Institute for Fiscal Studies

IFS Annual Lecture 2018

Professor Janet Currie: Life, Death, and Mental Health: How Access to Care Helps Children Succeed

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Life, Death, and Mental Health: How Access to Care Helps Children Succeed

Janet Currie

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Overview

- Inequality in mortality in the U.S. *declined* among children and approached the low levels seen in countries such as Canada.
- The U.S. expansion of public health care for pregnant women and children is likely responsible for much of this improvement, and provides a case study of how increasing access can improve health long-term.
- Improved mental health may be an important mechanism driving better outcomes in surviving children.

Research Highlights Stalling Life Expectancy and *Increases* in Inequality in Mortality

There has been a great deal of research and publicity about stalling life expectancy and *increases* in inequality in life expectancy and mortality over the past 20 years (Chetty et al. 2015; Lee et al. 2015; Case/Deaton 2015, 2017).

Most of this literature focuses on adults.

Most focuses on non-hispanic whites.

Disparity in Life Spans of the Rich and the Poor Is Growing, SABRINA TAVERNISE NYT FEB. 12, 2016

Patients at the Free Clinic in Newton, N.J. Researchers debate whether expanding access to health care will shrink the gap in life expectancy between the rich and the poor.
Credit Joshua Bright for The New York Times

Currie and Schwandt (2016a,b) look at *all* deaths at *all* ages

- Every death is associated with a place. We can rank places from richest to poorest.
- In contrast, ranking people by earnings or education creates a selected sample because not everyone has these measures in every period.
- Selection can change over time.
- Problematic for children, the disabled, and those with weaker labor force attachment (women?).

Currie and Schwandt (2016a,b)

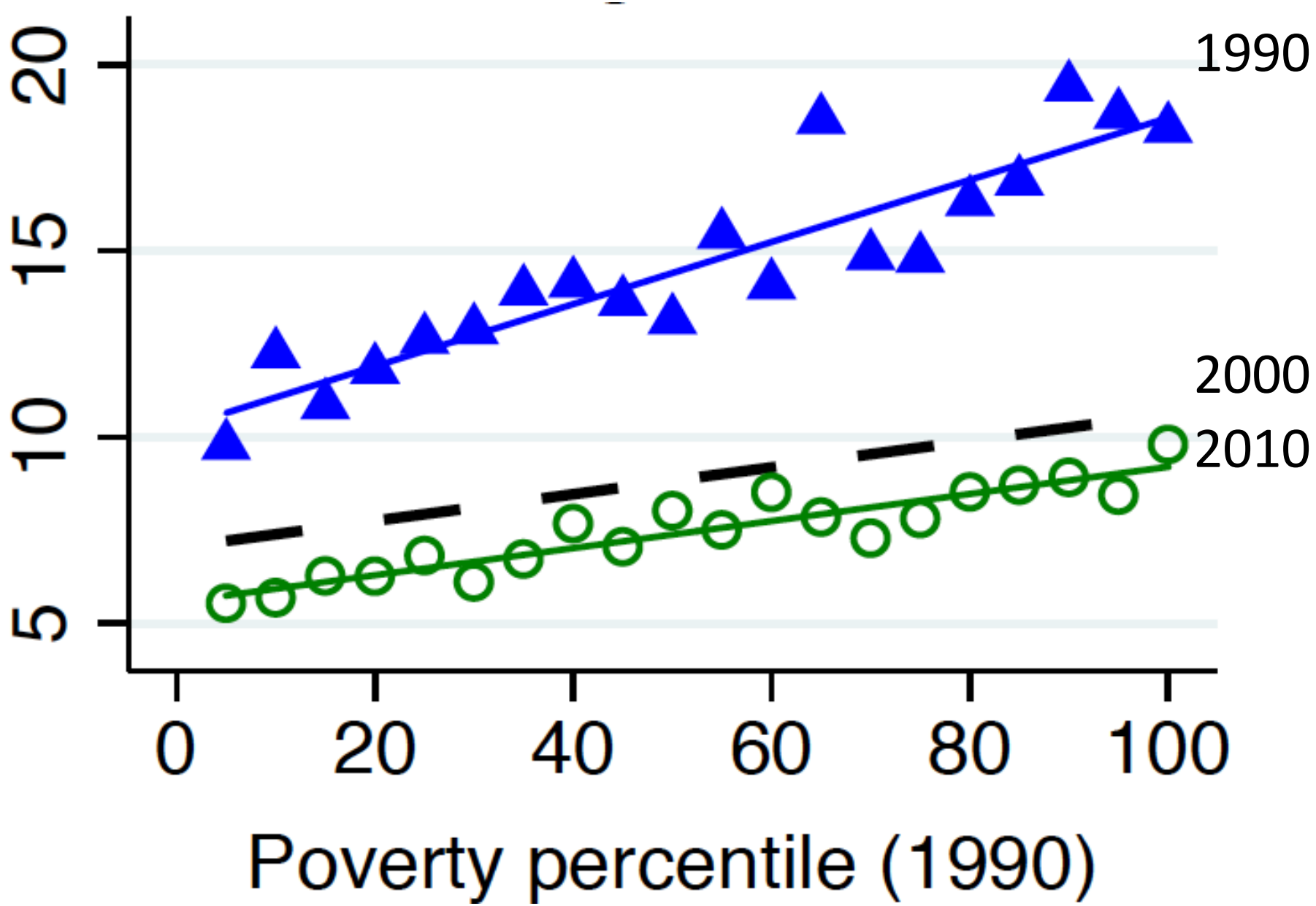
Rank U.S. counties from richest to poorest.

