Do Disparities in SES Cause Disparities in Child Health and Does it Matter?

Janet Currie

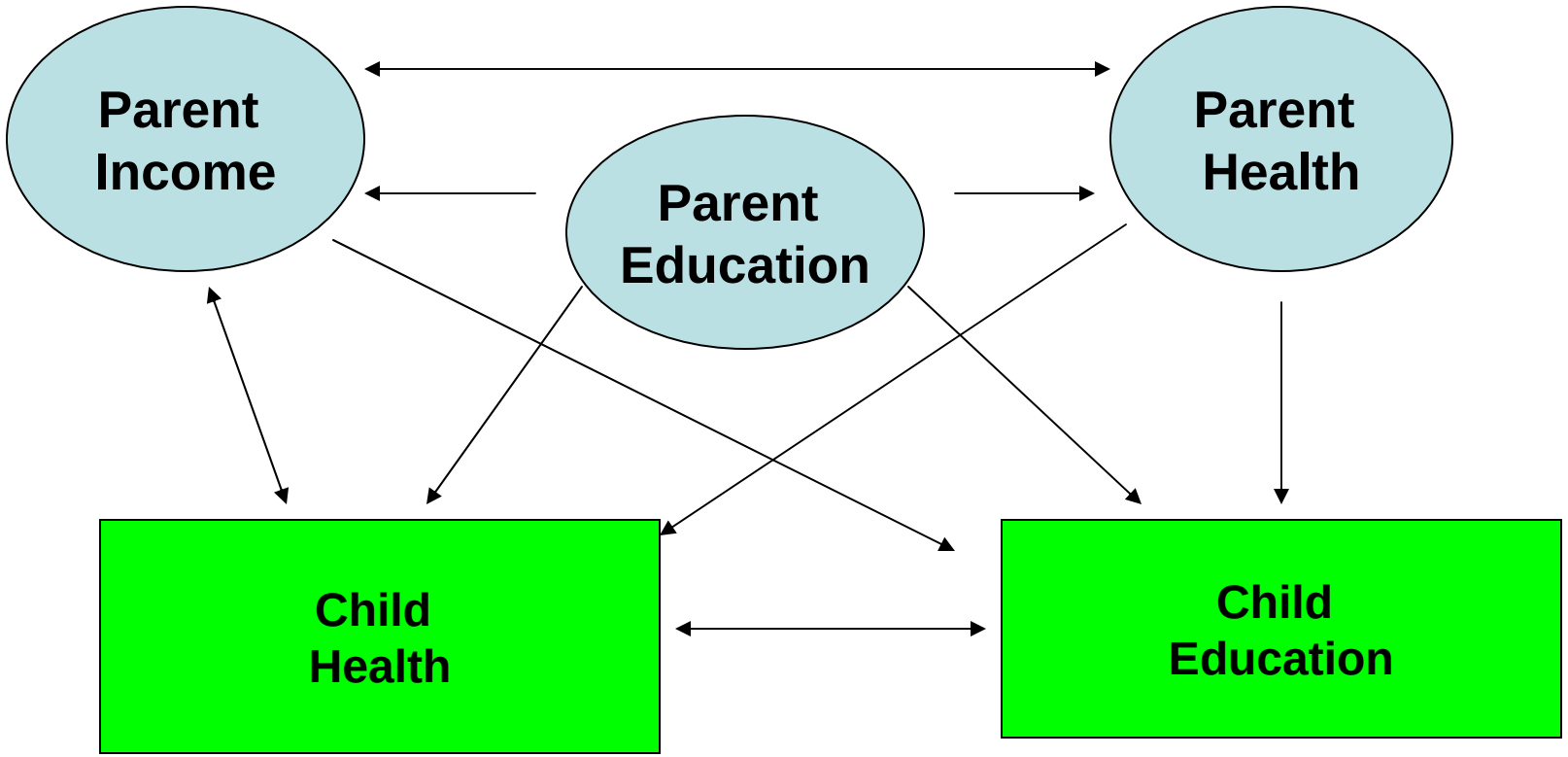
Everyone knows that children from “humble beginnings” are less likely to be successful in life.

But what are the mechanisms? Is it possible that health is a factor, even in rich countries like the United States?

It is not possible to answer this question definitively yet, but this essay examines two related questions:

- Does parental socioeconomic status have a causal effect on child health?
- What is the link between child health and future educational and labor market outcomes?

There are many ways for parent background to affect child outcomes



Parent Education and Income and Child Health

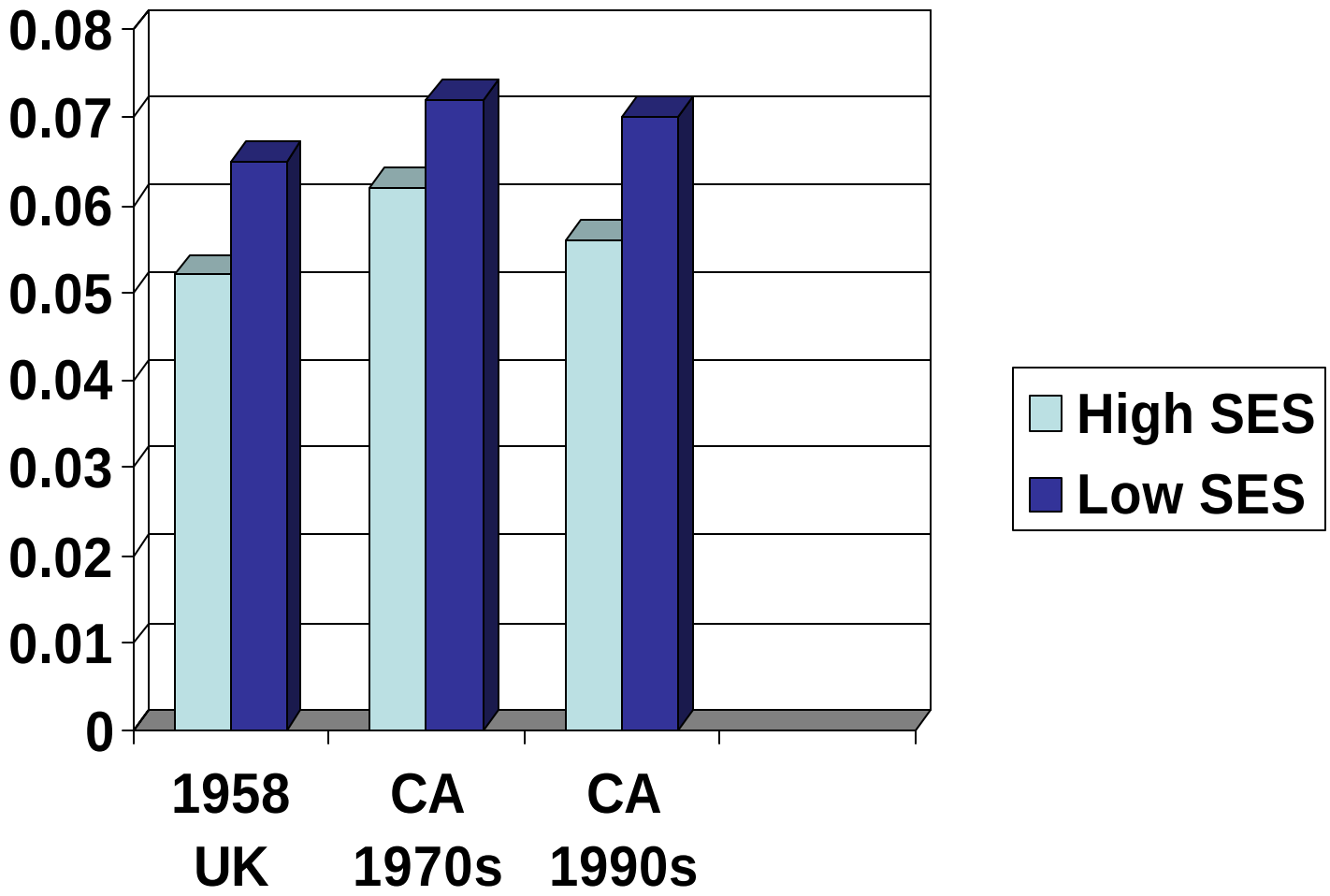
- Differences in child health are apparent at birth.

