



Health Inequality Network

Sept. 15, 2011



Janet Currie
Princeton University

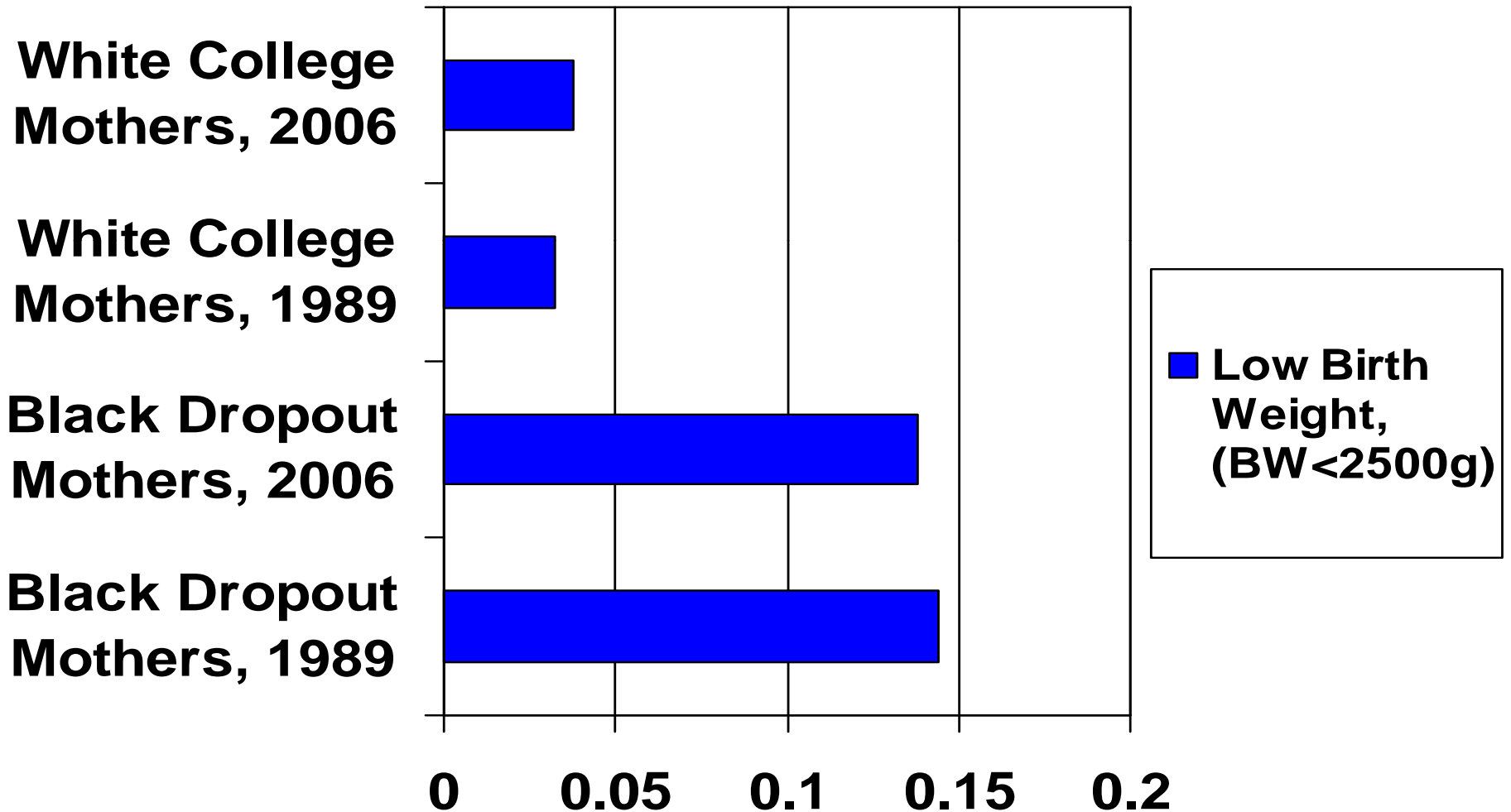


Why do we care?

- “Because it is there”
 - Differences in health at birth and in early life are large and beg scientific attention.
- Profound implications for remediation efforts.
 - May need to focus on mothers
 - May expect improvements to be slow if there are intergenerational effects
 - Intelligent discussion of remediation depends on knowing the size of the effects and cost effectiveness of proposed interventions.

Inequality at Health at Birth

(U.S. Single Births Only)