Group counties into "bins" representing ~5% of the population separately for 1990, 2000, and 2010.

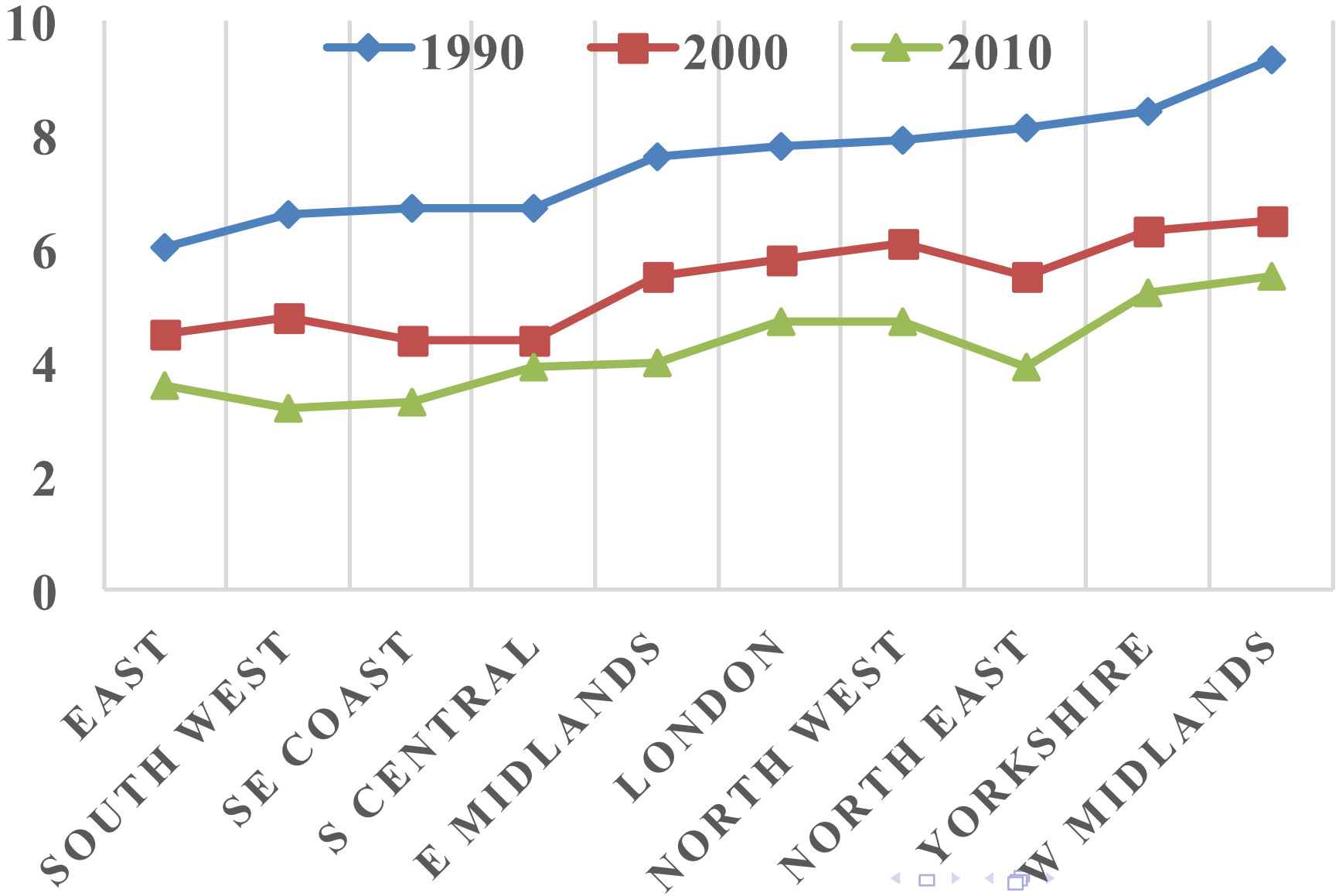
In each Census year, compare mortality in different groups, e.g. those representing the top and bottom 5% of the population.