- e.g. in rate of low birth weight (birth weight less than 2500 grams).

- And initial differences in health grow over time.

SES Difference in Low Birth Weight

Note: In CA SES=zip income at birth, in UK SES defined using Father occupation.



Health of Poor vs. Non-Poor Children, 2001-2005 NHIS

	Poor	Non-Poor
Maternal Assessment of Child Health		
health is excellent/very good	0.700	0.869
AGE 2~3	0.746	0.901
AGE 4~8	0.725	0.873
AGE 9~12	0.682	0.870
AGE 13~17	0.661	0.853
Health at Birth		
Birth weight (grams)	3221	3348
Birth weight < 2500 grams	0.112	0.078
Ever Chronic Conditions		
Ever told Asthma	0.159	0.131
Ever mental problem[a]	0.119	0.079
Ever told ADHD, 2-17	0.071	0.060
Trouble hearing or seeing	0.076	0.053
Stuttering or stammering-past 12 mo.	0.026	0.012
Ever told heart problems	0.018	0.014
Ever told diabetes	0.002	0.002
Ever told had arthritis	0.002	0.001
Any of the above	0.324	0.265

Activity Limitations	**Poor**	**Non Poor**
Limit b/c of chronic conditions	0.114	0.070
AGE 2~3	0.061	0.037
AGE 4~8	0.097	0.062
AGE 9~12	0.139	0.087
AGE 13~17	0.141	0.078
Asthma/resp. prob causes limit	0.019	0.006
Mental problem causes limit[b]	0.062	0.035
ADHD causes limits	0.023	0.014
Hearing/vision causes limit	0.008	0.005
Speech problem causes limit	0.019	0.015
Illness and Medically Attended Injury		
Days missed illness/injury past 12 mo.	4.471	3.531
injured/poisoned requiring med.attention last 3 mo.	0.024	0.031
asthma attack past 12 m	0.073	0.057
ER due to asthma last 12 m	0.032	0.016
resp. allergy last 12 m	0.115	0.135
frequent diarrhea last 12 m	0.018	0.012
3+ ear infection last 12 m	0.072	0.056
# Obs.	7,363	36,858
# Obs. Representing	8,339,503	44,476,130

SOURCE: NHIS 2001-2005 Sample Children Files, Children 2-17

Child health on family income
1=excellent, 5=poor
U.S. National Health Interview Survey
Source=Case, Lubotsky, Paxson (2003)

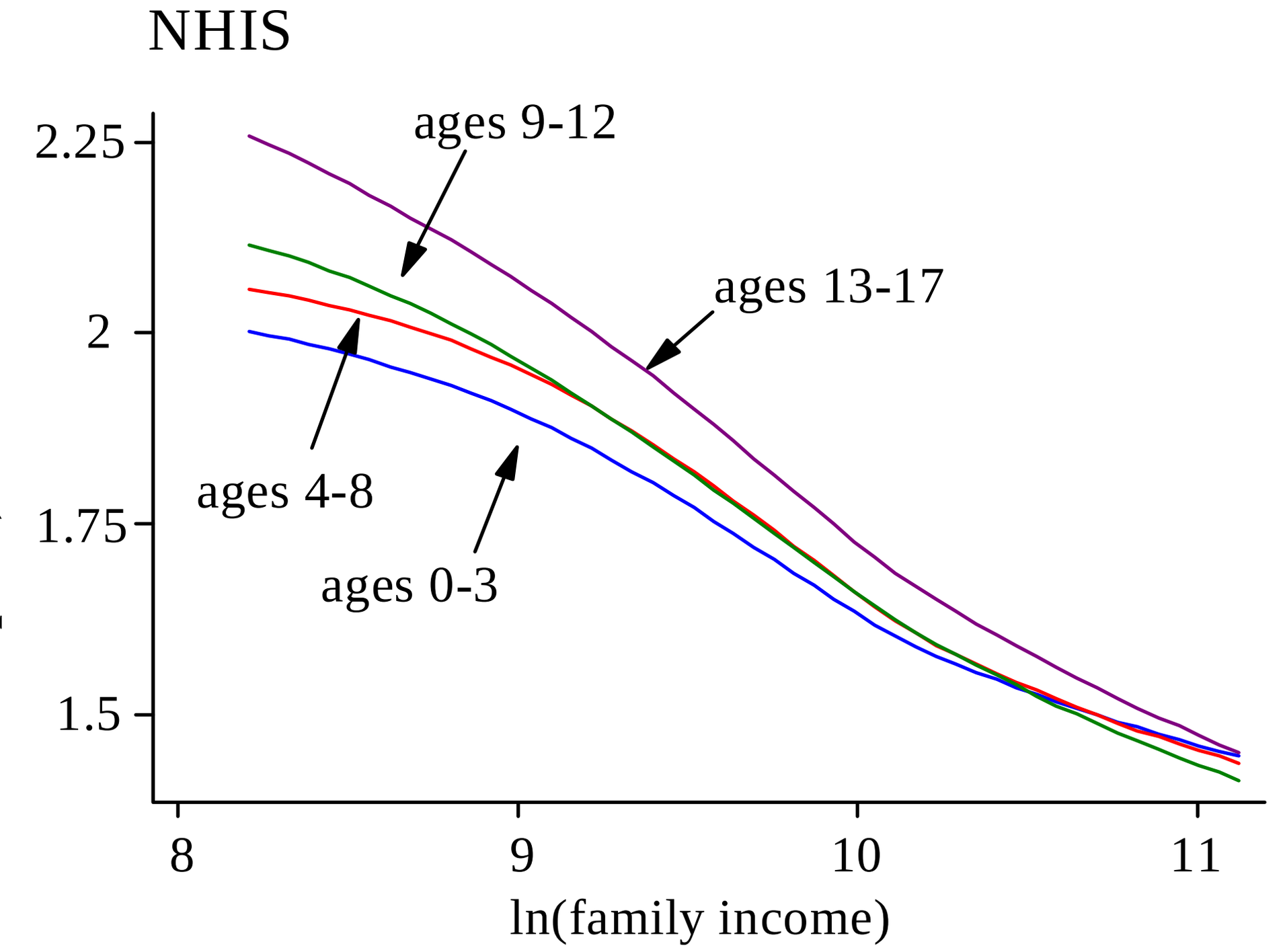


Table 1: The Steepening of the Health-Income Gradient with Child Age
A Comparison of the U.S., Canada, and the U.K.
Ordered Probits (1=excellent, 5=poor health)