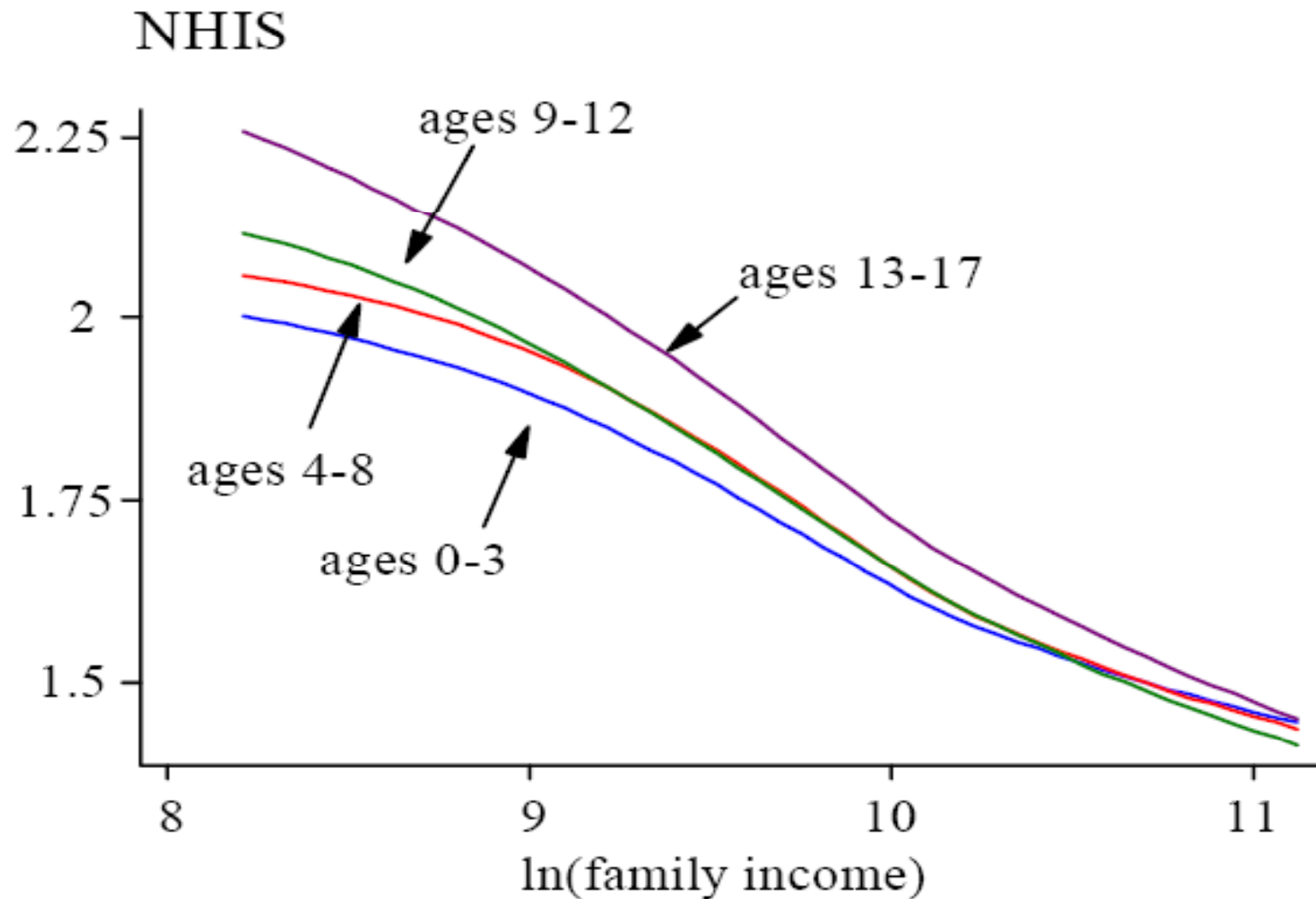


In the 1958 British Birth Cohort Study,
LBW is more predictive of age 7 math
than moving from low to high SES
(Source Currie and Hyson, 1999, Dep. Var.=Z-score)

	Males	Females
LBW	-.21 (.081)	-.21 (.075)
Father Professional	.078 (.033)	.14 (.034)
Father Semi- or Low-skilled	-.016 (.033)	-.078 (.034)

U.S. Relationship Between Family Income and Health: 1=excellent, 5=poor

Source: Case, Lubotsky and Paxson



The Long-run Effects of Fetal Origins/Early Exposures

Is a hypothesis that brings together many strands of research

- Epigenetics
- Evidence regarding effects of exposures on health at birth/early childhood
- Evidence regarding long term effects of health at birth/early childhood
- Cohort studies of fetal/early childhood exposures

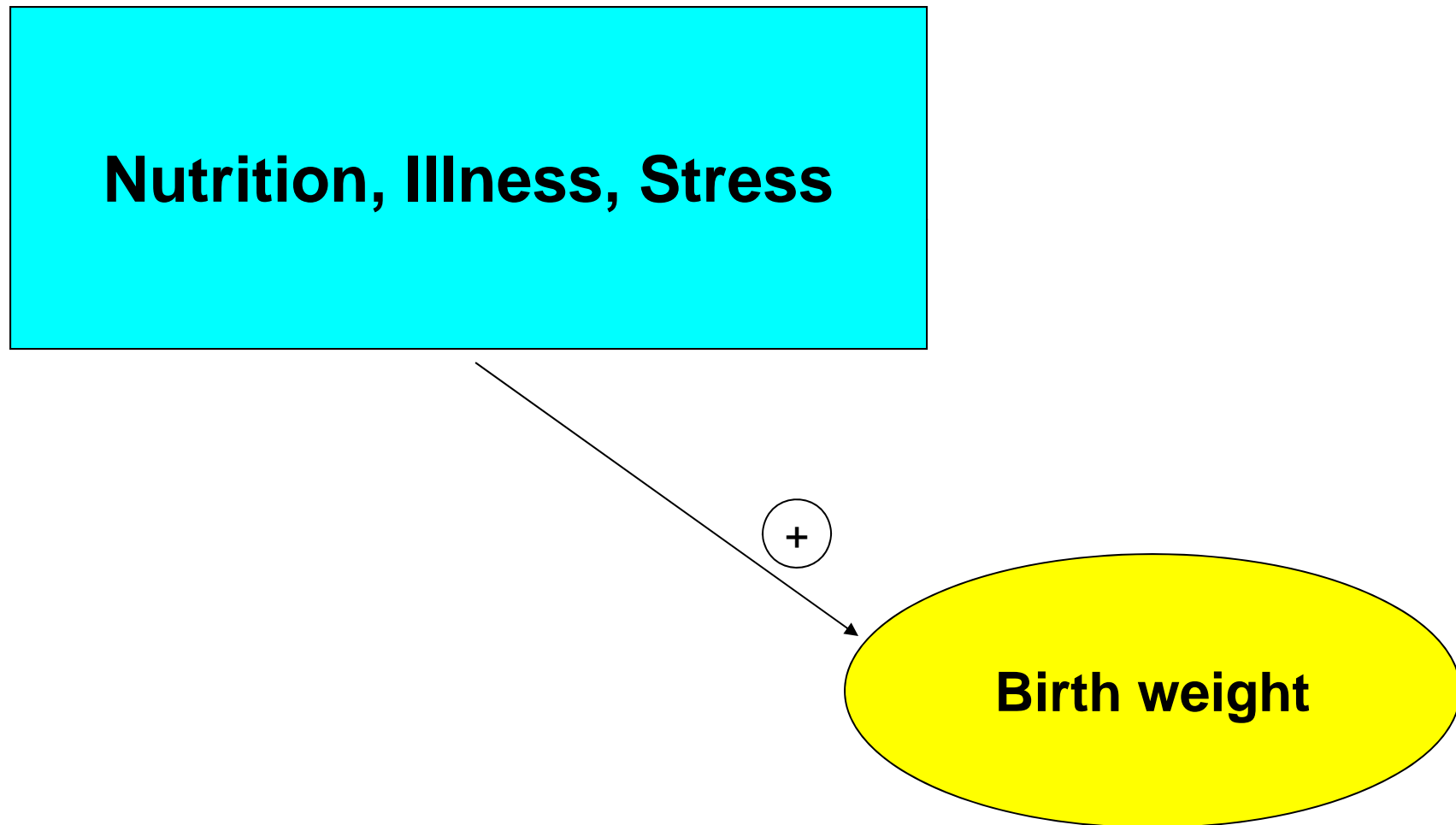
Epigenetics suggests that we should see environmental influences on health at birth, and that these could explain a large fraction of the differences between individuals.

Provides an explanation for something observed in many studies: health at birth is extremely malleable.

Birth Weight As a Summary Measure of Health at Birth

- Birth weight has been measured over a long period of time and in many populations.
- It is well measured and objectively measured (in rich countries) relative to other indicators.
- Birth weight and low birth weight (defined as birth weight less than 2500 grams) are often used as summary measures.
- But it is an extremely crude measure and probably only captures a subset of health insults.