This way, results are not affected by declining population in depressed areas, or growing population in thriving areas.

Male U.S. Infant Mortality by County Poverty Percentile (lower and flatter is better!)

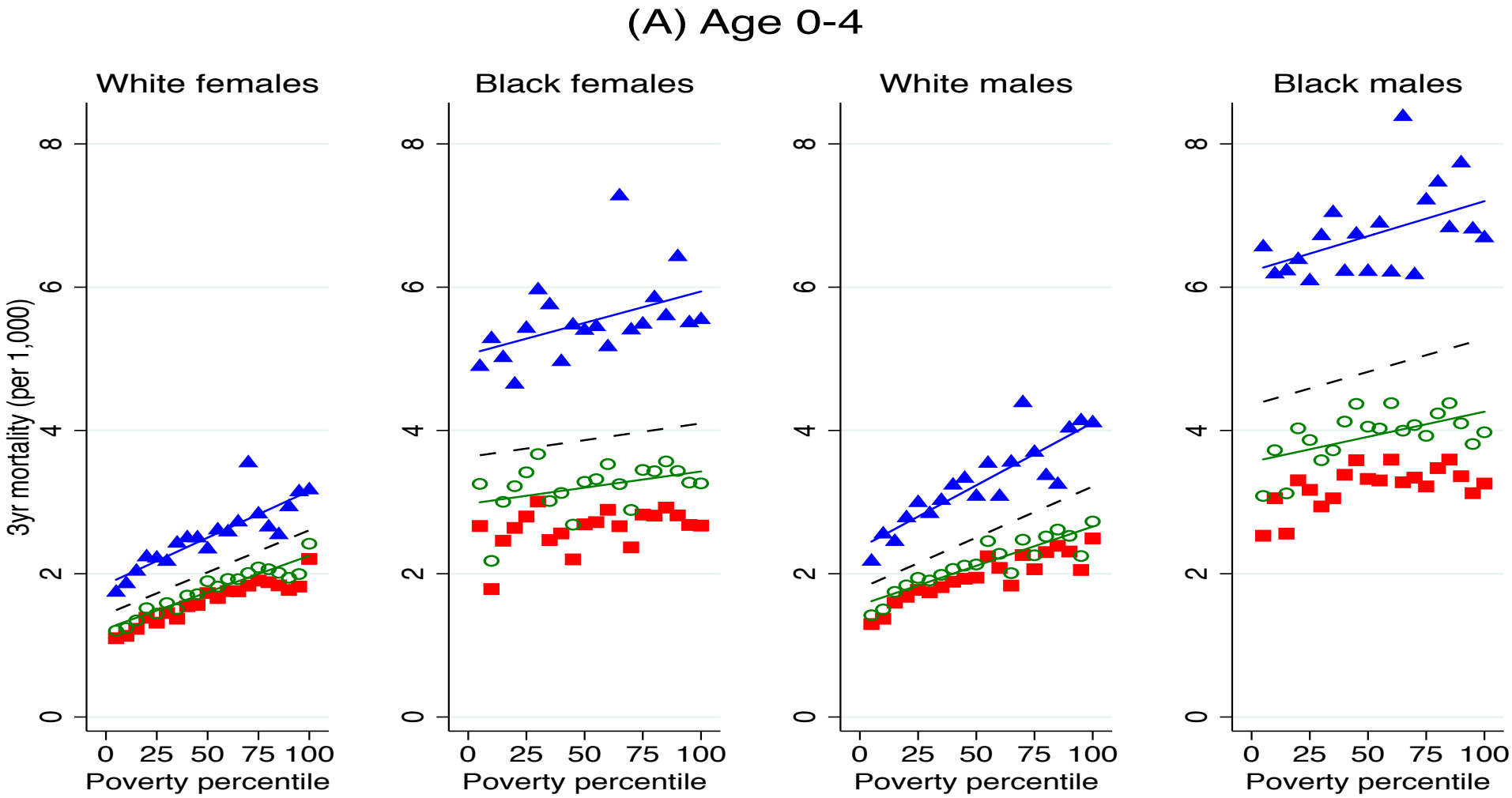