Age:	**0 to 3**	**4 to 8**	**9 to 12**	**13 to 17 (15)**
U.S.: Case, Lubotsky, Paxson, NHIS				
Ln(Income)	-0.183	-0.244	-0.268	-0.323
	[.008]	[.008]	[.008]	[.008]
Canada: Currie and Stabile, NLSCY				
Ln(Income)	-0.151	0.216	-0.259	-0.272
	[.026]	[.019]	[.024]	[.040]
U.K.: Case, Lee, Paxson, HSE				
Ln(Income)	-0.143	-0.212	-0.203	-0.194
	[.036]	[.026]	[.030]	[.034]

Notes: Standard errors in brackets. Regressions control for year effects, family size, sex, mother age tat birth, father present, etc.

The similarities between Canada and the U.S. suggest that access to health insurance is NOT the driver for the steepening gradient.

In Canada, rich and poor children recover from any given diagnosis to about the same extent after four years.

The problem is that poor children are subject to more negative health events.

The data on insults to health are poor, and often not recorded in the same surveys that track measures of SES and/or child outcomes.

Possible measures include:

- injuries
- hospitalizations
- chronic conditions

Injuries (intentional and unintentional) are the leading cause of death among children 1-14 in developed countries.

But there is little information about injuries that do not lead to death, about gradients by SES (parent information is often not included on death certificates), or about effects of injuries on the outcomes of surviving children.

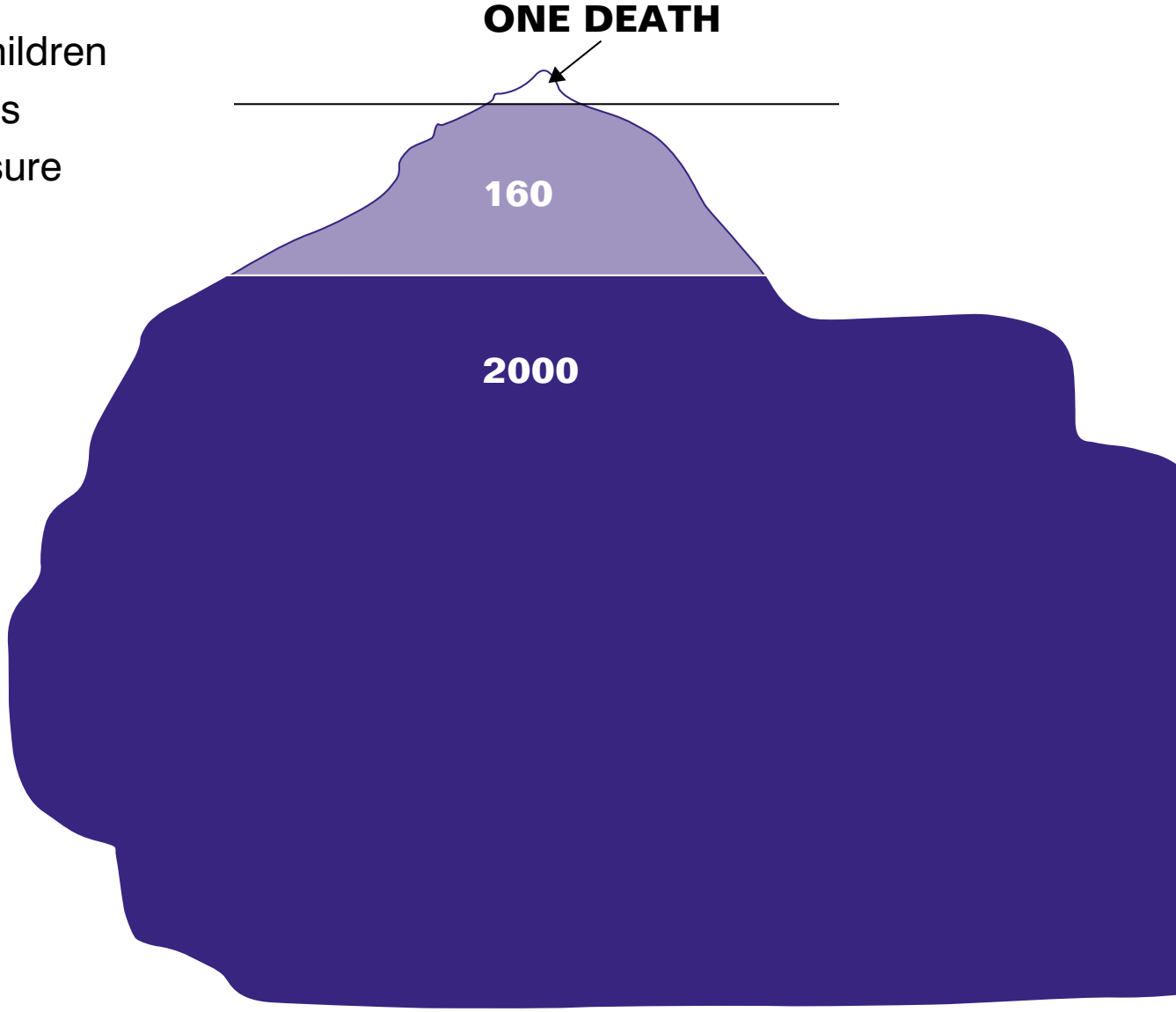
Deaths per 100,000 Due to Injuries
Children 1-14, 1991-1995

	Total Death Rate	Accidents as Share of Deaths (%)	Traffic Deaths	Boys Rate	Girls Rate
Sweden	5.2	33	2.5	5.9	4.4
UK	6.1	29	2.9	7.7	4.3
Italy	6.1	28	3.3	8.1	4.1
Netherlands	6.6	30	3.4	8.3	4.8
France	9.1	41	3.8	11	7
Canada	9.7	44	4.3	11.9	7.4
U.S.	14.1	49	5.8	17.5	10.4