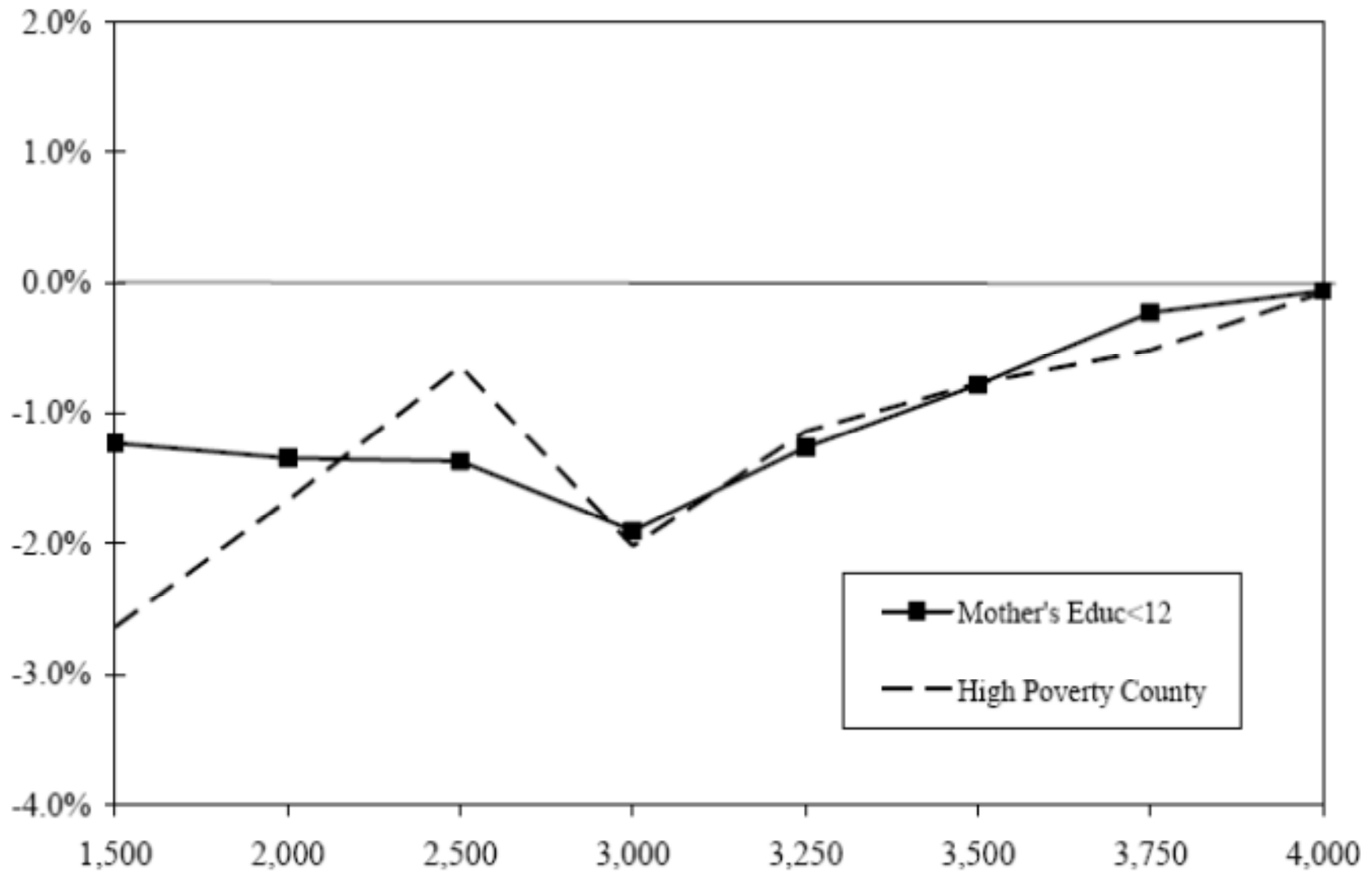
Recent economic studies in rich countries show that health at birth is subject to many environmental influences



E.g. Hoynes, Page, Stevens (2009)

- Study the Supplemental Feeding Program for Women, Infants, and Children (WIC).
- Provides supplemental food to pregnant women.
- Program was rolled out on a city/county basis between 1972 and 1979.
- HPS examine the effect of the rollout of WIC on birth weight.

Effect of WIC Implementation on Fraction of Births Below Each Birth Weight Threshold, Coefficient/Mean



