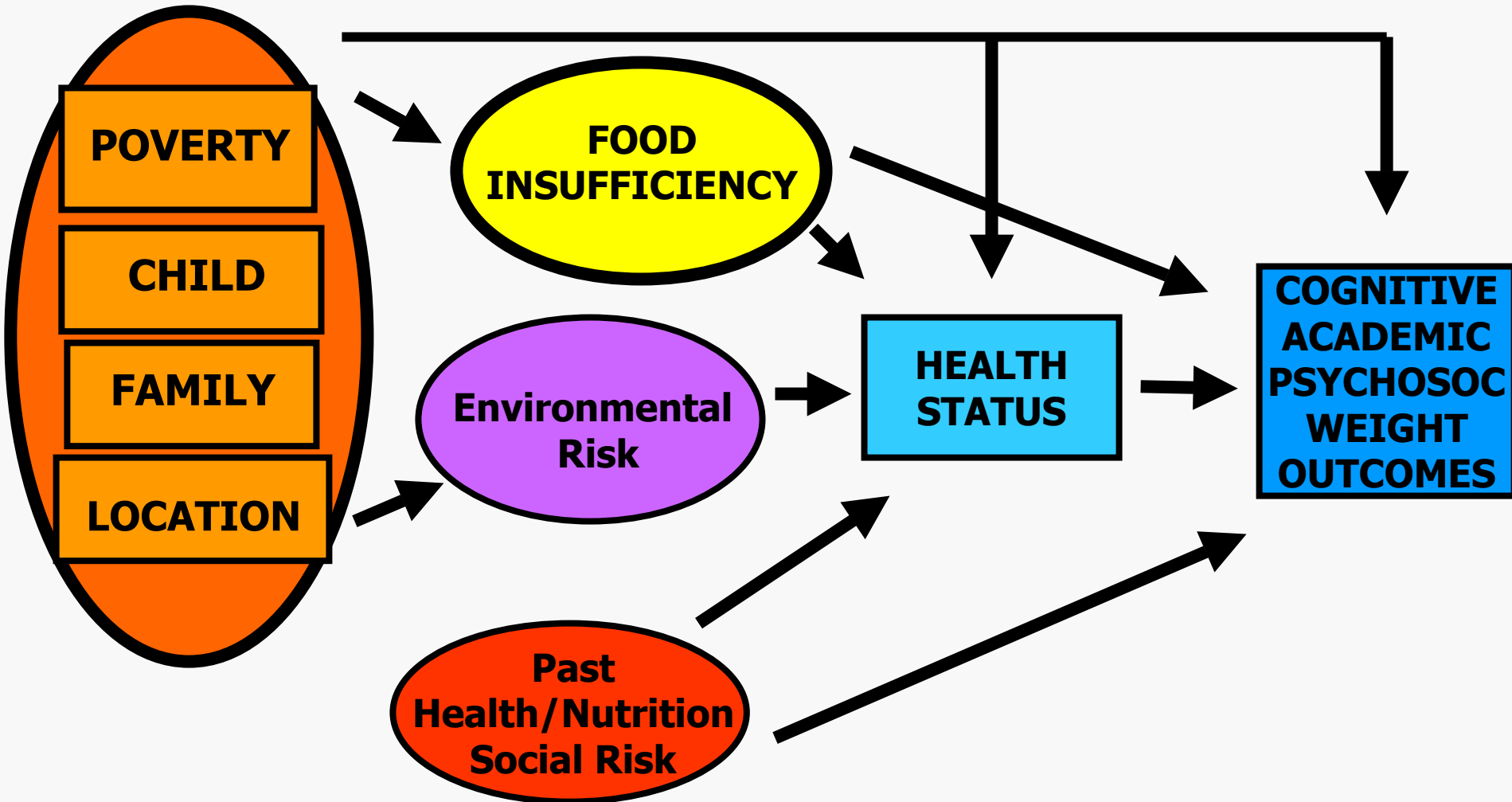
Relationship between family food insufficiency and ...

- Health
- Cognition
- Academic achievement
- Psychosocial factors
- Symptoms of depression and suicide
- **Overweight**

NHANES III: Analysis Model



NHANES III: Analysis Model

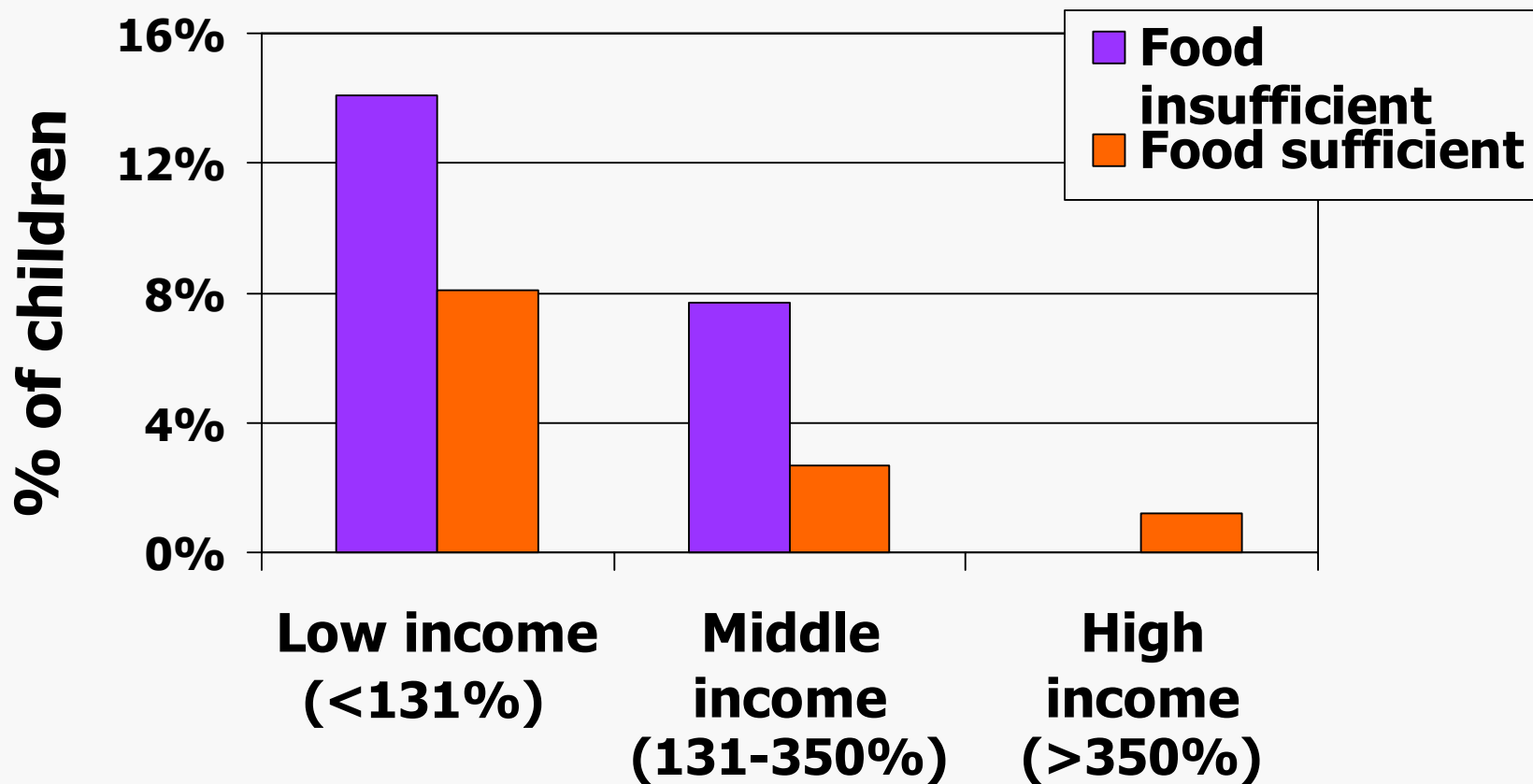


Methods



- Prevalence estimates by food sufficiency status
- Regression analyses to adjust for other risk factors
 - Linear regression
 - Logistic regression
 - Ordinal logistic regression

Fair/poor health status



N=10,751 children (1-16 years)



Health outcomes

PRESCHOOL CHILDREN

Food insufficient children*:

- poorer health status
- more frequent stomachaches
- more frequent headaches
- more frequent colds

SCHOOL-AGED CHILDREN

▪ Food insufficient children*:

- poorer health status
- more frequent stomachaches
- more frequent headaches

*Adjusted for sociodemographic and family characteristics, location, past health risk, health care risk and environmental risk.