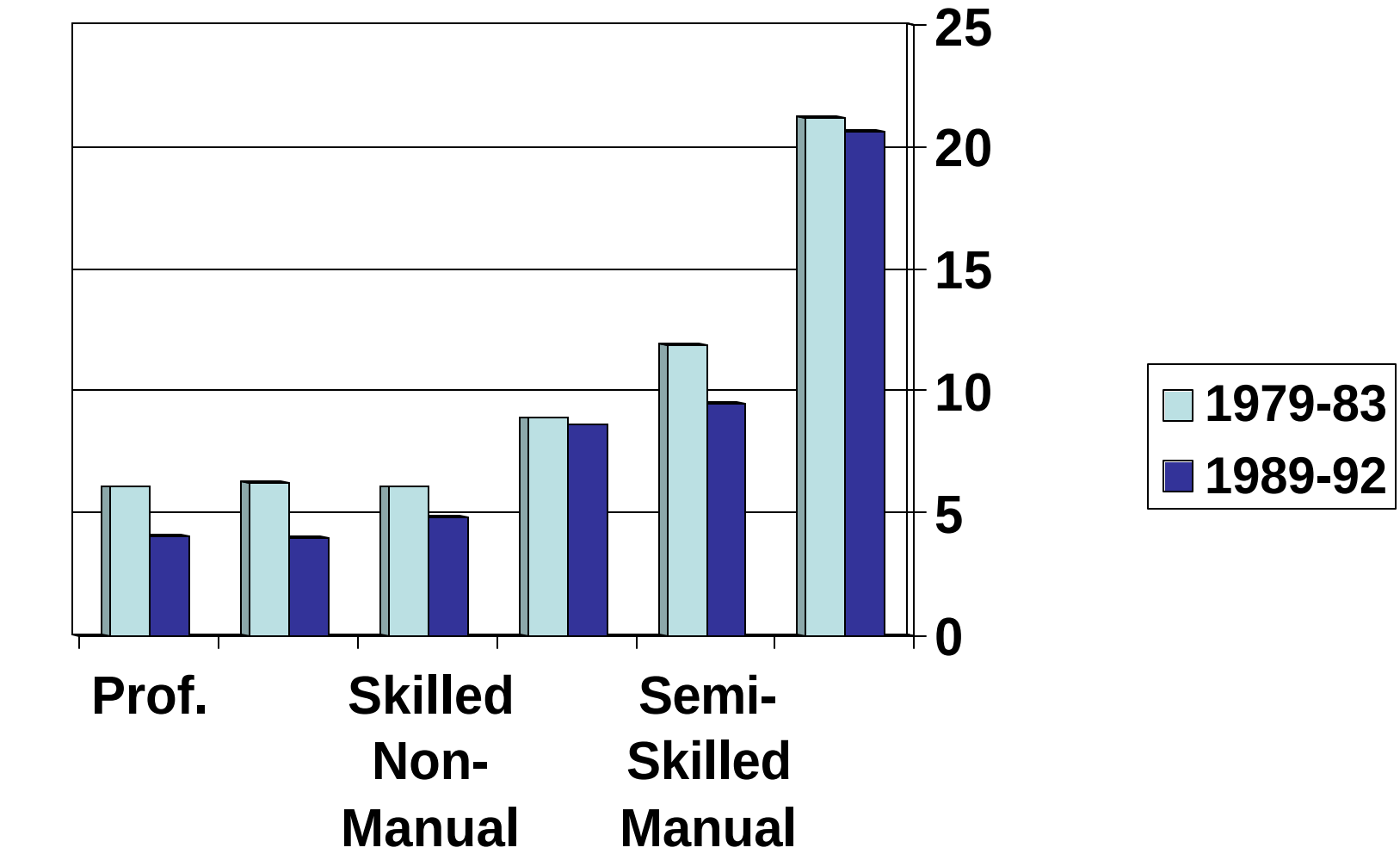
Source: Unicef, 2000.

For every one death among children aged 0 to 14 in the Netherlands during 1991-95 (home and leisure accidents) there were:

- 160 hospital admissions
- 2,000 accident and emergency department visits



Parental Occupation and Child Injury Deaths per 100,000 Children 0-15, England and Wales



Source: Unicef, 2000

Hospitalizations and chronic conditions are subject to reporting biases.

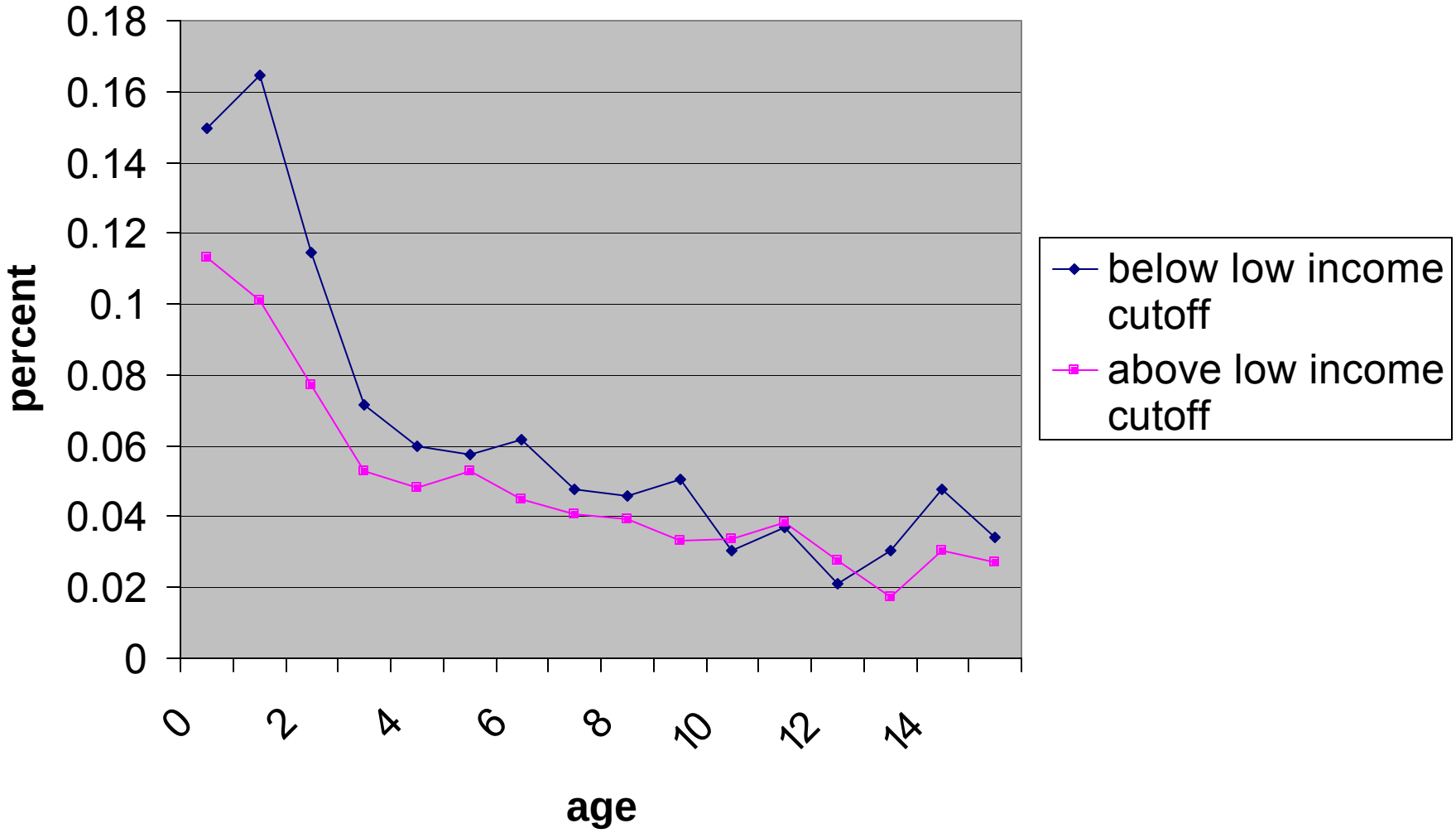
- e.g. in the U.S., children with better insurance or more likely to be hospitalized other things being equal. In countries with universal health care, more educated parents are still more likely to seek care for given conditions.