**Nutrition, Illness,
Stress**

**Smoking, Drinking,
Drugs**

+

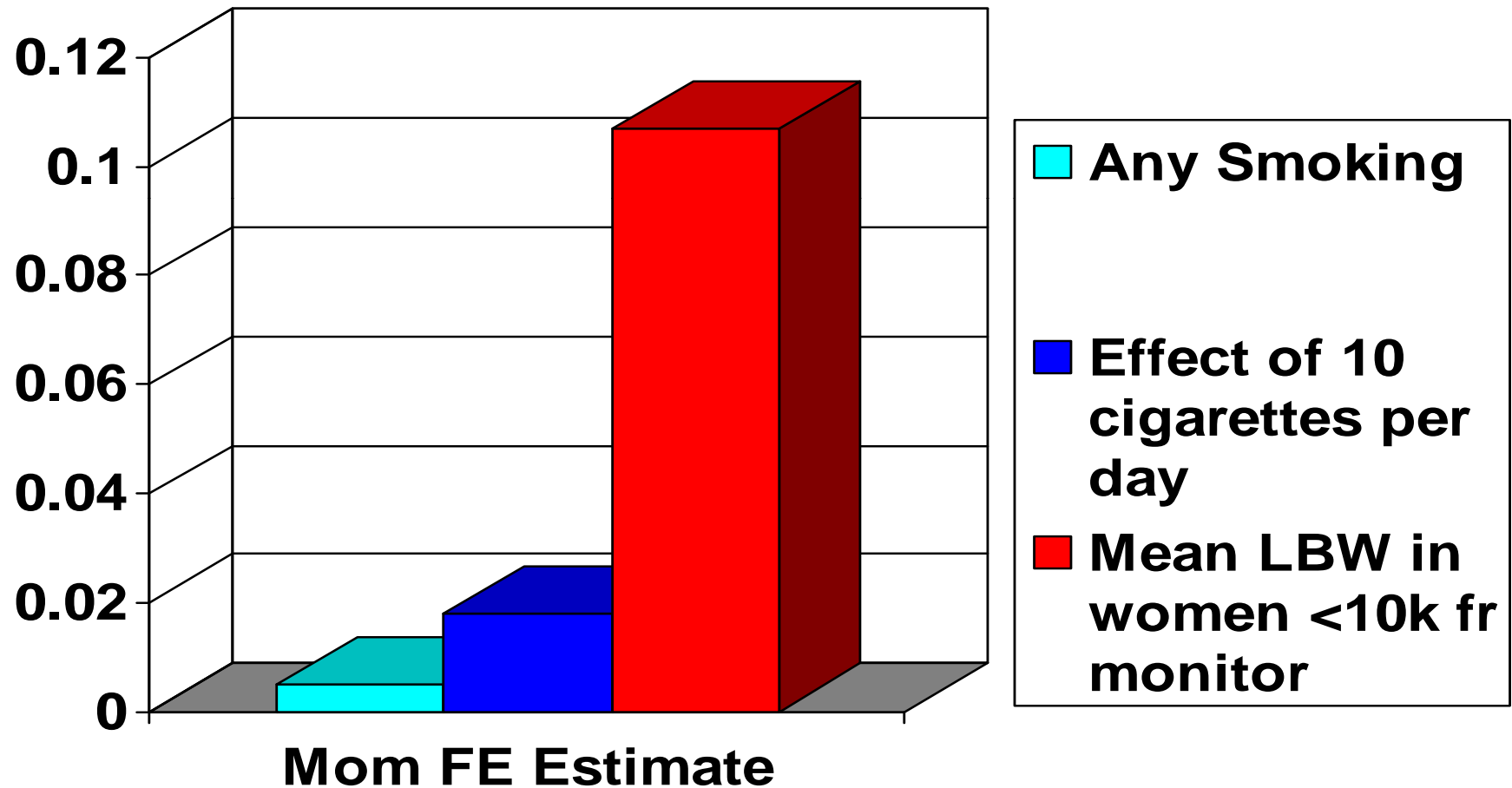
-

Birth weight

E.g. Currie, Schmeider, and Neidell (2009)

- Look at 1.5 million New Jersey births between 1989 and 2003 using data from birth certificates.
- A confidential version of the data allows us to link siblings to each other.
- We examine the effects of smoking in a sibling fixed effects model.

Estimated Effects of Smoking on Probability of Low Birth Weight



**Poor Nutrition,
Illness, Stress**

**Smoking, Drinking,
Drugs**

Birth weight

Pollution

-

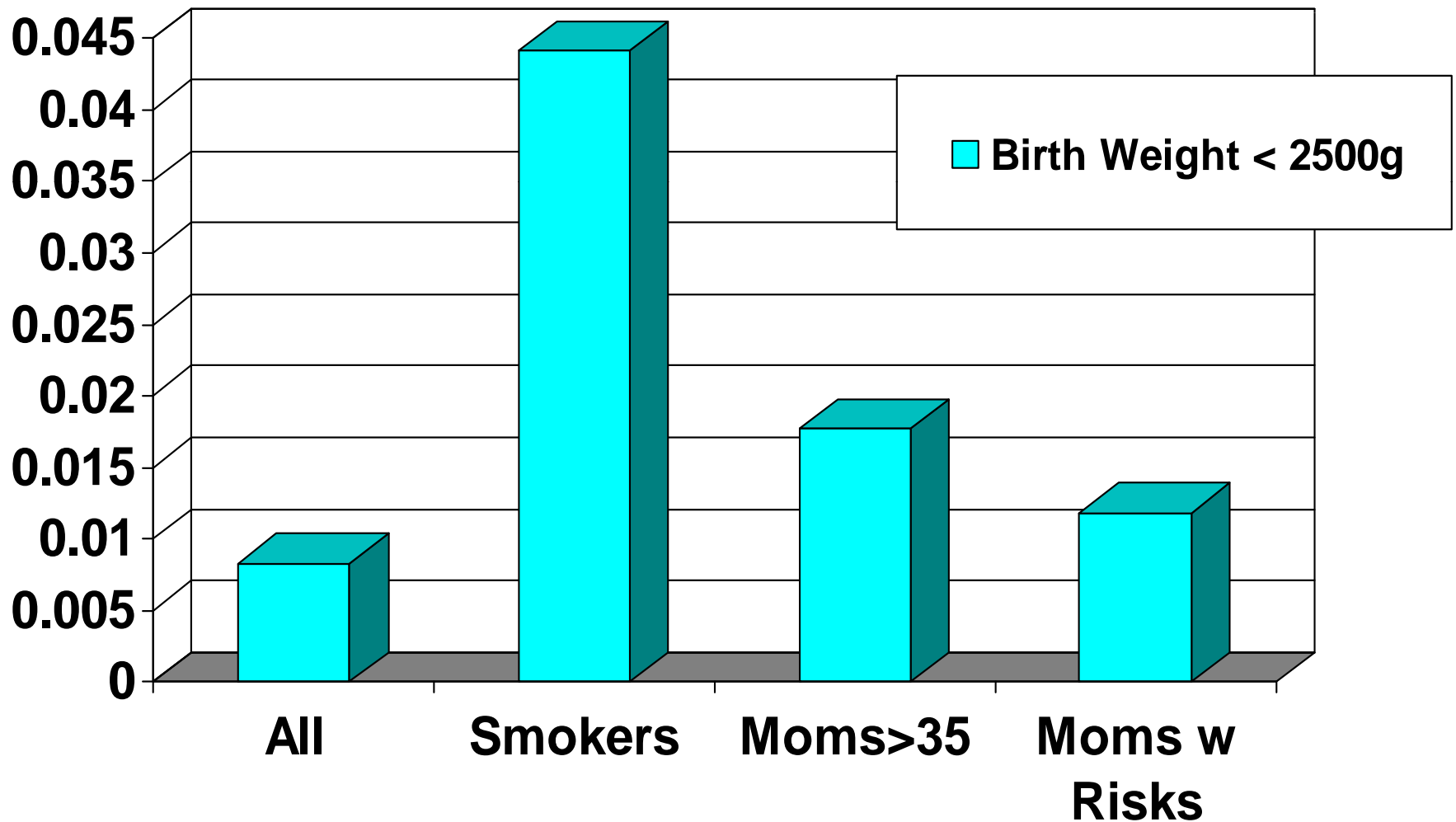
-

-

E.g. Currie, Schmeider, and Neidell

- Confidential version of the data allows us to geocode.
- Select mothers who live near fixed air quality monitors.
- Examine the effect of changes in criterion air pollutants (CO, PM10, Ozone) between births on the fetal health of siblings.