Academic and Psychosocial outcomes

6-11 YEAR OLD CHILDREN

Food insufficient children*:

- lower math scores
- more likely to repeat a grade
- more likely to have seen psychologist

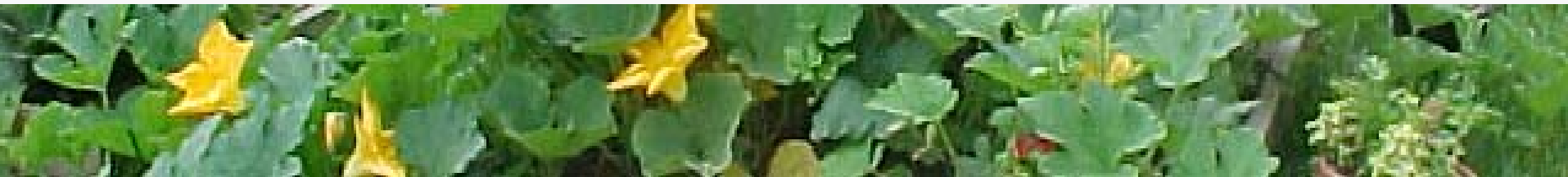
12-16 YEAR OLD TEENAGERS

Food insufficient children*:

- more likely to have seen a psychologist
- more likely to have been suspended
- more difficulty getting along with others.

*Adjusted for sociodemographic and family characteristics, location, past health risk, health care risk and environmental risk.

