Fitness for the Future: Implications & Impacts of Health and Physical Education on Childhood Obesity

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Child Obesity as a Public Health Issue

The World Health Organization declared obesity a “global epidemic” in 1997.

Nearly 13.7 million children and adolescents aged 2-19 in the U.S. are obese or overweight. (Centers for Disease Control)

Childhood obesity is linked to higher rates of adult morbidity & mortality. (World Health Organization)

Long-term implications

Children who are obese are two times more likely to be obese as adults than non-obese children. (National Center for Chronic Disease Prevention and Health Promotion)

Obesity kills: Nearly 2.8 million Americans die from health complications as a result of being overweight or obese. (World Health Organization)

Weight-related health complications produce greater risk of developing major illnesses or injury, which is estimated to cost nearly $150 billion in medical care spending in one year. (Centers for Disease Control, 2008)

Health Implications

Physical

More likely to suffer from...

- Cardiovascular disease
- Type II Diabetes
- Various types of cancers
- Osteoarthritis
- Polycystic Ovary Disorder
- Asthma

Psychological

More likely to suffer from...

- poor academic performance
- distorted body-image
- Anxiety
- Depression
- Food and/or drug addiction

Show me the money: Economic Implications

Global Obesity Prevention Center simulation study:

Currently, 31.9% of youth in the U.S. meet the CDC's physical activity recommendations.

Costs nearly $1.1 trillion in direct medical care

Lose $1.7 trillion in labor productivity over lifetime

If level is increased to 75% of children in U.S. meeting CDC physical activity recs:

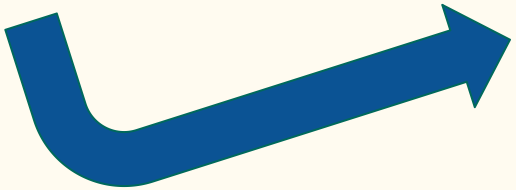
Save $16.6 billion in direct medical care costs

Gain $23.6 billion in labor productivity over lifetime

Ways to Reduce Childhood Obesity:

1. Balance children's caloric intake
2. Reduce sedentary time
3. Provide healthy snacks
4. Promote healthy eating
5. Keep children active

from cdc.gov



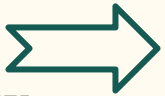
CDC's Comprehensive Approach

Efforts are most effective in schools because school children are in their most formative, habit-learning years.

How does reducing health and PE class lead to increased childhood obesity?

Children will have less time to be active

Children will not form interests in physical activity or healthy habits.



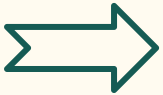
Children will not exercise as frequently

They are more likely to stay or become obese.

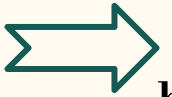
How does reducing health and PE lead to increased childhood obesity?

Children will have less time to learn about healthy eating.

Children will consume more more high calorie, low nutritious foods



Eating high-calorie foods without balancing it with exercise can lead to weight gain and other health issues.



They are more likely to become or stay obese.

Hypothesis

States that pass a law to reduce health and physical education time in schools are more likely to have a higher rate of childhood obesity than states that do not pass a law to reduce health and physical education time in public schools.

Quasi Experiment

Research Design

Treatment Group (Illinois)

00 X 00000

Comparison Group (New Jersey)

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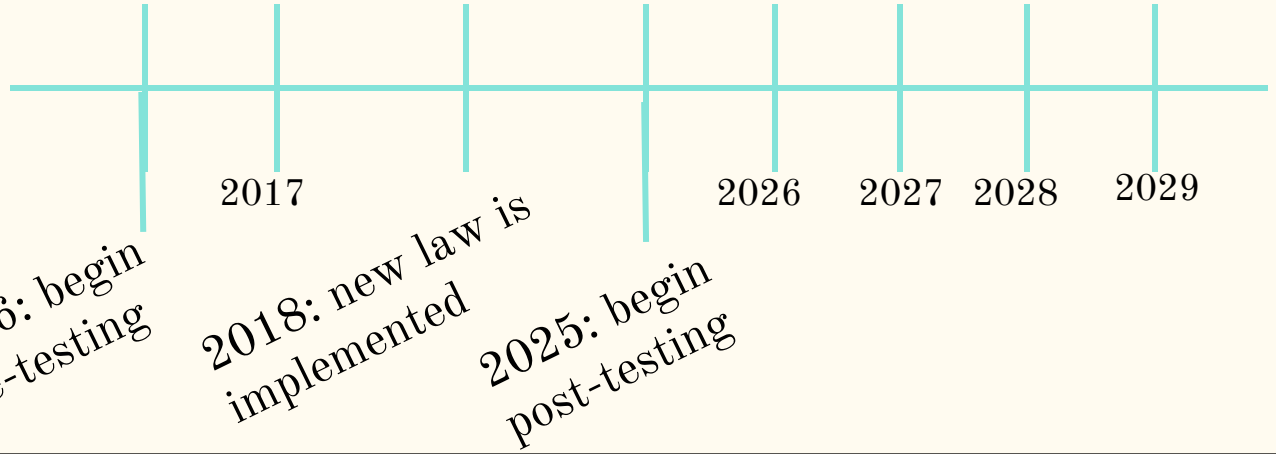