Effect of a 1 Unit Change in CO (Mean=1.6, SD=13) on Incidence of Low Birth Weight



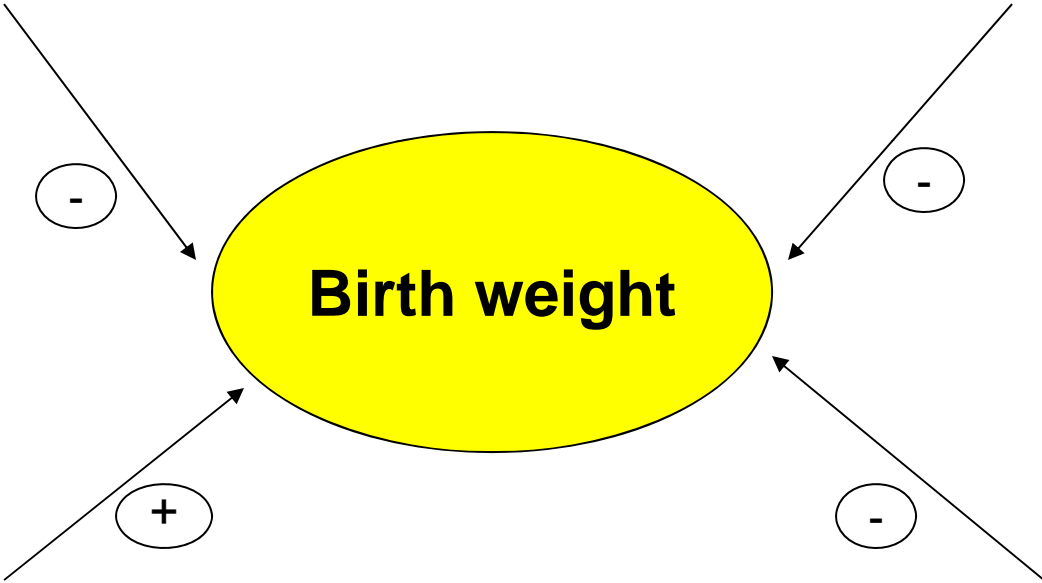
**Poor Nutrition,
Illness, Stress**

**Smoking, Drinking,
Drugs**

Birth weight

Maternal Education

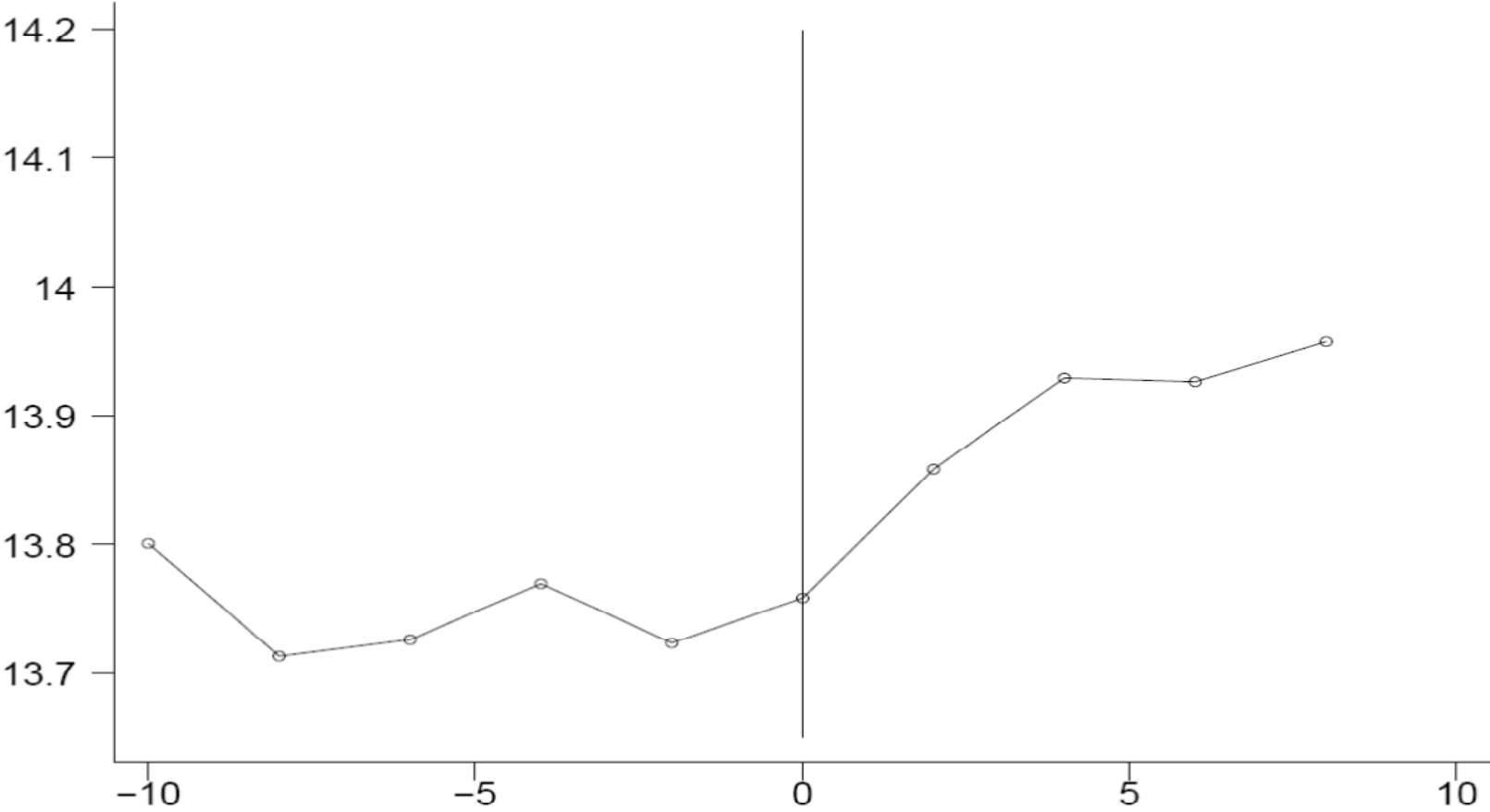
Pollution



E.g. Currie and Moretti (2003)