- one important exception may be mental illness, where higher SES parents may be more able to avoid the stigma of diagnoses by finding alternative ways to deal with their child.

- if parents do not seek care for child conditions, then chronic conditions may not be diagnosed.

- age patterns may be particularly sensitive to reporting biases if many conditions are diagnosed at school entry.

NLSCY (Canada): Hospitalizations by SES



Why Might Parental SES Affect Child Health?

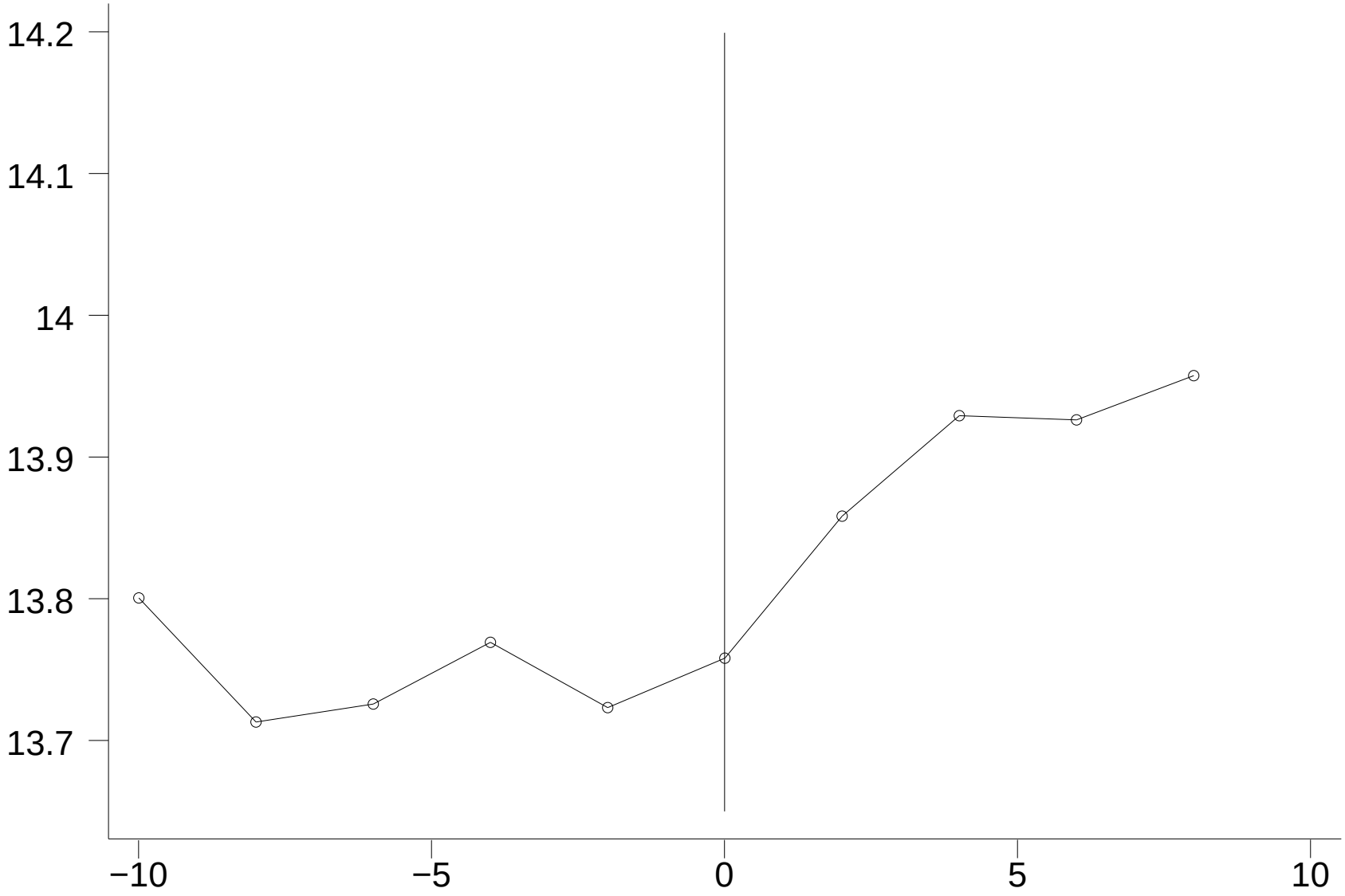
The standard “Grossman” model of parental investment in child health suggests two reasons:

1. Budget constraints are less binding in wealthy families, so they can purchase better health “inputs”.
2. Parents of lower SES may be less able to “produce” child health given the same inputs.
3. Children of lower SES parents may have lower health endowments (note, this may be true even among children with identical genetic enowments).

Do Correlations Imply Causality?

- third factors may be important. E.g. poor children may have parents who are in poor health and who therefore have low earnings (or poor child health may cause low earnings, though evidence for this is weak).
- relatively few papers attempt to get at causality. Many shocks to parental SES could have direct effects on children's health.

Currie and Moretti (2003) document a large increase in the number of colleges between 1960 and 1980, which increased college going among white women. This increase improved birth outcomes, through many channels, including a reduction in smoking.



Avg. years education 1st time mothers 24+
Before & after opening of 4-year college
Source: Currie and Moretti, 2003

The Effects of Mother's Education on Infant Health
Data=U.S. Vital Statistics, IV Estimates Using College Openings as IV. Mother's 24-45 years old at time of birth.

	Coeff. Estimate	Mean of Dep. Var.
1. Low Birth Weight	-0.0098	0.049
	[.0038]	
2. Preterm Birth	-0.01	0.069
	[.0044]	
3. Prenatal Care 1st trimester	0.0234	0.921
	[.0055]	
4. Smoked During Pregnancy	-0.0583	0.078
	[.0118]	

Notes: Std. errors in brackets. Models include mother age, cohort, county*year-of-child's birth. Each row is from a separate regression.

Source: Currie and Moretti, 2003.

Effects of maternal income on child health

Berger, Paxson, and Waldfogel (2006) use Fragile Families data. Show that parenting skills and physical aspects of home environment are strongly related to income. However, effects are small enough that bringing a family up to the poverty line would have little impact, even if effects were causal.