IV: Law decreasing minimum time requirements for health and PE

- If the state passes a law decreasing the minimum mandatory health and PE time requirement, we would expect the number of hours students spend in health and PE to decrease
- If the state does not pass a law, we would expect the number of hours students spend in health and PE to remain constant

Treatment Group: Illinois

Pre-2017 Law	**New Law Passed in 2017**
5 days of PE per week; minimum of **100 minutes** per week	Minimum of **3 days** of PE a week; **no minimum number** of minutes; waivers could be submitted for fewer days
Health included in PE programs	Health still included in PE programs, but overall time is reduced

In an attempt to reduce costs in school districts, Illinois passed new legislation in August of 2017.

Matching

Poverty Level	Geographic Region
Match on change in population poverty level	Match on number of days below freezing
Higher poverty rates correlate to higher obesity rates	**Different regions experience different weather patterns**
Poorer areas may be unable to afford nutritious foods	Weather patterns influence outside activity — including P.E. classes
Fitness centers and sports team can be expensive	Northern states experience extremely cold & often snowy winters
Fast,cheap food is usually higher in calories & less nutritious	

Matching

Education Levels

Match on parent's completed levels of education

Education is a common variable used in analyzing health trends

Lower education rates are generally linked to higher obesity (Natl. Health & Nutrition Examination)

Higher adult education influences the way the parent/guardian views diet and exercise.

Diversity

Match on children's demographic data

Minorities are more at risk for childhood obesity

Minority populations are more likely to be in lower socioeconomic status, and children in these communities are two times as likely to be obese that wealthier children. (National Center for Health Statistics data brief).

State Law Comparison Chart — post 2017

	Illinois (Treatment Group)	New Jersey (Comparison Group)
Minimum amount of Health and PE per week	No minimum minutes requirement; 3 days or less per week	150 minutes per week
Waivers	Allowed to reduce PE instruction time	None

Alternative Explanations

	Treatment Group- Illinois	Control Group- New Jersey
Poverty Level in 2016	13%	10.4%
Number of days below freezing in 2016	Zero days	One day
Parents' education attainment (percent bachelor's degree or higher)	35.3%	43.2%
Sex and race distribution of the children enrolled in public schools	Male 51.3%, Female 48.7%; White 64.9%, Black 16.9%, Asian 4.4%, American Indian and Alaska Native 0.3%	Male 51.3%, Female 48.7%; White 61.5%, Black 15.6%, Asian 9.1%, American Indian and Alaska Native 0.3%
Percent of children enrolled in public school through K-12	62.42%	62.80%

The DV Measurement: Childhood Obesity Rate

National Survey of Children's Health: Data Collection & Process

- Sponsored by Maternal and Child Health Bureau of the Health Resources and Services Admin. within U.S. Dept. of Health and Human Services
- SAS or STATA microfiles available on the U.S. Census Bureau's website
  - Link: https://www.census.gov/programs-surveys/nsch/data.html
- Collects data from all 50 states on children aged 0-17 via online and paper surveys
  - 2018 total sample size: 176,052
- Stratified random sample from Census' Master Address File.
- Oversamples households with higher probabilities of having a child or children present.

Data Collection

NCSH Survey- Two Questionnaires

#1: Screener Questionnaire

- Determine if any children under 18 live at selected household address. If so, participant submits roster of children (or child) with basic health & demographic information.