English Infant Mortality, by Health Authority



U.S. 3-Year Mortality Rates by Race and Gender, County Groups Ranked by Poverty Rates

(Blue=1990, Green=2010, Red=2010 multi race)



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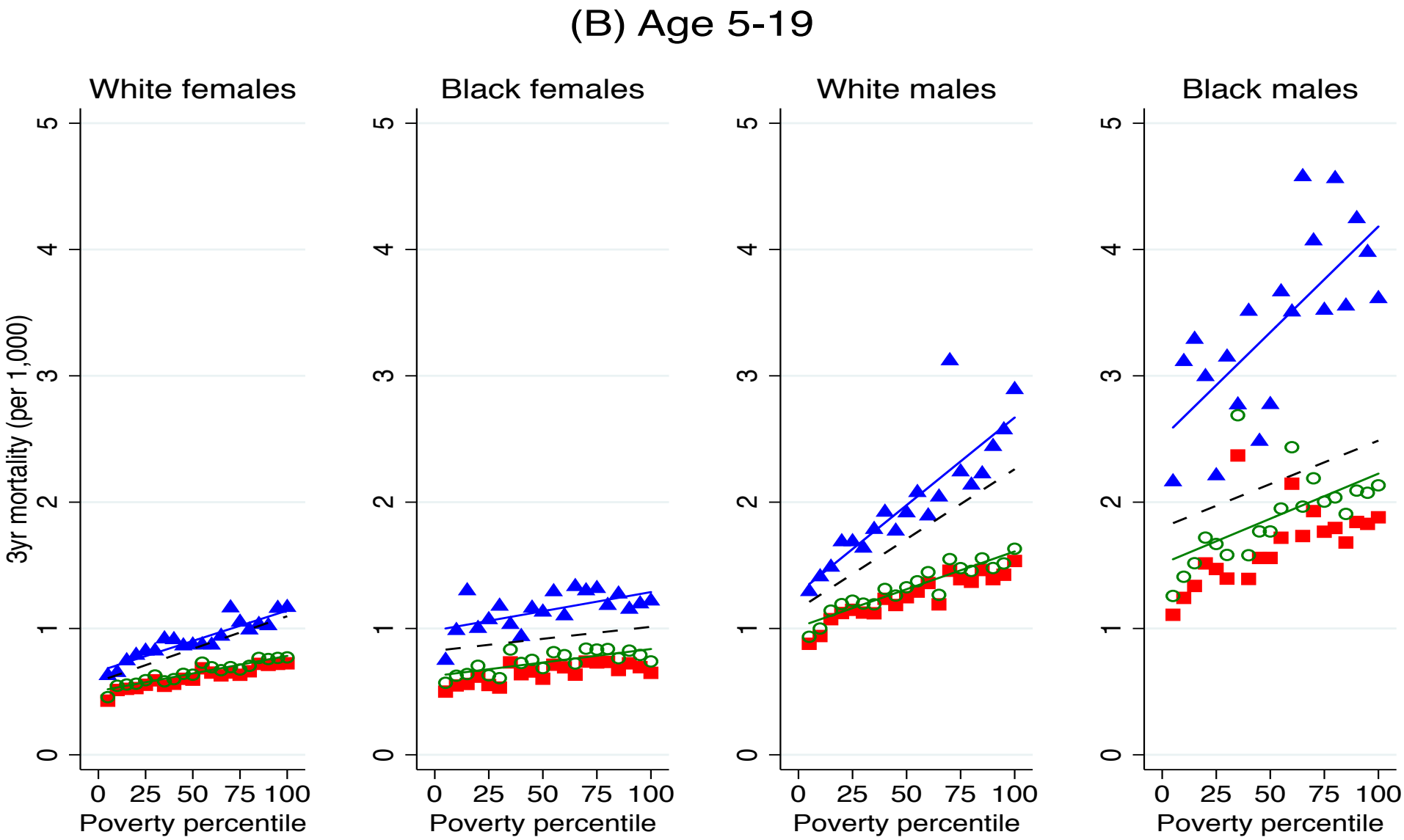