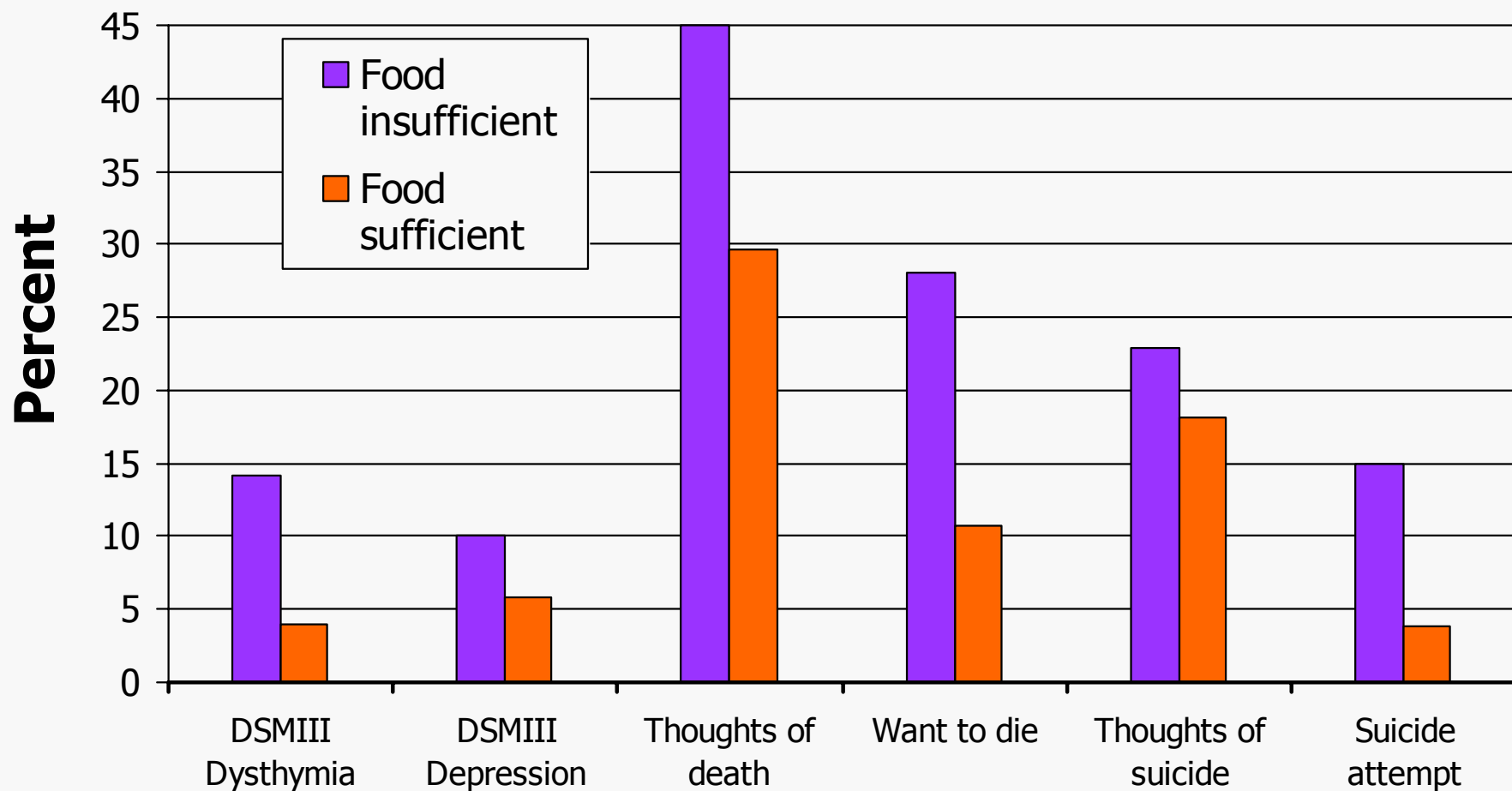
Depression outcomes



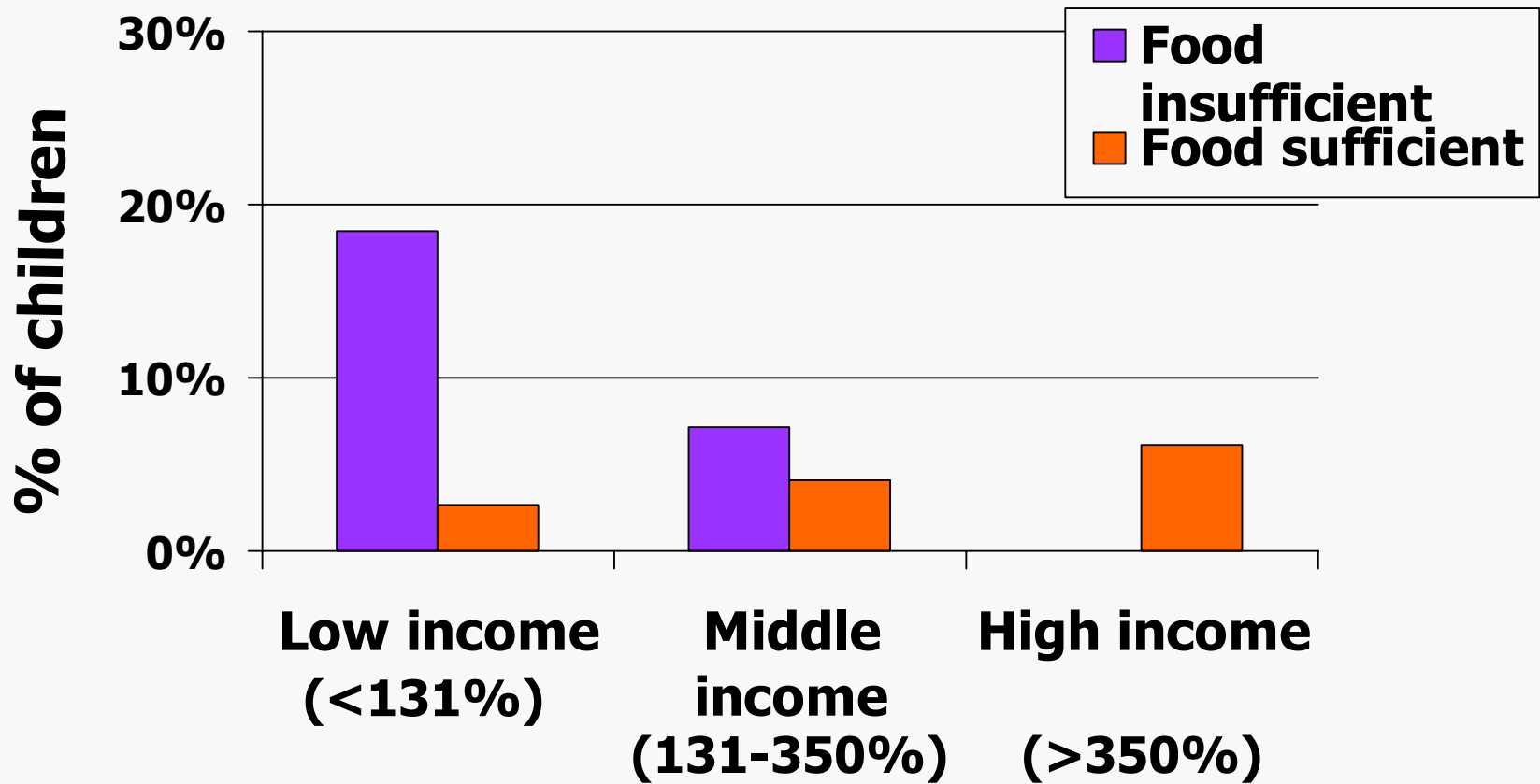
15-16 YEAR OLD TEENAGERS

- Food insufficient children*:
 - more likely to have dysthymia
 - more thoughts of death
 - more desire to die
 - more likely to have attempted suicide.
- *Adjusted for sociodemographic and family characteristics and metropolitan region.

Symptoms of depression and suicide: 15-16 year old teenagers



DSMIII Dysthymia



N= 661 children (15-16 years)



Other research:

Correlational studies

- **CCHIP:** Hungry children suffer from health problems such as unwanted weight loss, fatigue, frequent colds, ear infections, anemia, asthma, and headaches.

Wehler CA, Scott RI, Anderson JJ. Community Childhood Hunger Identification Project. Washington, DC: FRAC; July 1995.

- **CCHIP:** Children hungry or at risk of hunger were more likely to have impaired psychosocial function

1. Murphy JM, Wehler CA, et. al. Relationship Between Hunger and Psychosocial Functioning in Low-Income American Children J Am Acad Child Adolesc Psychiatry 1998. 37(2):163-70.

2. Kleinman RE, Murphy M, et. al., Hunger in Children in the U.S.: Potential Behavioral and Emotional Correlates. Pediatrics. 1998.101(1).



Other research:

Supplementation studies

- **Head Start & School Lunch:** Head Start children were taller and had fewer absences than School Lunch children, but not as tall as non-participating children

Gietzen D. Vermeersch JA. Health Status and School Achievement of Children from Head Start and Free School Lunch Programs. Public Health Reports. 1980. 95(4):362-368.

- **School Breakfast:** Children participating in School Breakfast Program had higher Basic Skills scores and fewer absences and tardiness.

Meyers AF, Sampson AE, et. al. School Breakfast Program and School Performance. AJDC 1989. 143:1234-9.



Other research:

Supplementation studies

- **WIC:** Perinatally supplemented children were compared to later supplemented siblings and found benefits in height for age, and cognitive and academic outcomes.

Hicks LE, Langham RA, et. al. Cognitive and Health Measures Following Early Nutritional Supplementation: A Sibling Study. AJPH. 1982. 72(10): 1110-8.



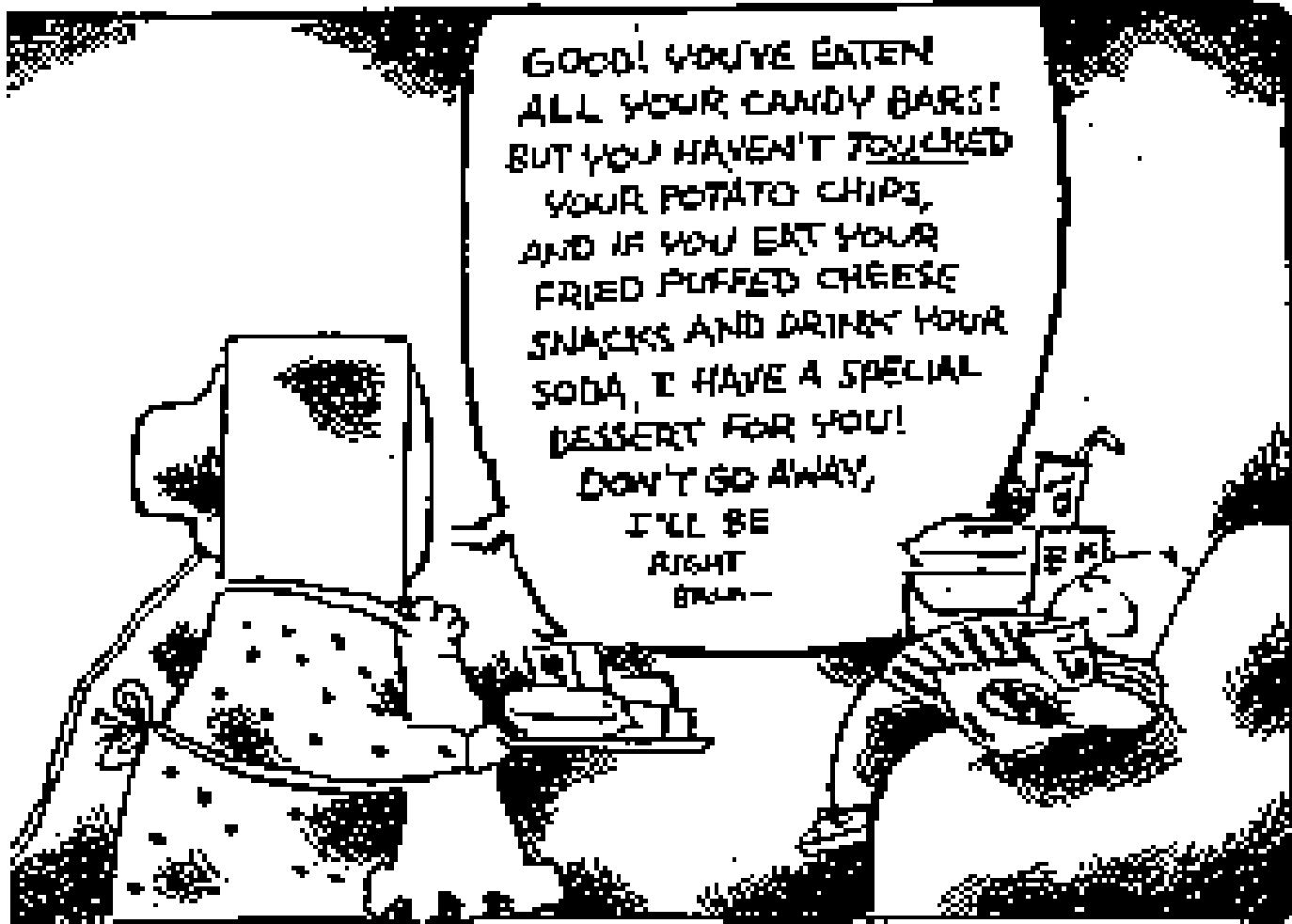
Latest research:

Welfare reform study

- **Welfare reform:** Children in families whose welfare was terminated or reduced by sanctions had a **greater odds of being food insecure, of having been hospitalized since birth, and of being admitted the day of an emergency department visit.**

Receiving food stamps did not mitigate the effects of the loss or reduction of welfare benefits on food security or hospitalizations.