#2: Topical Questionnaire

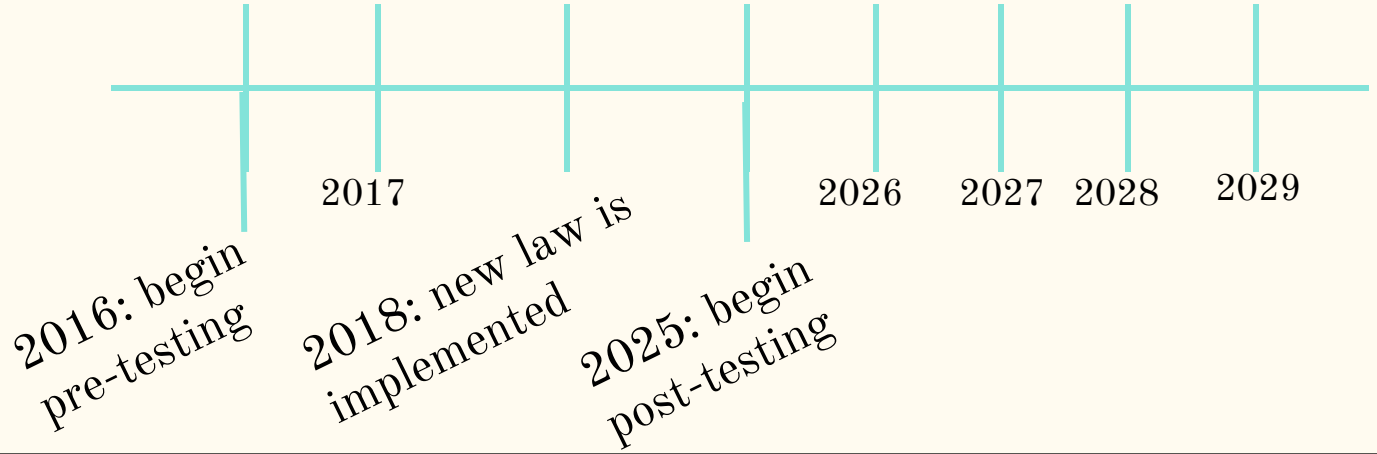
- Only one child per responding household selected as survey subject.
- Three age-specific questionnaires based on screener data: children aged 0-5, 6-11 & 12-17.

For more information, visit the NSCH page on HRSA's website or "NSCH at a glance" on the CDC's website

Research Design

Illinois **00 X 00000**

New Jersey **00 00000**



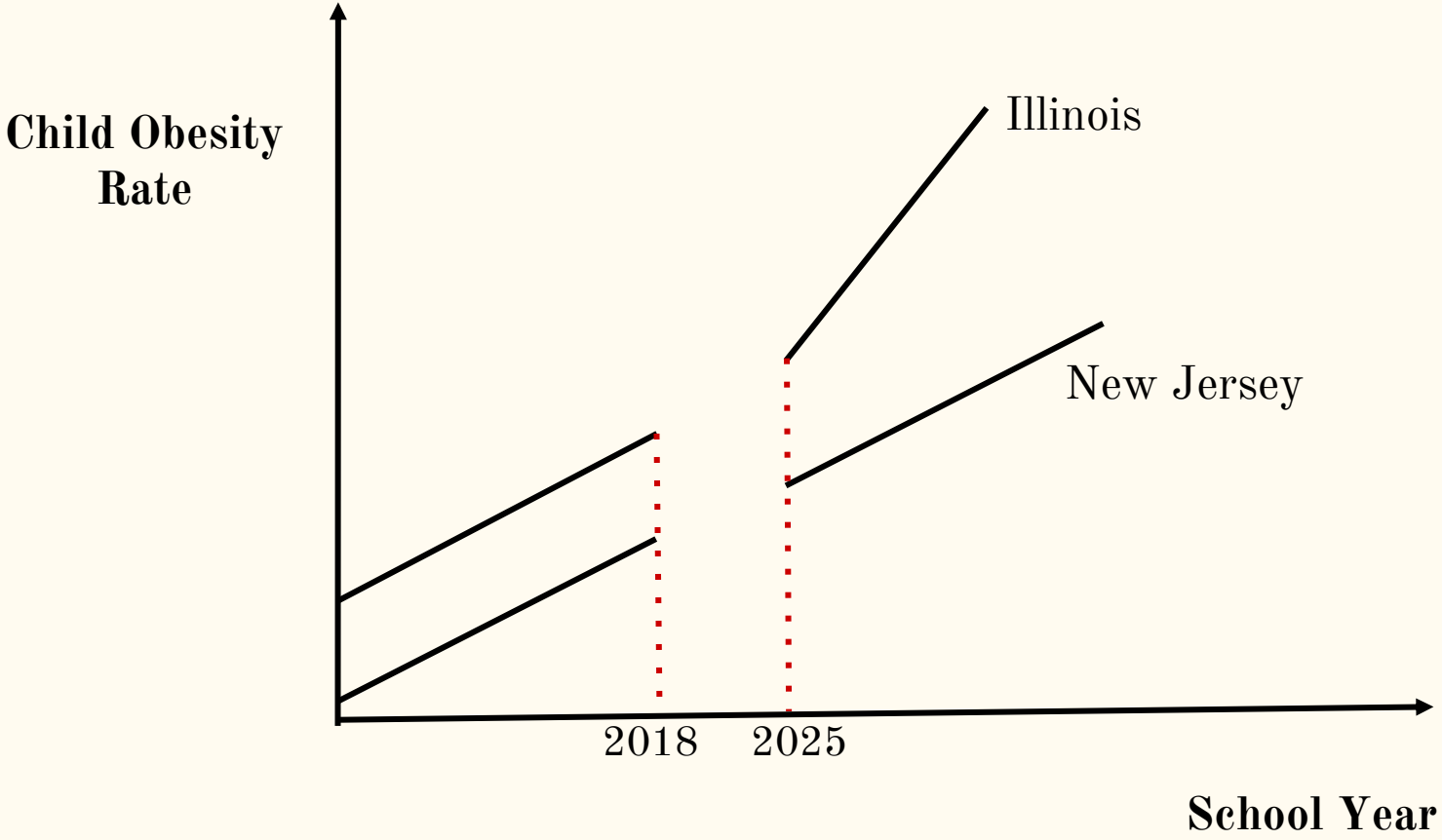
NSCH Data in use: State comparison example