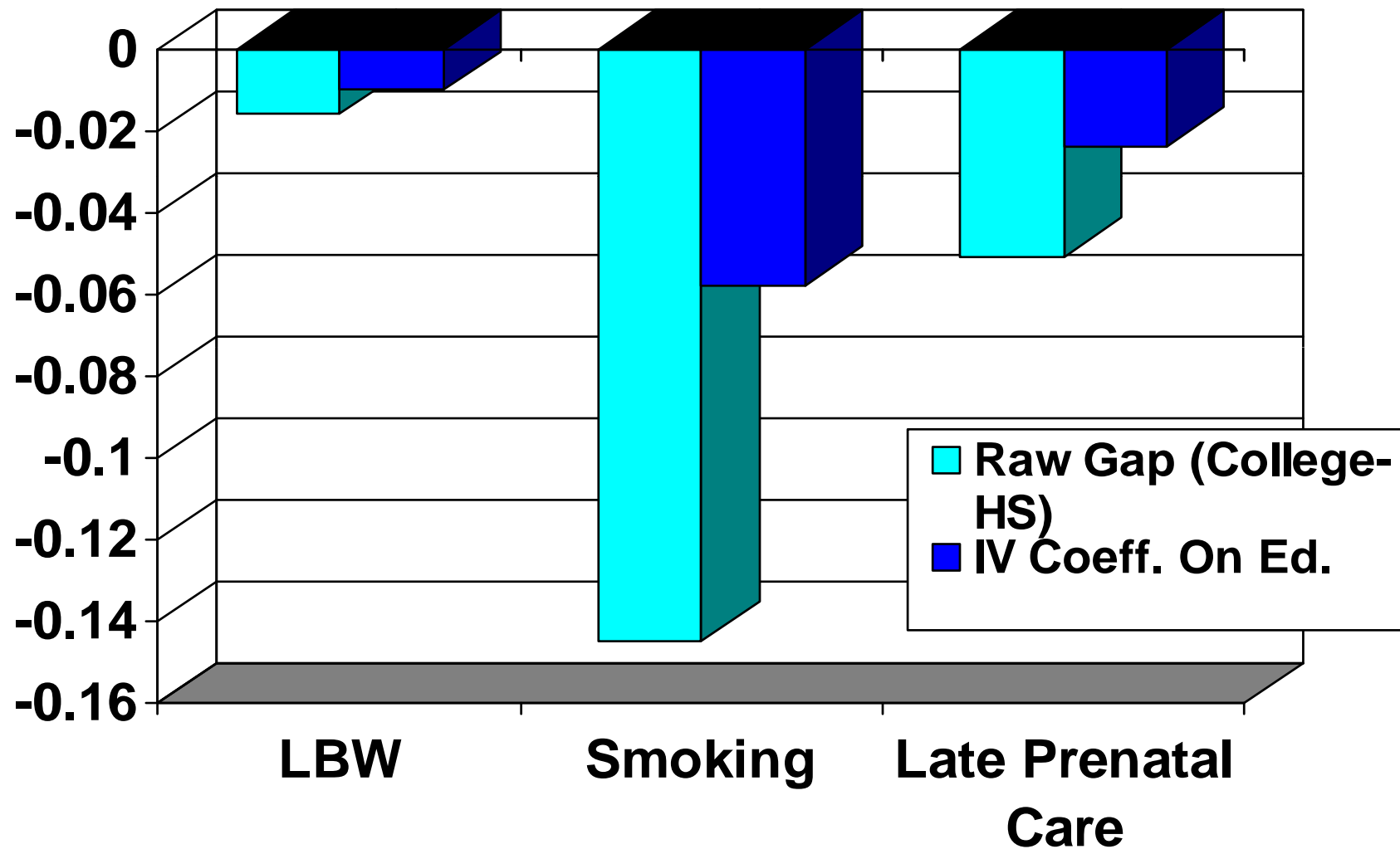
- Use national birth data and a data set we collected of college openings.
- Use college openings in the woman's county in the year in which she was 17 as an instrument for education.
- Examine the effects of college education on birth weight and inputs such as prenatal care and smoking.

College Openings Increase Education

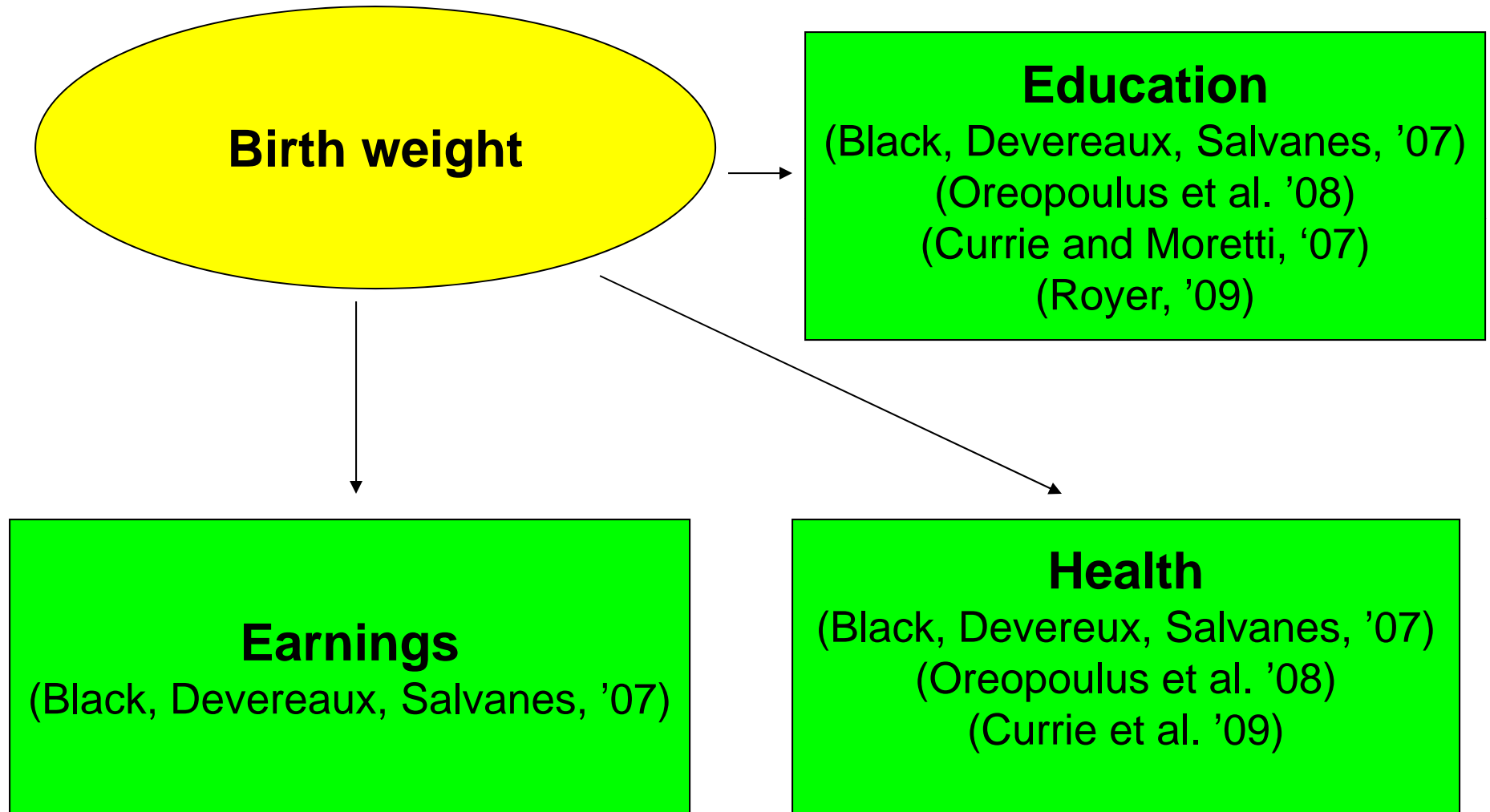


Avg. years education 1st time mothers 24+
Before & after opening of 4-year college