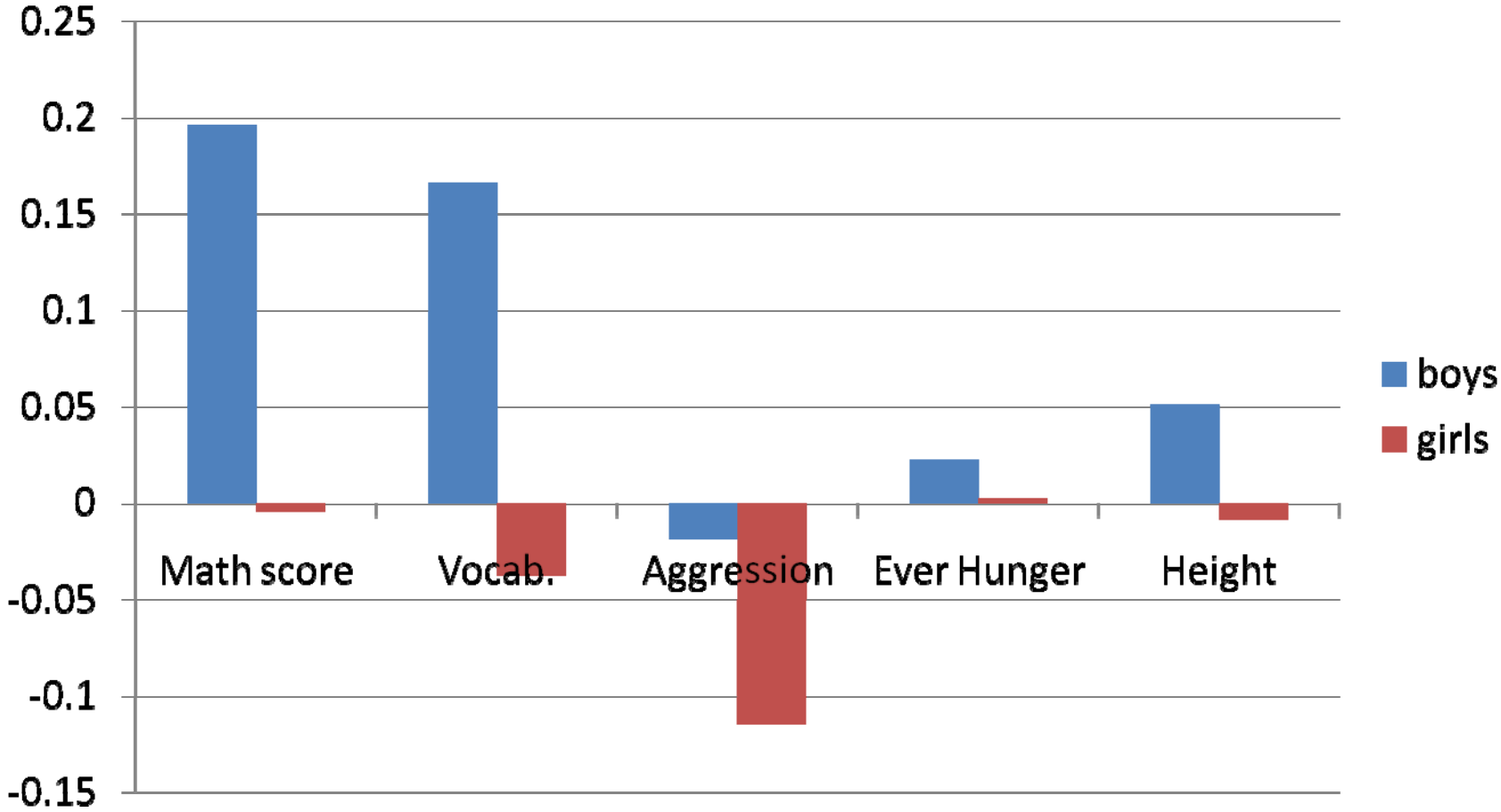
Berger, Propper, and Riggs (2006) use the Avon birth cohort study and a reach similar conclusions. The mother's own health appears to matter more for child health.

Conley and Bennett (several studies), Johnson and Schoeni (2007) use PSID & sibling design. Find positive effect of income on birth weight when mother was low birth weight.

Milligan and Stabile

- Canadian NLSCY 1994-2005
- Use variation in child benefits over time and province as IV
- An increase of $1000 in benefits leads to 1.5% reduction in learning disability (mom<HS); 3.6% decline conduct disorders; 4.3% decline in maternal depression (11.6% if mom<HS).
- Larger effects on education for boys, larger impacts on mental health for girls.

Milligan and Stabile show significant effects of child benefits on outcomes if mothers <=HS



Currie and Moretti (2007) show that mothers born in poor areas are more likely to be low birth weight, and more likely to later give birth to low birth weight babies than their own sisters who were not born in poor areas.

Effect of Mother's Low Birth Weight and Income at Time of Own Birth on Mother's Education at Time of her Child's Birth - California

	All OLS	All - Fixed Effects	White OLS	White FE	Black OLS	Black FE
Outcome=Mother's education at time of child's birth in years.						
Mom's Birth SES	0.017	0.007	0.02	0.008	0.011	0.009
(1000's $)	[.001]	[.001]	[.001]	[.001]	[.001]	[.002]
Mother LBW	-0.214	-0.097	-0.229	-0.092	-0.207	-0.114
	[.007]	[.008]	[.008]	[.009]	[.013]	[.016]

Notes:
Mom SES @ birth = median family income in zipcode of hospital of birth.
Mean (std.) are $10,096 (3,254) in $1970.
All regressions include race, year of child's birth, mother's age, and parity of the child.
Standard errors in brackets.
Source: Currie and Moretti, 2005

MTO (Orr et al., 2003) shows positive effects of moving away from a poor area on the mental health of girls (but not on any measure of the health of boys).

Van Den Berg, Lindeboom and Portrait (2007) use administrative data from the Netherlands and show that children born just after a recession were 7 percent more likely to die before one year than children born just prior to a recession.

Effects of Child Health on Future Outcomes – Why Might Child Health Affect Future Outcomes?

1. Poor health in childhood often leads to poor health in adulthood. E.g. Bozzoli, Deaton, and Quintana-Domeque (2007) find that in rich countries, cohorts with high disease burdens in childhood have higher death rates in adulthood. (In poor countries, selection causes the relationship to be reversed).

Also, fetal origins hypothesis.

2. Poor health in childhood may impede the acquisition of skills.

Using data from the 1999 PSID, James Smith shows that a retrospective question about health during childhood is remarkably predictive of future outcomes.