Childhood Obesity Rate for Children Aged 12-17

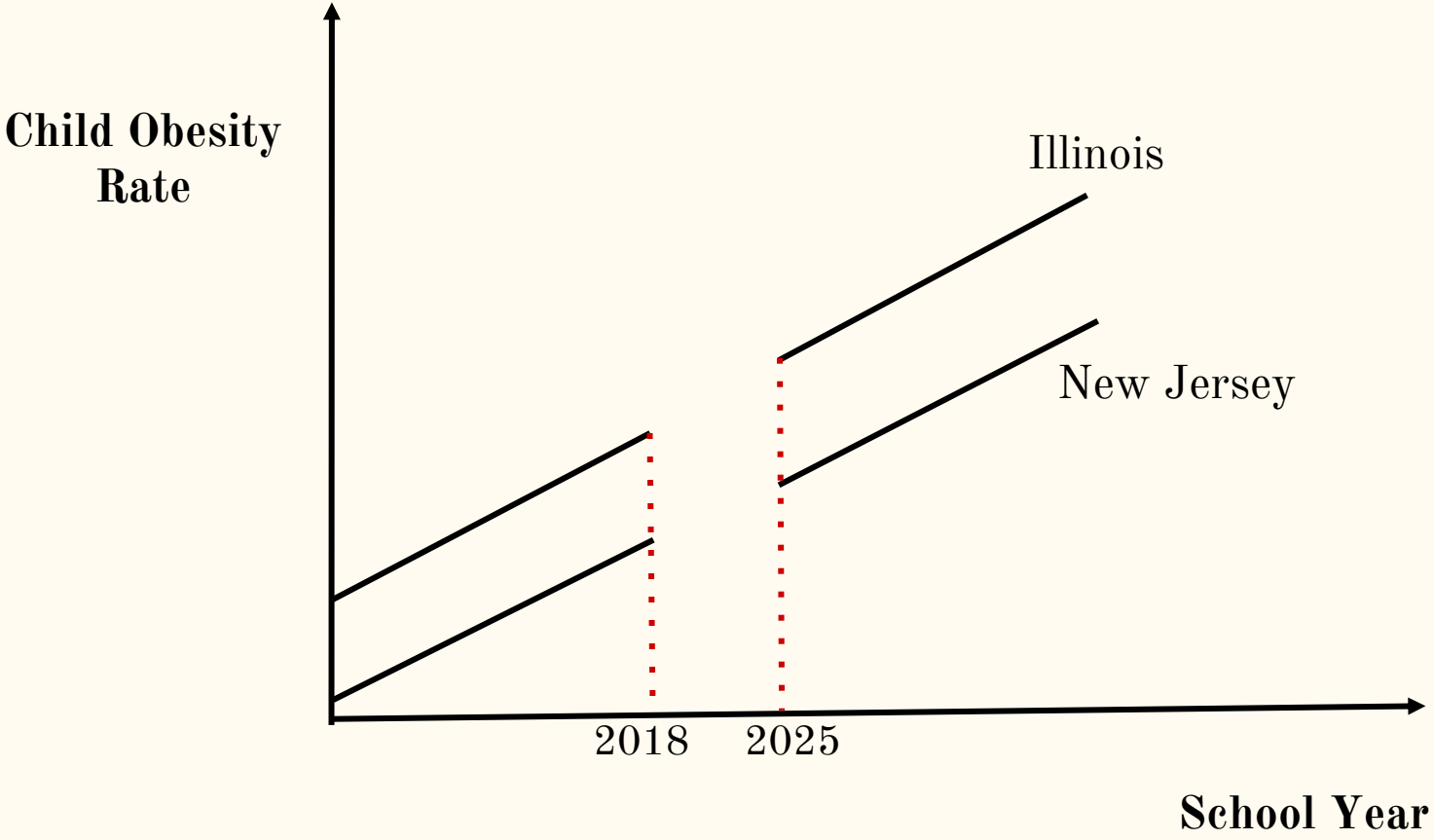
(National Survey of Children's Health)