Cook JT, Frank DA, Berkowitz C et al. Welfare Reform and the Health of Young Children. Arch Pediatr Adolesc Med. 2002. 156: 678-684.

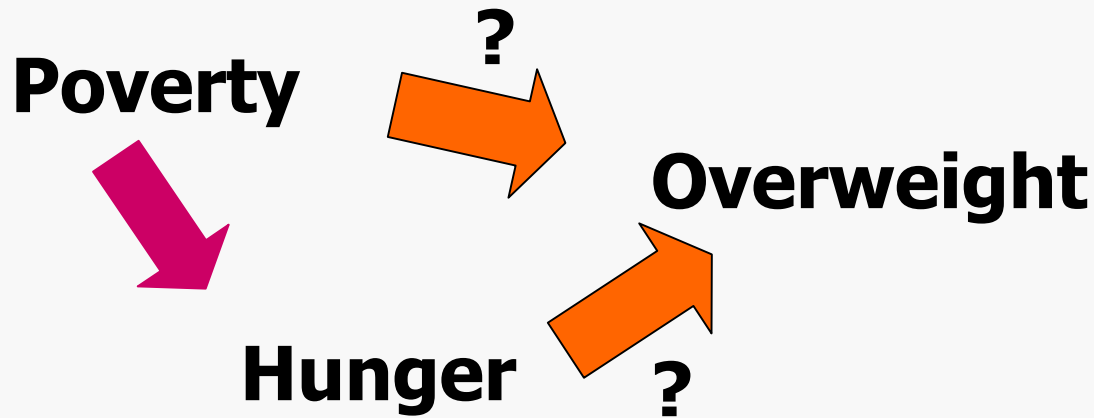


Epidemic childhood obesity baffles researchers.

AMERICAN ACADEMY ON CHILD DEVELOPMENT
10/2005 The National Academies Press

I'M NO LONGER ABLE
TO GO AWAY —

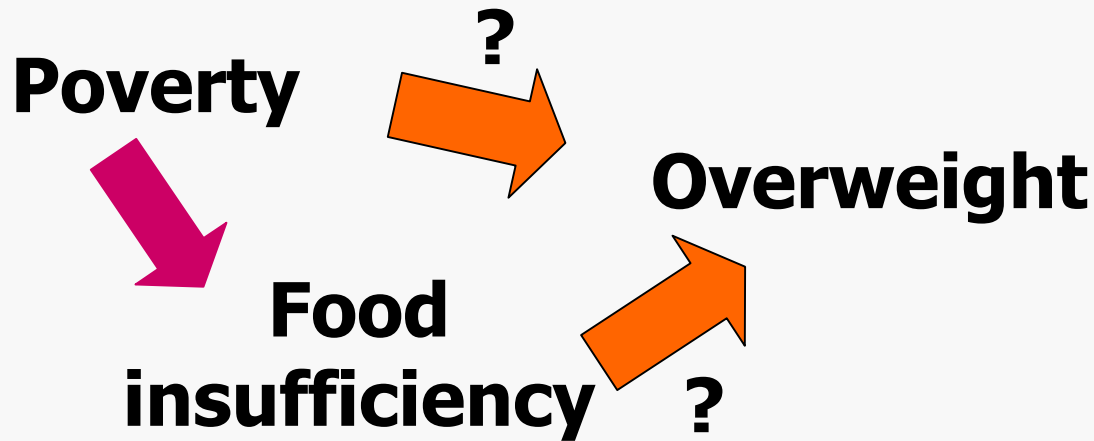
Research Question



"Both **hunger** and **obesity** occur with an increased frequency among **poorer populations** in the United States. Because obesity connotes excessive energy intake, and hunger reflects an inadequate food supply, the increased prevalence of obesity and hunger in the same population seems **paradoxical**".

- Dietz WH, "Does Hunger Cause Obesity?" Pediatrics.1995.95(5):766-7.

Research Question



- Is poverty associated with overweight in U.S. children?
- Does the paradox exist? If so, for whom?
- Is food insufficiency associated with overweight in U.S. children?
- Why?

Third National Health and Nutrition Examination Survey (NHANES III)



High BMI: Body Mass Index \geq 85th percentile

% of poverty line

Low income: \leq 130%

Middle income: 131 - 300%

High income: $>$ 300%

NHANES III: Data limitations

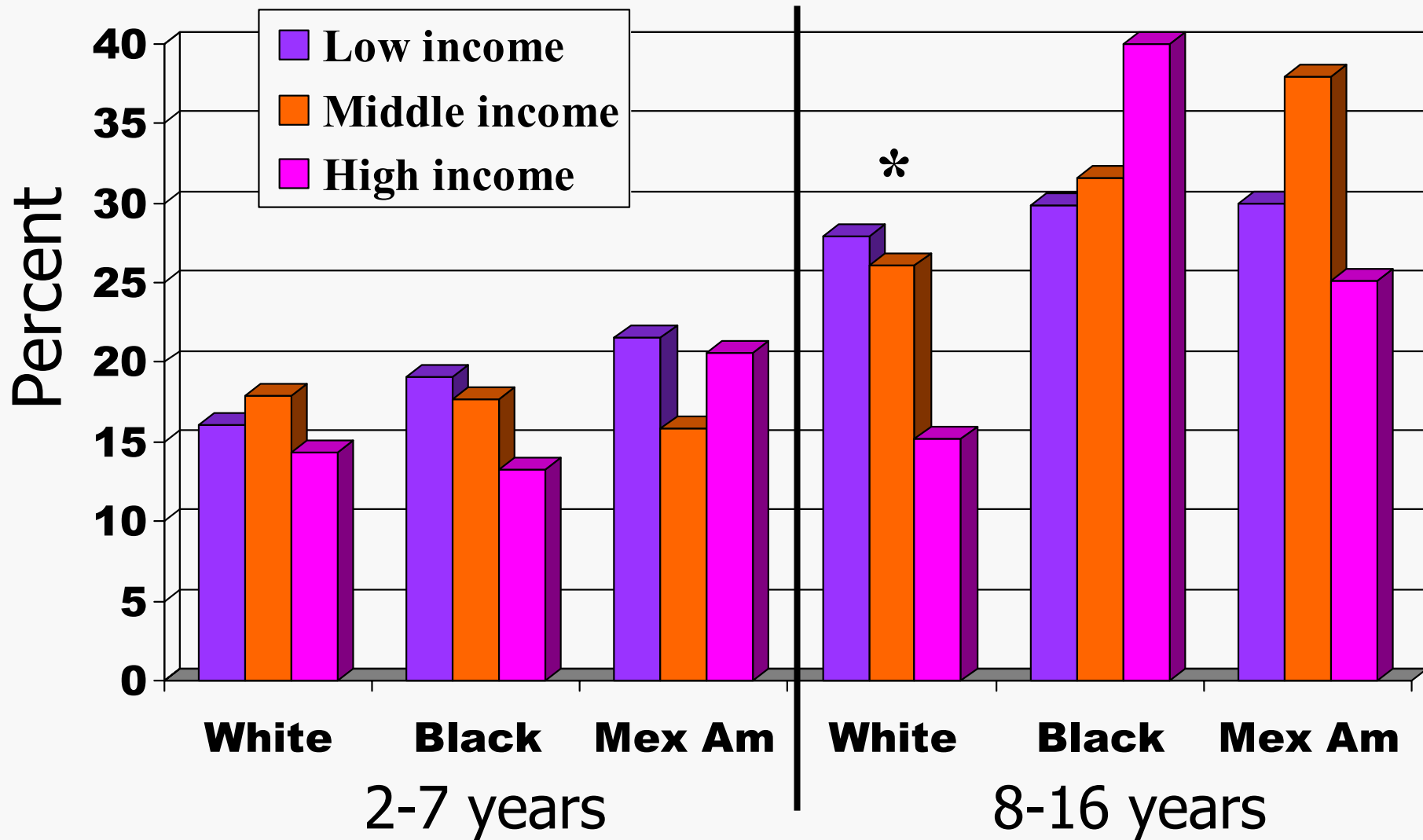


- Sample sizes are very small
- Cross-sectional survey measures associations, not causation