(What was your general health status when you were <=16 years old? 1=excellent, 5=poor)

Predicting Adult Education and Earnings Using Child Health.
PSID 1999, 25-47 Year Old Children of Original Respondents

	OLS Education	Sib-FE Education	OLS Ln(Earnings)	Sib-FE Ln(Earnings)
Health in Childhood	0.356	0.111	0.138	0.251
Excellent/Very Good	[4.40]	[1.12]	[3.07]	[3.69]
Parent's Income 1-16	0.01	…	0.002	…
	[10.7]		[4.29]	

Source: Smith (2005). Models also control for mother and father education, race/ethnicity, age, age squared.
Age 1999 squared. T-statistics in brackets. Income in $10,000.

So child health may have a significant effect on future outcomes.

But can we identify specific health conditions that have negative effects on future outcomes?

Many studies examine the long term effects of low birth weight.

Currie and Hyson (1999), Currie and Thomas (2001), Case, Fertig, and Paxson (2005) use data from the 1958 British Birth Cohort Study

- all children born in one week in March 1958
- followups at 7, 11, 16, 23, 33, 44
- detailed measures of family background, school quality.

Effects of Low Birth Weight on Math Scores at Age 7 (z-scores) in the 1958 British Birth Cohort Data

	Males	Females
LBW	-0.21	-0.21
	[.081]	[.075]
High SES	0.078	0.14
	[.033]	[.034]
Low SES	-0.016	-0.078
	[.033]	[.034]

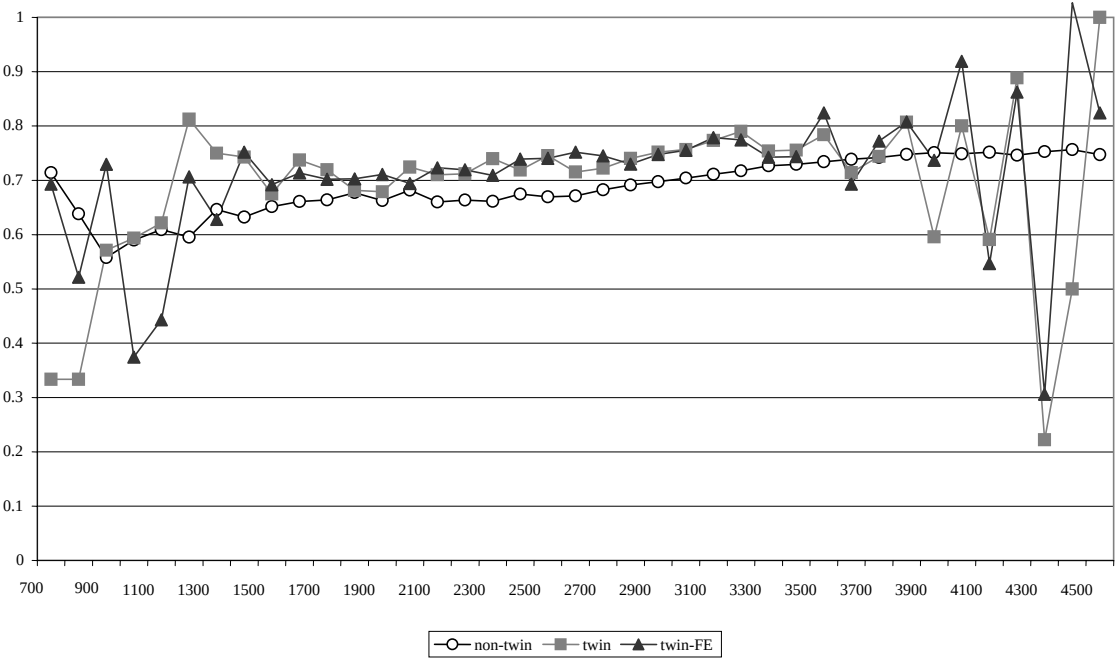
Notes:
High SES is defined as before. Low SES is semi-skilled manual or low-skilled father.
Source: Currie and Hyson (1999)

Several more recent studies use large “registry” data sets to try to get at the causal effects of birth weight by comparing twins or siblings (following an earlier twins study by Behrman and Rosenzweig, 2004).

Black, Devereux, and Salvanes, 2005 examine Norwegian twins. Find that twin FE models are similar to OLS: A 10% increase in birth weight leads to a 1 percentage point increase in the probability of graduating high school and a 1 percent increase in earnings.

Effects are surprisingly linear.

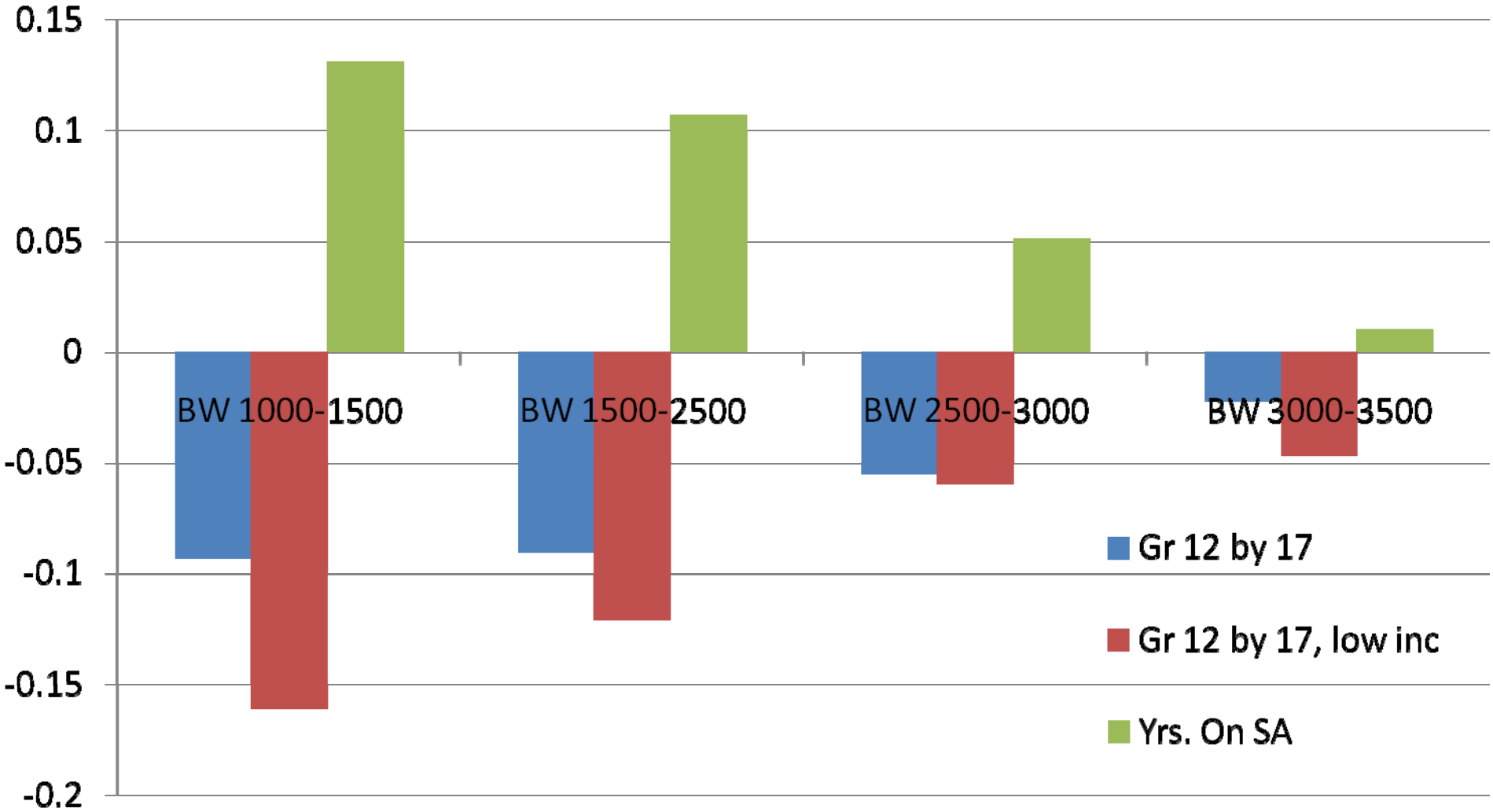
Figure 11
High School Graduation by Birth Weight