	2016	2017	2018
Illinois	14.9%	16.2%	14.2%
New Jersey	14.8%	14.8%	15%

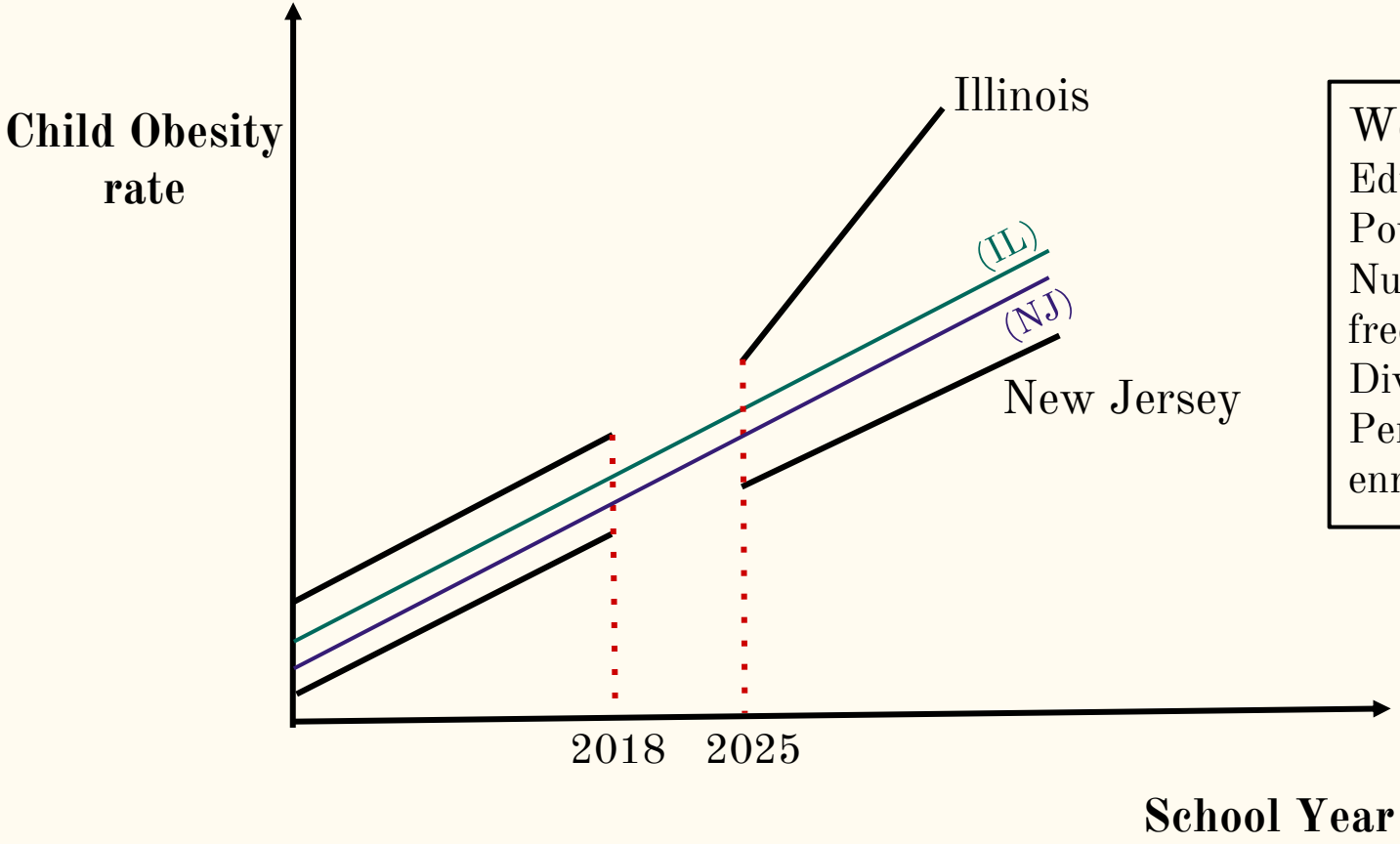
Visualizing the trends- Supported Hypothesis