Prevalence of HIGH BMI: NHANES III, 1988-94

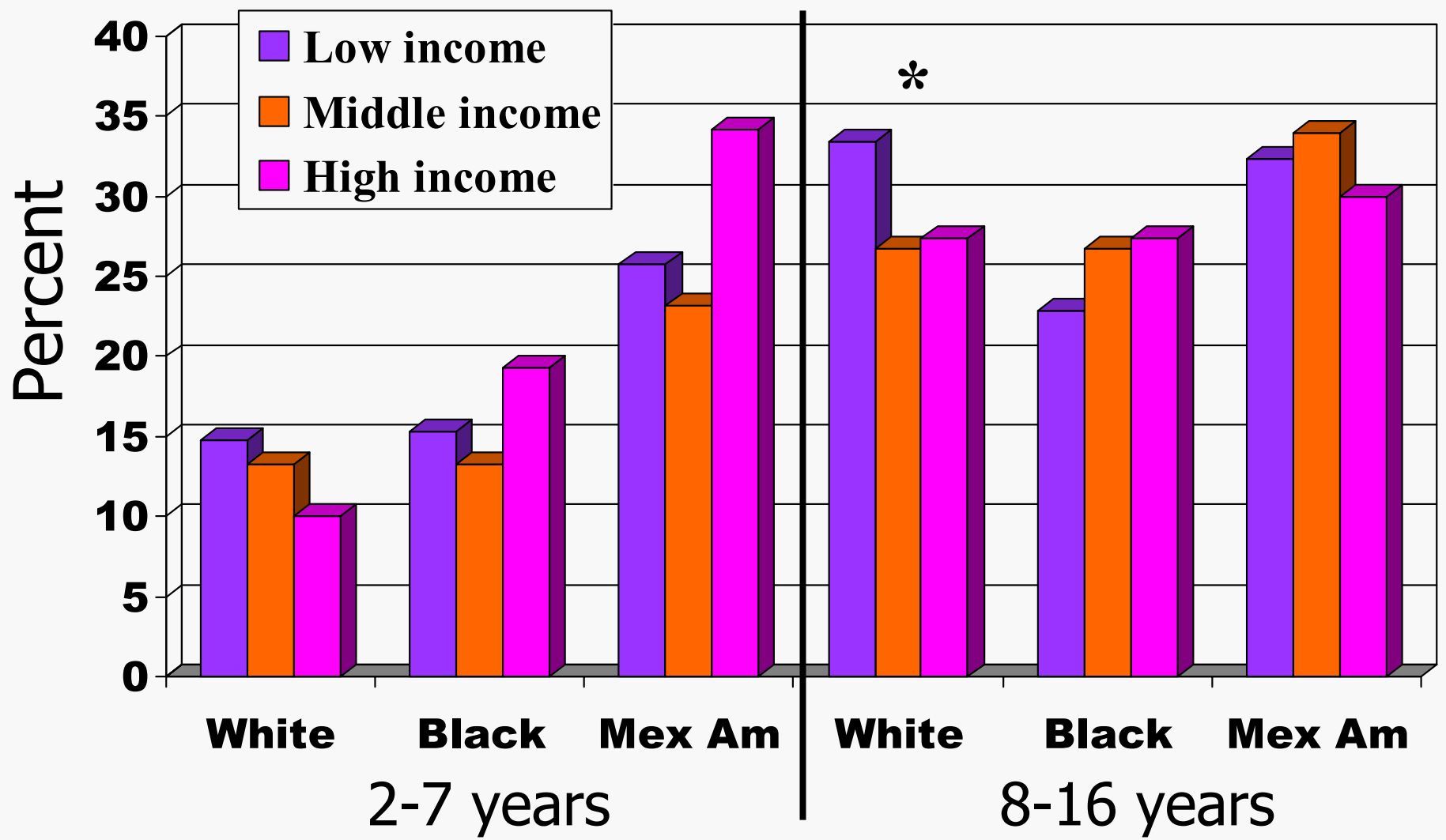
GIRLS

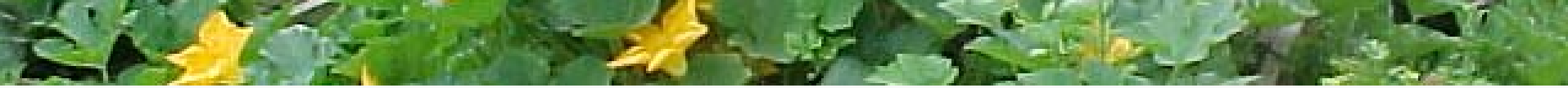




Prevalence of HIGH BMI: NHANES III, 1988-94

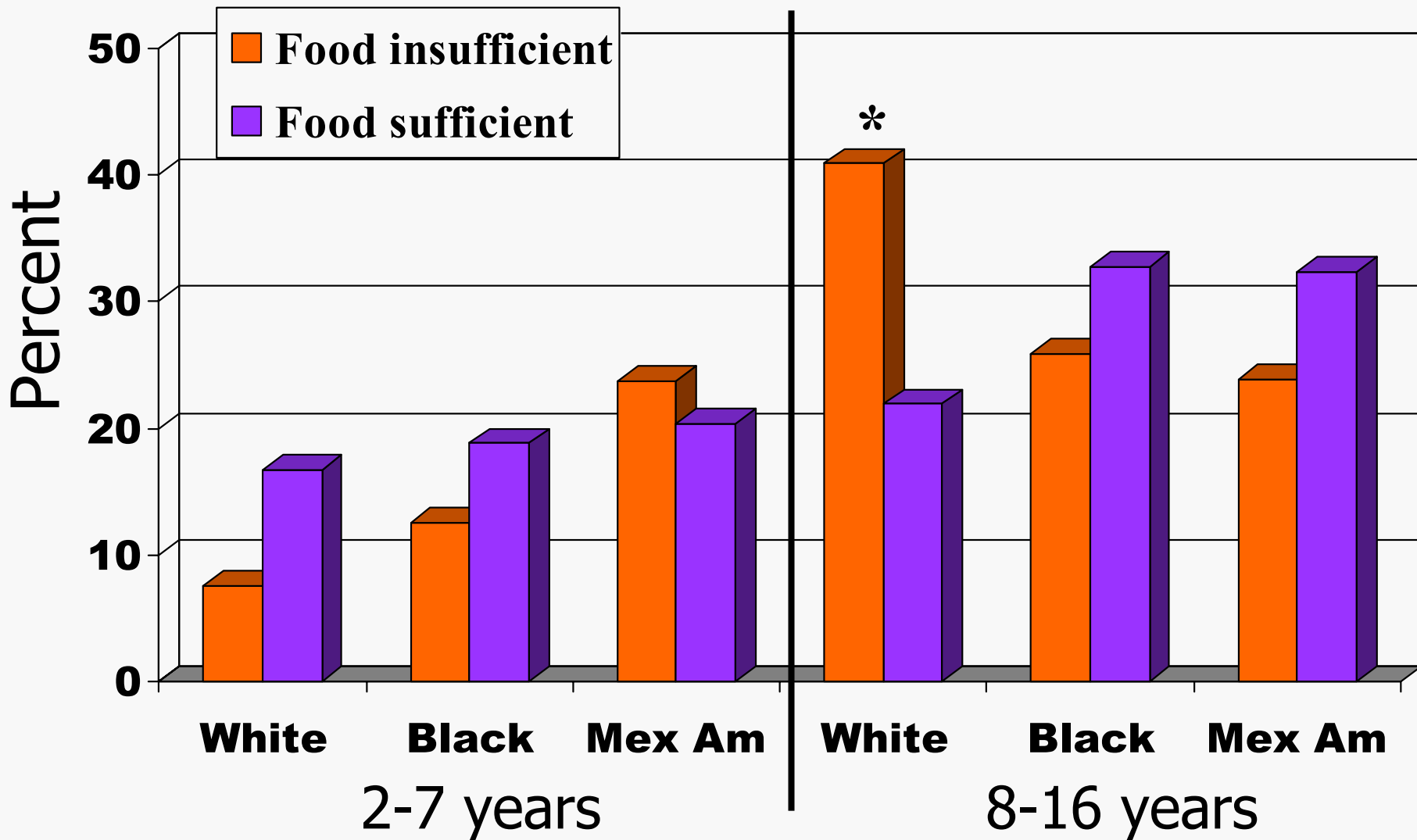
BOYS





Prevalence of HIGH BMI: NHANES III, 1988-94

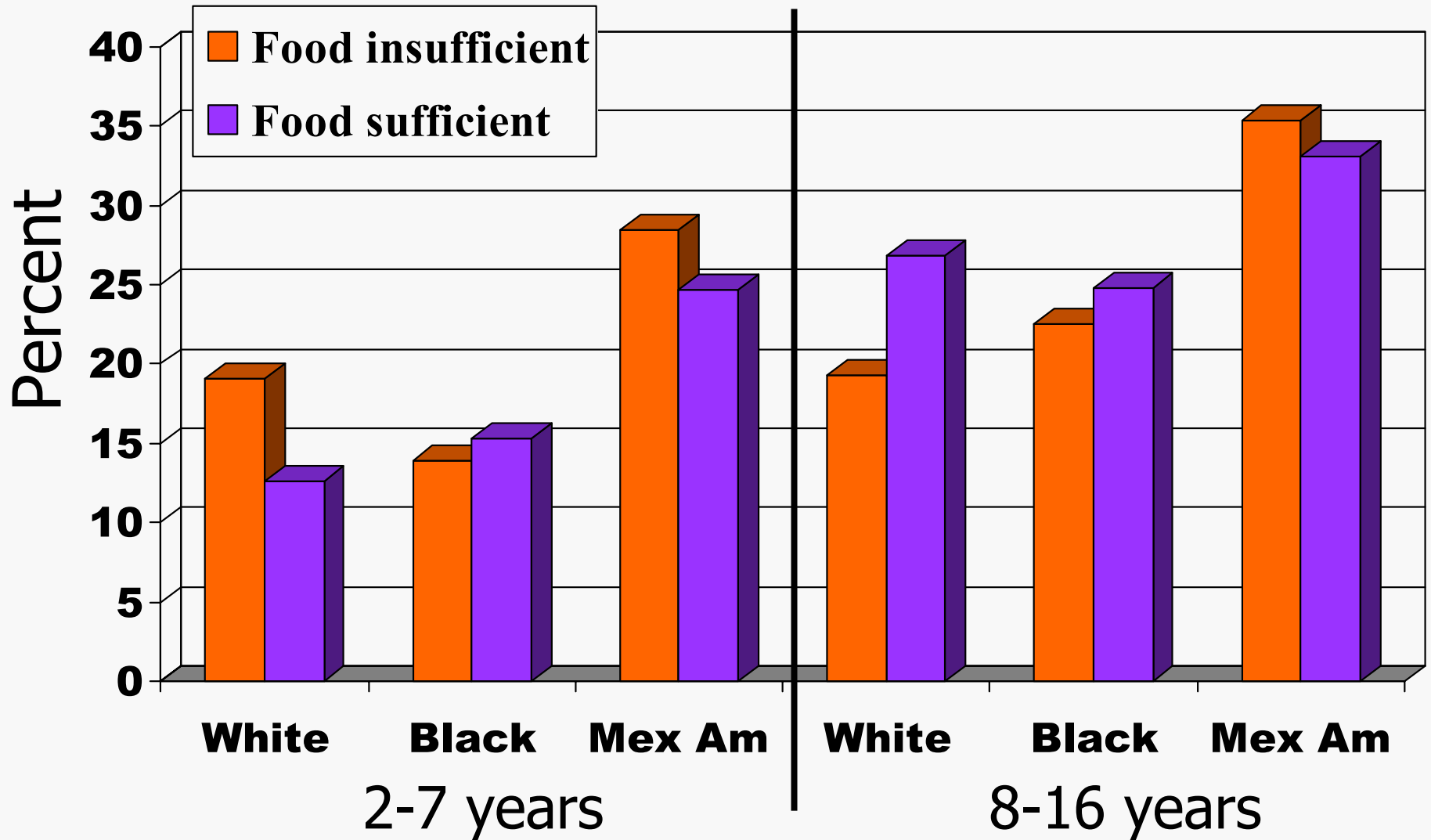
GIRLS





Prevalence of HIGH BMI: NHANES III, 1988-94

BOYS



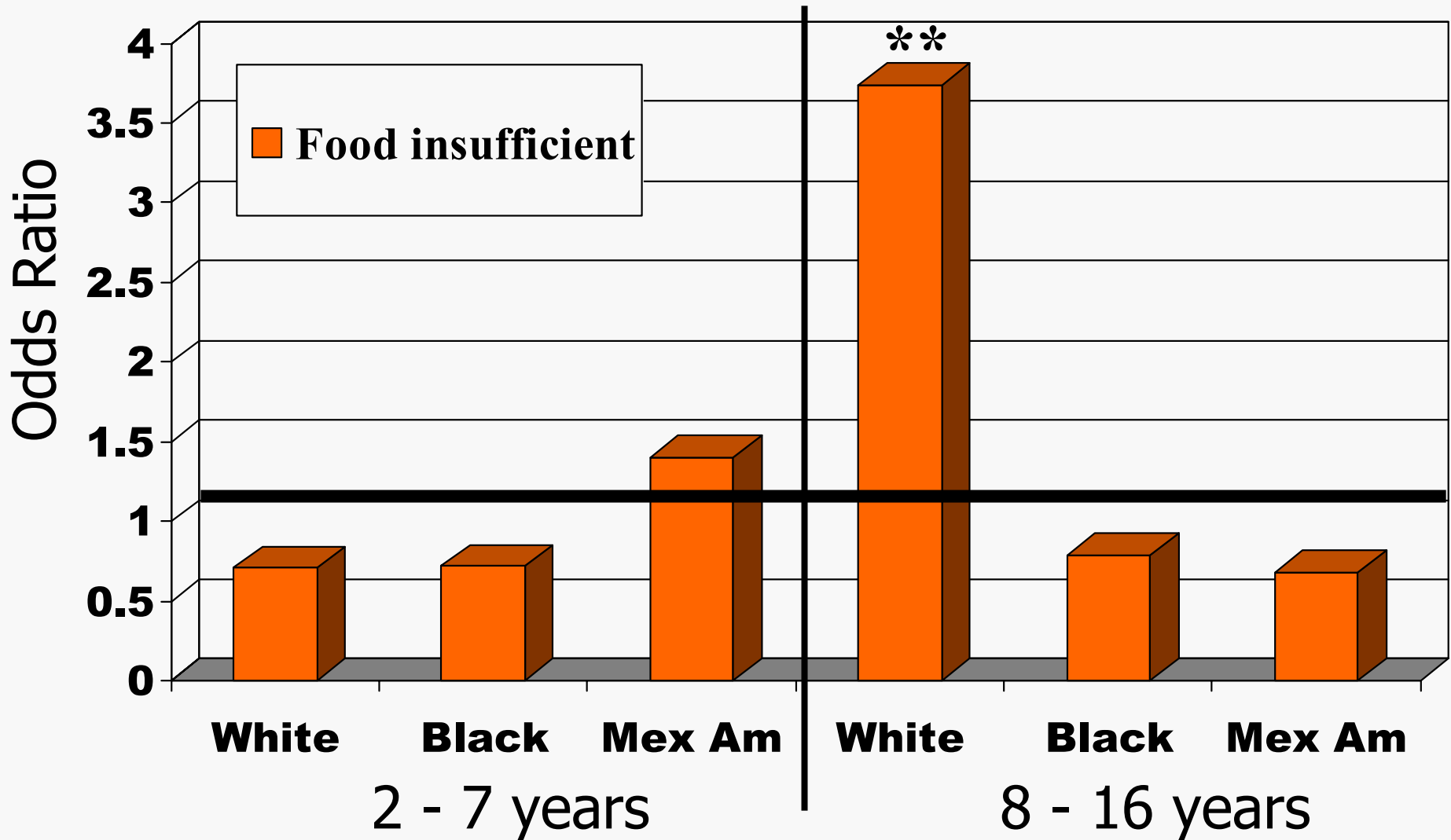


Summary Analysis: Logistic Regression

- **All children**
 - age, height, mother's height and weight, father's height and weight
 - poverty income ratio, education, employment status, marital status of family head, family size, metropolitan region, health insurance status, regular source of health care
- **2-7 year olds**
 - birthweight, prenatal smoking, birth complications
- **6-18 year olds**
 - # hours of tv viewing, # hours physical activity
- **Mexican American children**
 - language of interview