Oreopolous, Stabile, and Wald (2006) use similar data from the Canadian province of Manitoba. Find that sibs 1500-2500 grams are 8% less likely to reach grade 12 by age 17 than sibs who weighted over 3500 grams.

Royer (2005) examines birth certificate data for California. We know mother's education at the time she gave birth. If the mother was born in CA, we can locate her own birth certificate to find out her birth weight. Royer examines mothers who were twins. She finds that for each 1000 grams of birth weight there is a gain of .16 years of education.

Oreopoulos, Stabile, Wald, and Roos examine health at birth and long term outcomes in Manitoba



Birth weight is one indicator of health conditions before birth.

Another approach is to identify sharp systemic shocks to fetal health and then examine the long term effects by following cohorts. E.g. Dutch hunger winter has been linked to disorders of the central nervous system, heart disease, and anti-social personality disorders among affected cohorts.

Almond and Mazumdar (2005) use SIPP data to show that children of mothers infected by the influenza epidemic of 1918 were more likely to suffer schizophrenia, diabetes, and stroke as adults.

Almond (2006) examines educational outcomes, showing that these cohorts were 15% less likely to graduate from high school, and that wages of affected men were reduced by 5-9%.

These are large effects!

Aside from low birth weight, there has been little study of the long term consequences of other specific health conditions.

Longitudinal data suggests that they could be important.

E.g. Case, Fertig, and Paxson use data from the 1958 British Birth Cohort to examine associations between various health problems in childhood and future educational attainments.

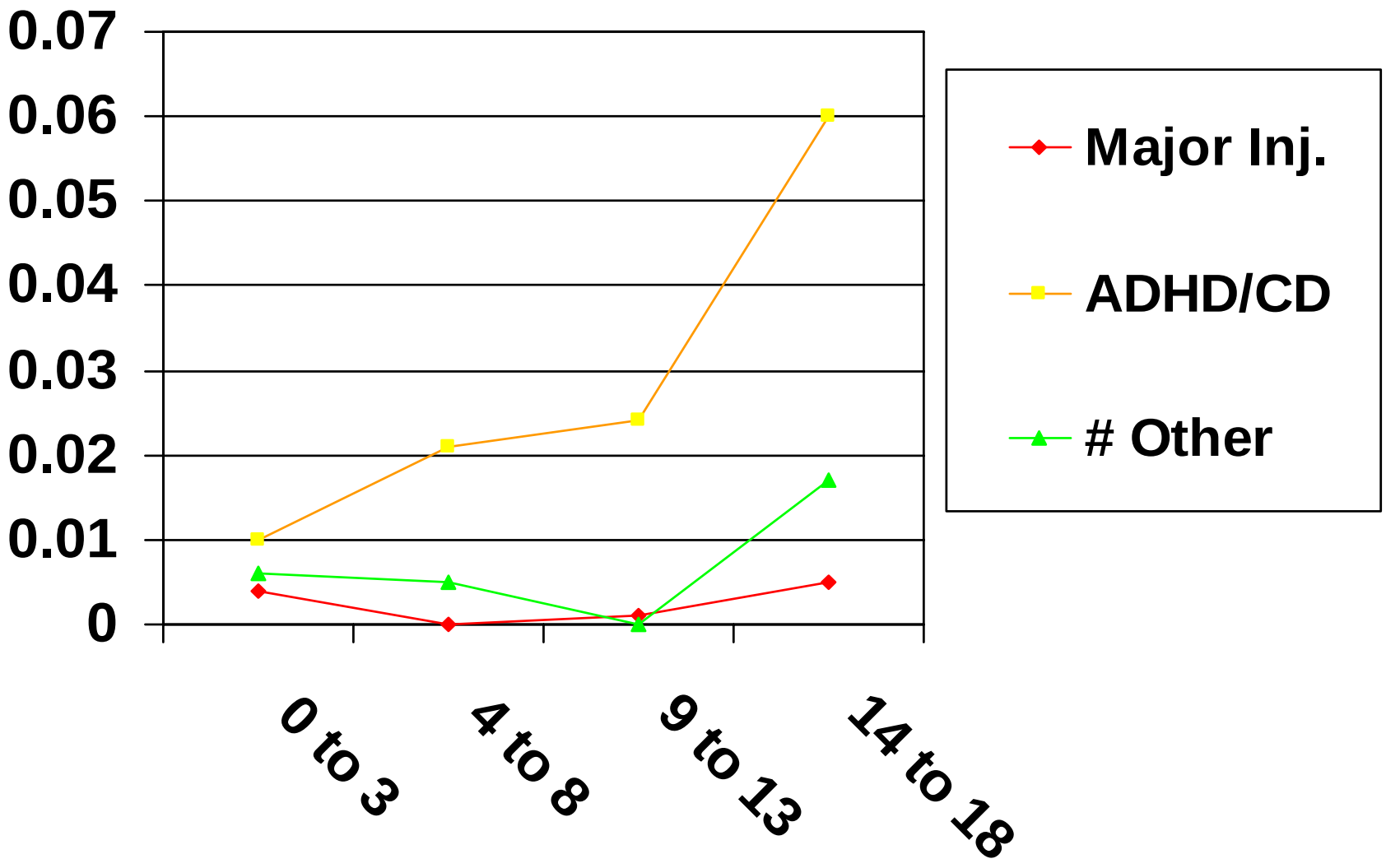
Currie et al. (2009) examine claims data from Manitoba Canada matched to social assistance records.

Examine the effect of child health problems at 0-3, 4-8, 9-13, 14-18 on the probability of receiving SA in 70 weeks after turning 18.

Estimate sibling fixed effects models.

Compare the impact of different types of conditions.

Figure 1: Coefficients on Social Assistance for each Condition and Age



Some Interim Conclusions:

Disparities by Race, Income, Education, (etc.) are present at birth and grow as children age.

Parental SES has a causal effect on children's health.

In turn, childhood health problems predict future outcomes. This is particularly true of problems present at birth and child mental health problems.