Visualizing the trends- Unsupported Hypothesis



Visualizing the trends- Tracking example



We will track:
Education Level
Poverty Levels
Number of days below freezing
Diversity
Percent of children enrolled in school

Study Strengths

Matching the tracking characteristics

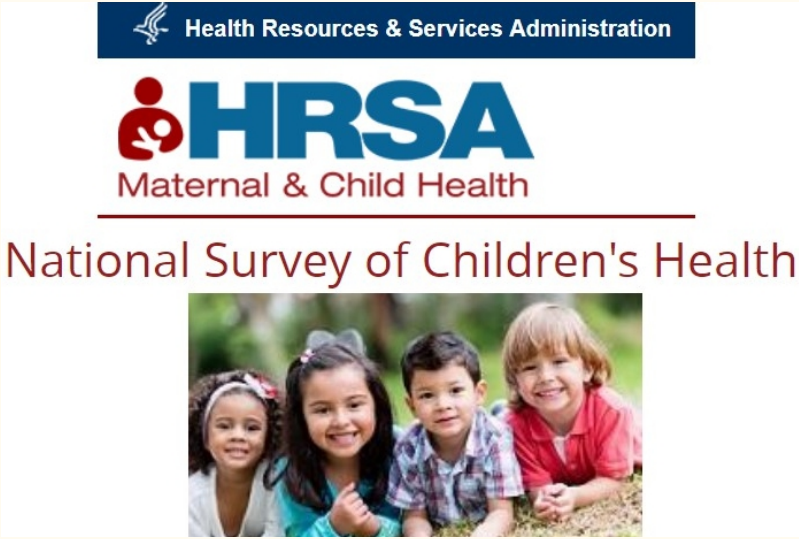
- Poverty level
- Climate
- Parents' education levels
- Demographic makeup(sex and race distribution)
- Percent of children enrolled in public schools

Study Strengths

Secondary Data Collection

- Data collected and aggregated anonymously by U.S. Dept. of Health and Human Services, not us.

- Avoid concerns over confidentiality, subject harm, or other identification issues associated with primary data collection.



https://www.autismspeaks.org/news/national-survey-parents-identifies-1-40-children-autism

Study Weaknesses

Lying on the NCSH survey

- Respondents in Illinois may be tempted to lie on reports, especially in regards to their children's health status.
- Illinois respondents will give more socially desirable answers to make their state look better to a government agency.

History threats

- A nonprofit or other governmental program in New Jersey aimed at promoting health/physical activity in children would reduce a state's overall childhood obesity rates.

Study Weaknesses

https://health.clevelandclinic.org/playing-team-sports-may-help-kids-ward-off-depression-study-finds/

Other alternative explanations

Our study does not match on:

- Percentage of children enrolled in extracurricular sports
- Adult obesity rates
- Presence of state-sponsored and local health programs

Instrumentation

- The NCHS may change their data collection method, and we would be unable to influence them

Ethical Concerns

- Our conclusions may indirectly promote unfavorable images of a state's population if we find the state to have increasing childhood obesity rates.

- If trends show that children in Illinois are becoming more obese on average, it may be unethical not to share this information with state legislature.

Conclusion

Significance

- To determine whether weak physical education laws impact childhood obesity rate change.

If our hypothesis is supported,

- States with lower, weaker PE laws will likely see long-term & costly consequences linked to rising childhood obesity rates.
- We can recommend school-level physical education policies to address these issues.