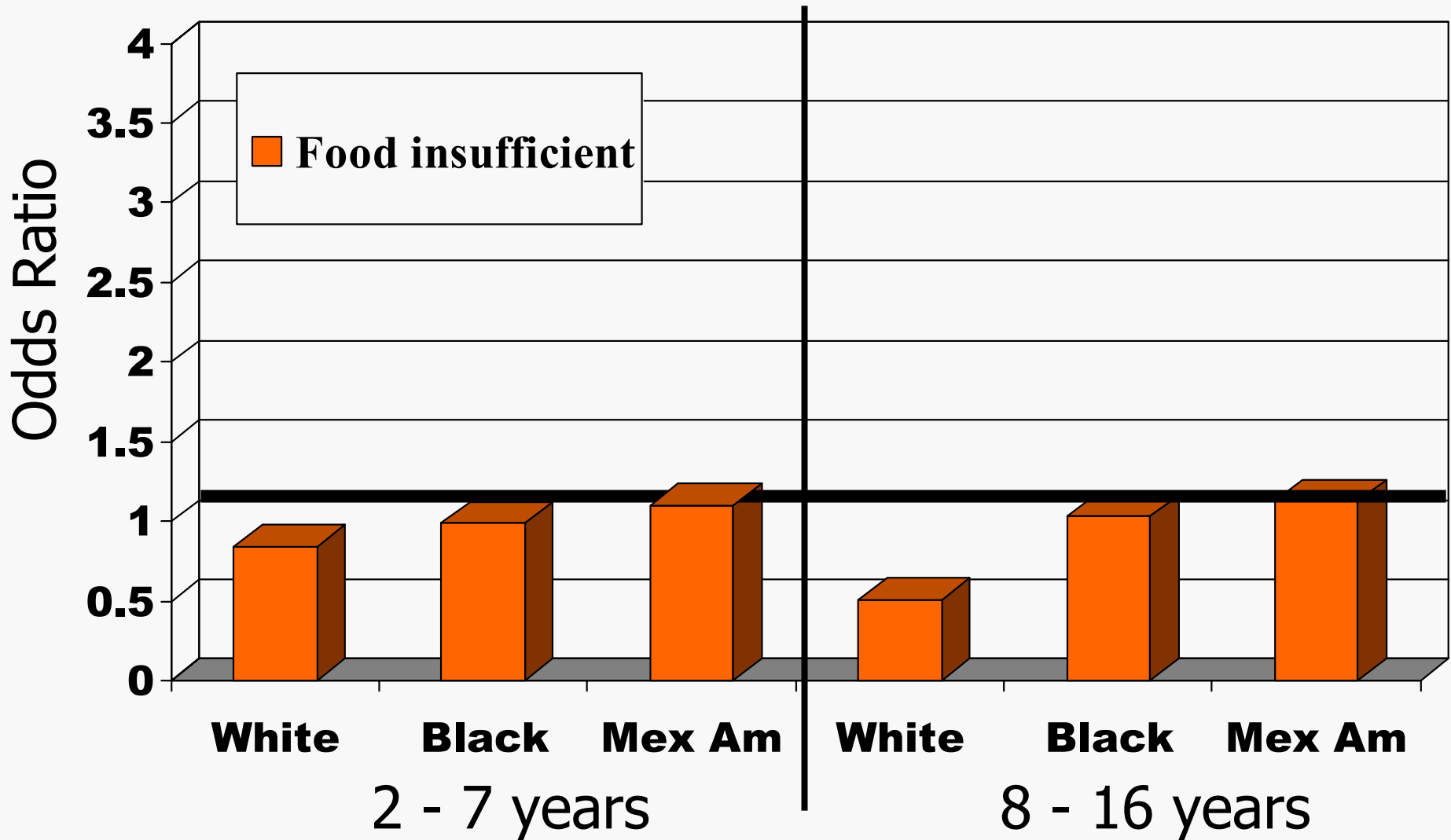
Odds ratios for HIGH BMI: NHANES III, 1988-94 GIRLS



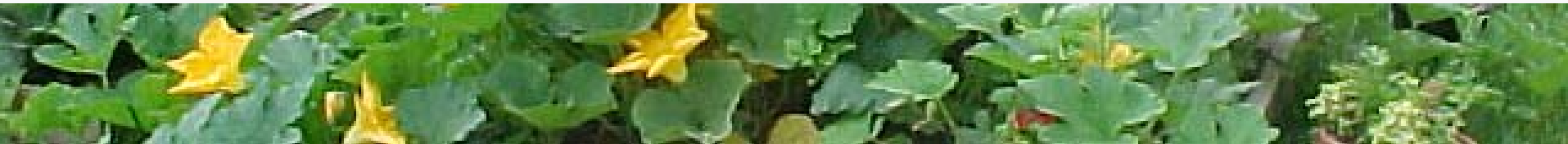


Odds ratios for HIGH BMI: NHANES III, 1988-94

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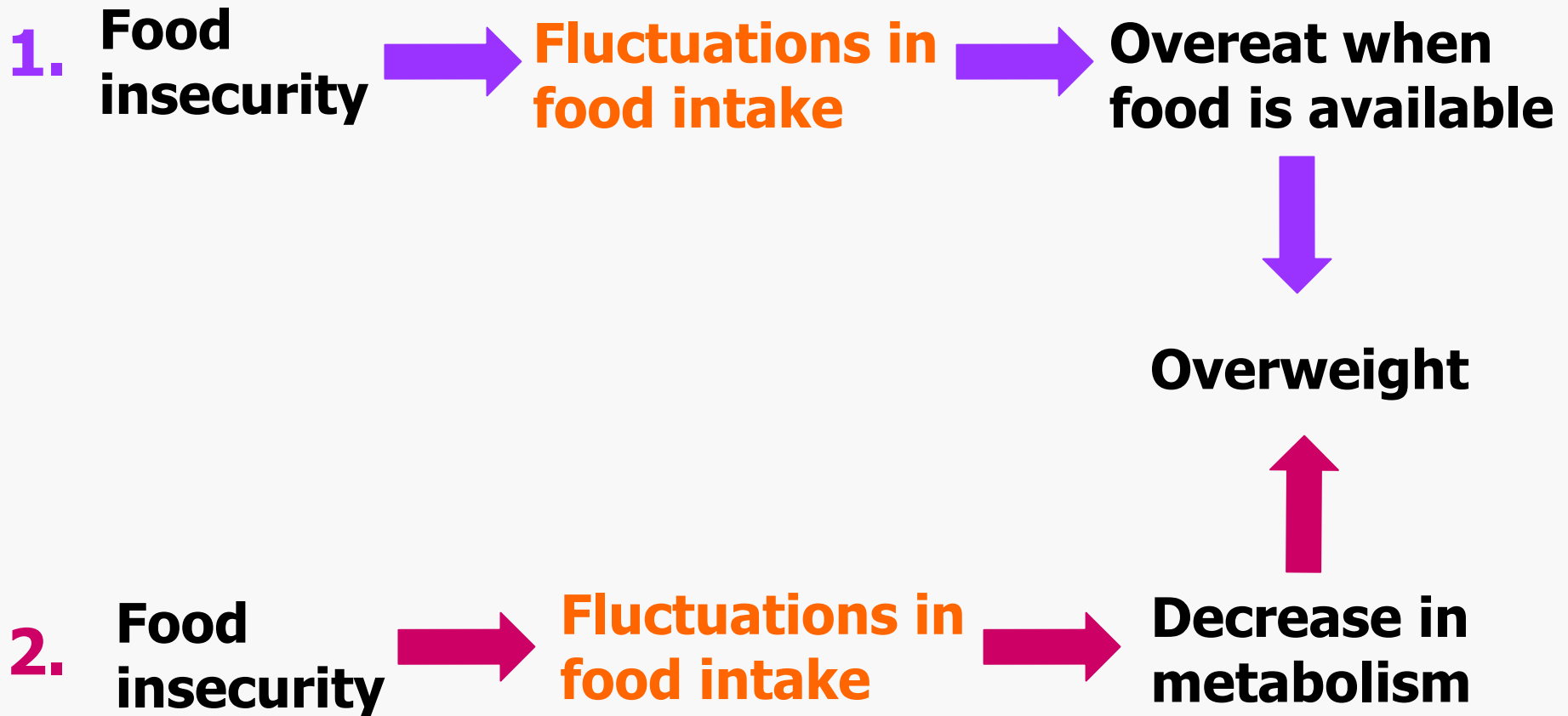