College education has large positive effects on maternal behavior and birth weight among whites



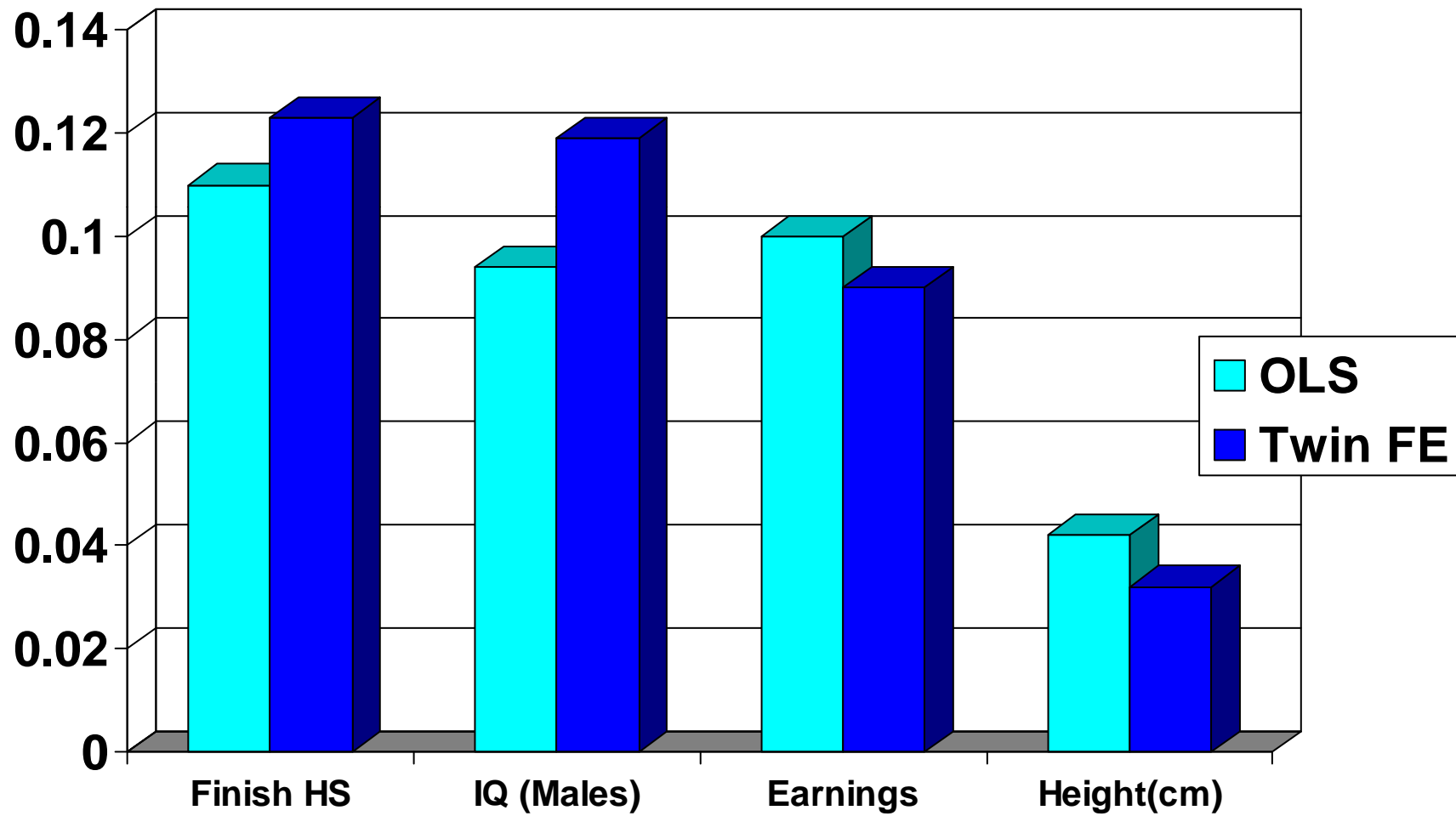
Large scale sibling studies link birth weight to positive adult outcomes



E.g. Black, Devereux, and Salvanes (2007)

- All Norwegian births from 1967-1997.
- Focus on twins.
- Match to Norwegian registry data for 1982-2002 (i.e. administrative records on educational attainment, earnings, etc.)
- For men, match to military records for 1984-2005 (IQ + height [for subset])

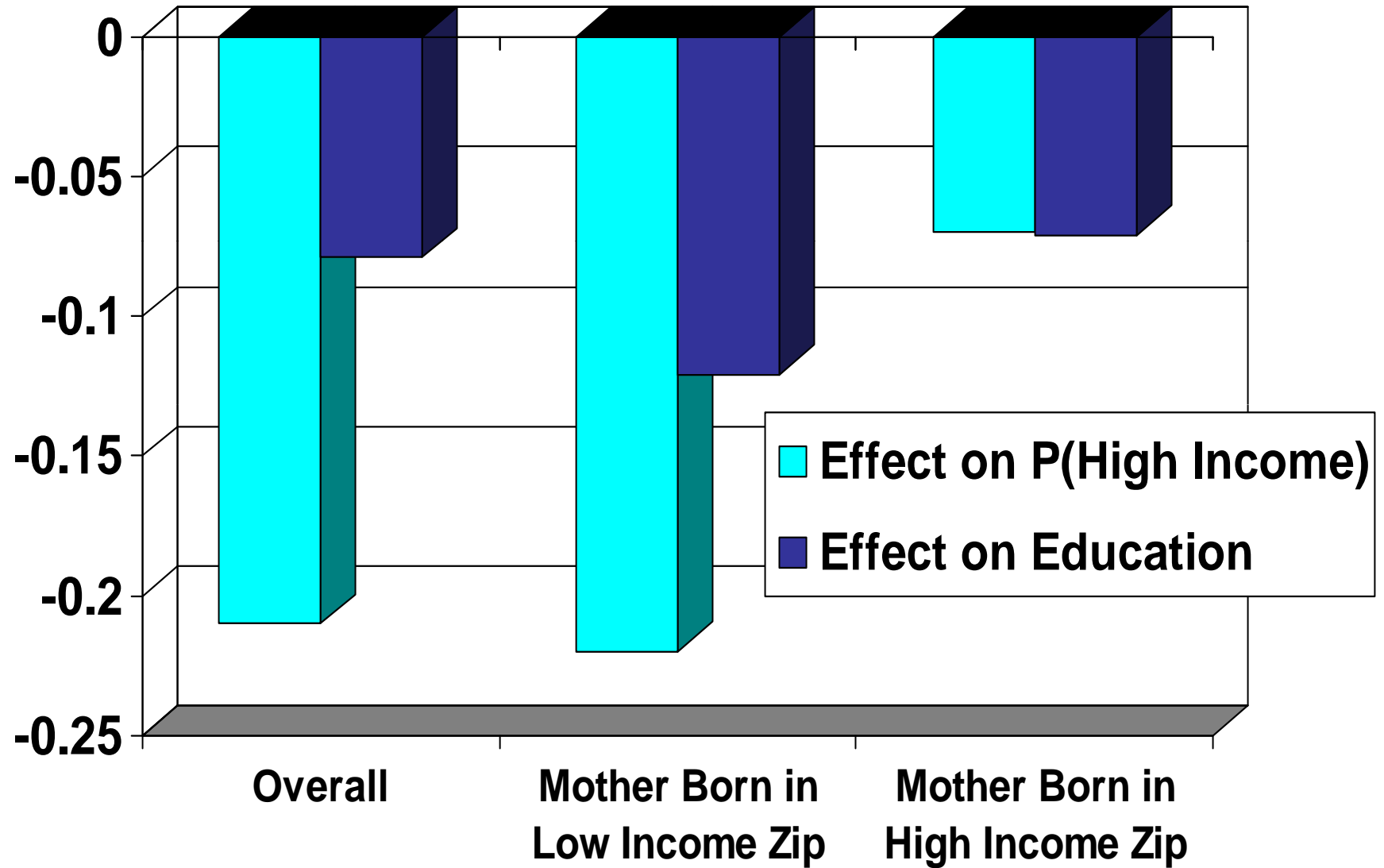
Estimated Elasticity of Outcome wrt to Birth Weight (data from Black, Devereaux and Salvanes)