Definitions



- **Food insecurity** - Limited or uncertain availability of nutritionally adequate and safe foods or limited or uncertain ability to acquire acceptable foods in socially acceptable ways.
- **Hunger** - The uneasy or painful sensation caused by a lack of food. The recurrent and involuntary lack of access to food.

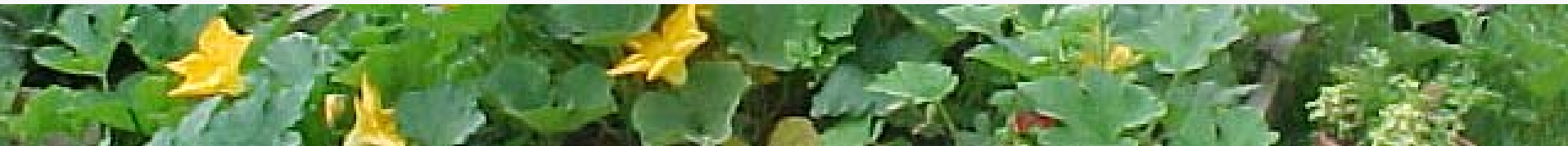
Potential Mechanisms



Potential Mechanisms



Conclusions: Poverty, food insufficiency and overweight, NHANES III



Although...

- Sample sizes are very very small
- Cross-sectional data
- Concept of food insufficiency is not the same as food insecurity
- Poverty is associated with high BMI for non-Hispanic White girls and non-Hispanic White boys ages 8-16 years, but not for other groups.
- It is possible that food insufficiency is associated with high BMI in 8 - 16 year old non-Hispanic White girls.

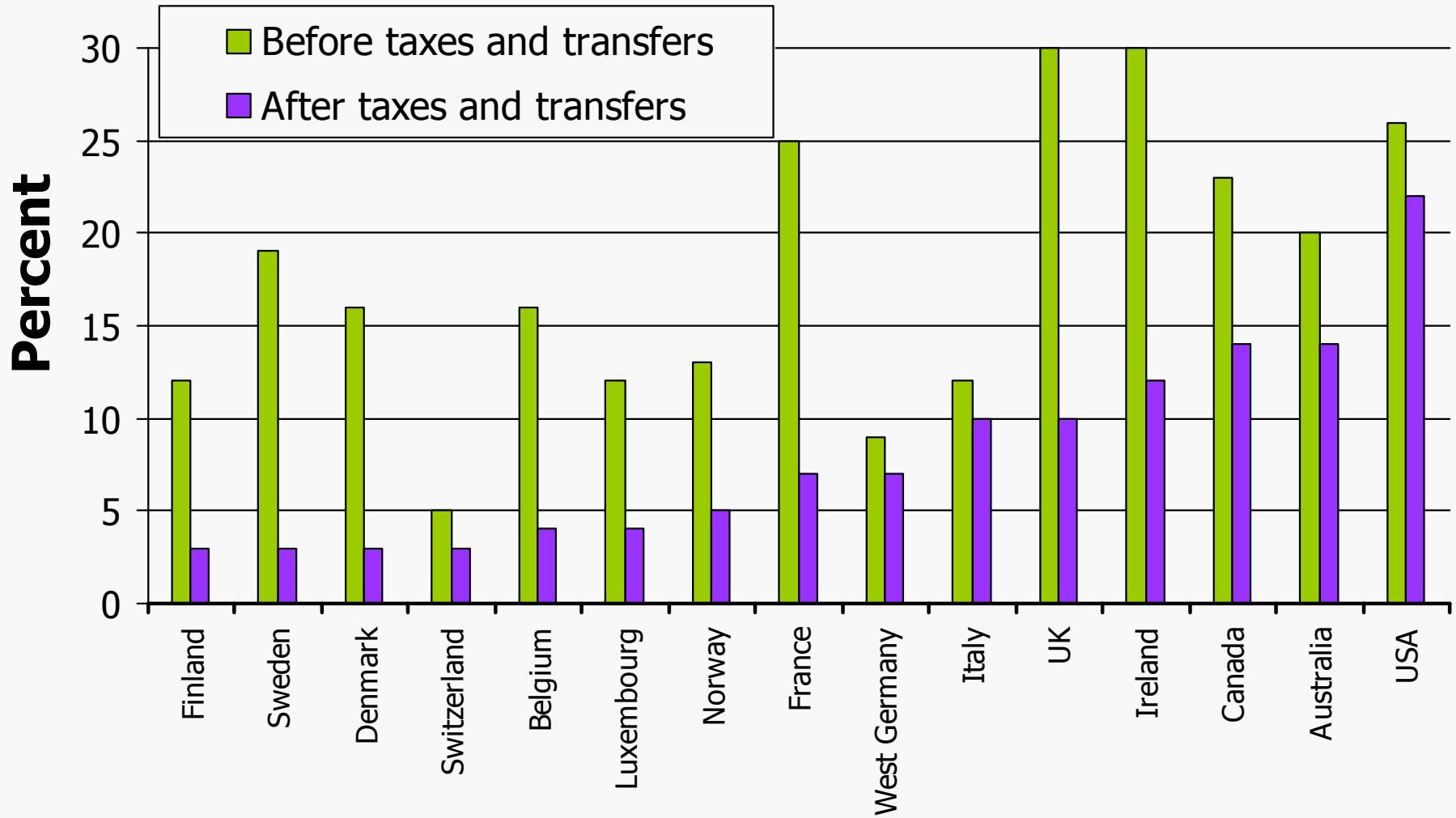
Implications



Childhood hunger and poverty will be solved by **PUBLIC POLICIES** THAT ENSURE THAT **families are able to be economically stable and food secure. . .**

- . . . have assured access to enough food for an active, healthy life, including the ready availability of nutritionally adequate and safe foods, and an assured ability to acquire acceptable foods in socially acceptable ways.

Childhood Poverty (50% of median income)



REFERENCES



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- Alaimo K, Olson CM, Frongillo EA, Jr. Family food insufficiency is associated with dysthymia and suicidal symptoms in adolescents: Results from NHANES III. *Journal of Nutrition*. 2002;132:719-725.
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- Alaimo K, Olson CM, Frongillo EA, Jr., Briefel RR. Food insufficiency, family income, and health in U.S. preschool and school-age children. *American Journal of Public Health*. 2001;91:781-786.
- Alaimo K, Olson CM, Frongillo EA, Jr. Food insufficiency and American school-aged children's cognitive, academic and psycho-social development. *Pediatrics*. 2001;108:44-53.