Long term effects of Low Birth Weight are smaller for children of well off parents

- E.g. Currie and Moretti (2007) compare California mothers who were sisters.
- Women who were LBW got less education and were more likely to be low income (measured as living in a high poverty zip code) at the time of her own infant's birth.
- But effects smaller for women born in high income zip codes.

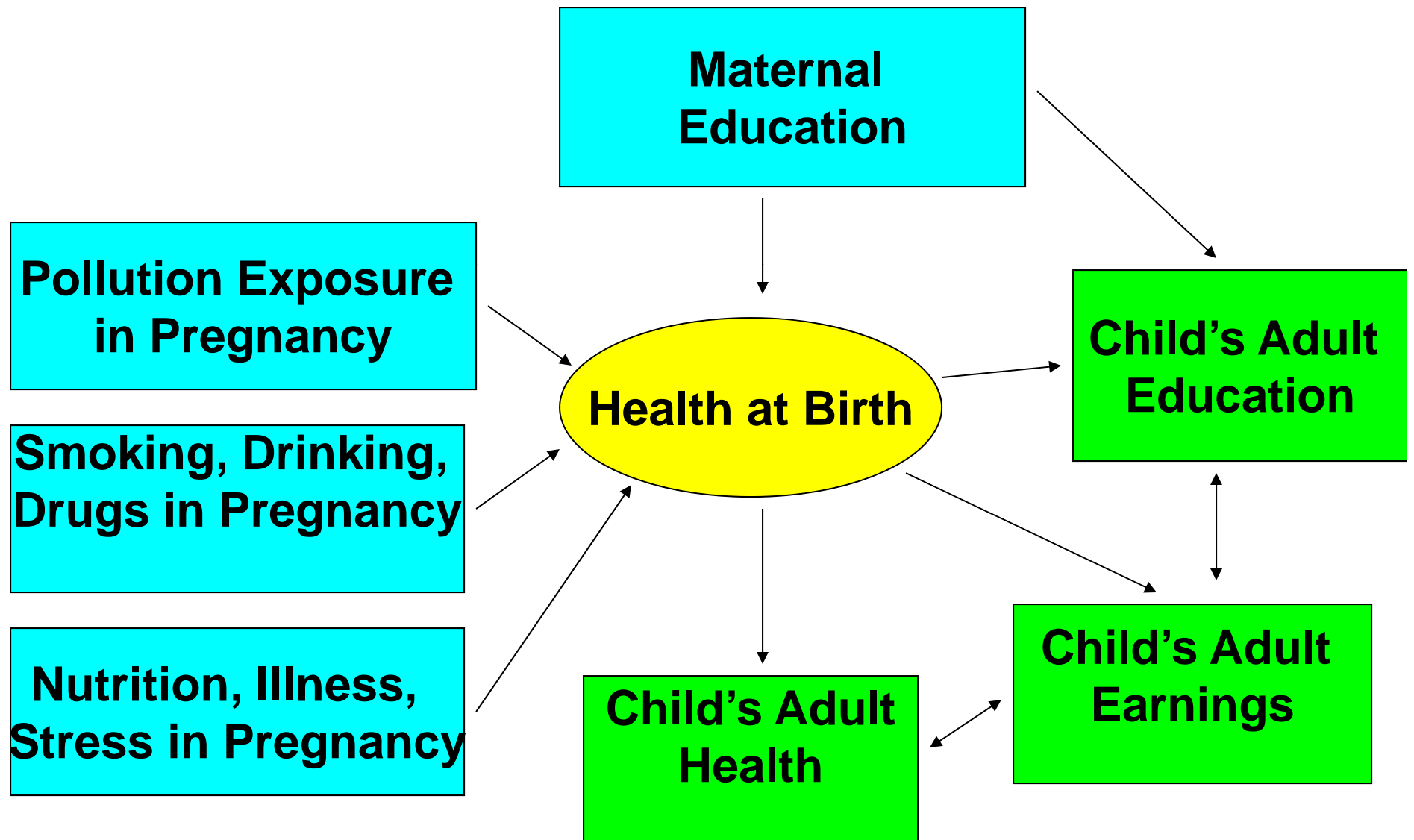
Effect of Maternal LBW on Mother's Adult Outcomes



Why might long-term effects be context specific?

- Depend on ability to remediate and resources available for remediation.
- Different propensities to invest in children with disabilities (e.g. cultural differences?).
- Differences in frequency, intensity, and type of insult.
- Possibility that insults interact.
- Effects depend on starting position on production function.

Prenatal Factors, Health at Birth, and the Child's Adult Outcomes



Better Data Might Help us Understand these Linkages

- Agreement on more subtle measures of health prior to birth, at birth, and in early childhood (subtle measures would help us make use of shocks which did not result in a great deal of mortality selection).
- Agreement on markers for fetal/early childhood “damage.”
- Data linking adult outcomes to conditions in early life at the individual rather than the cohort level.