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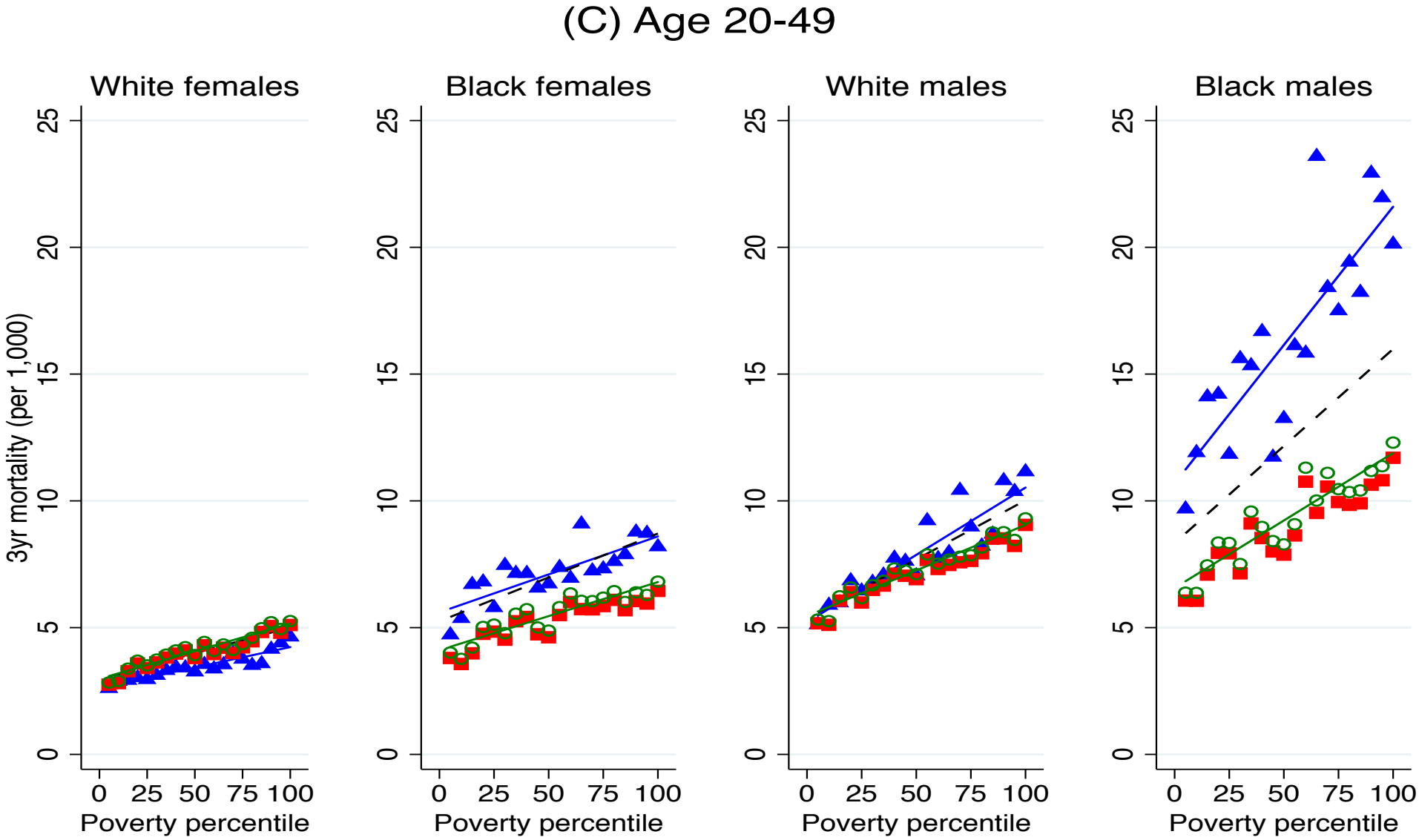

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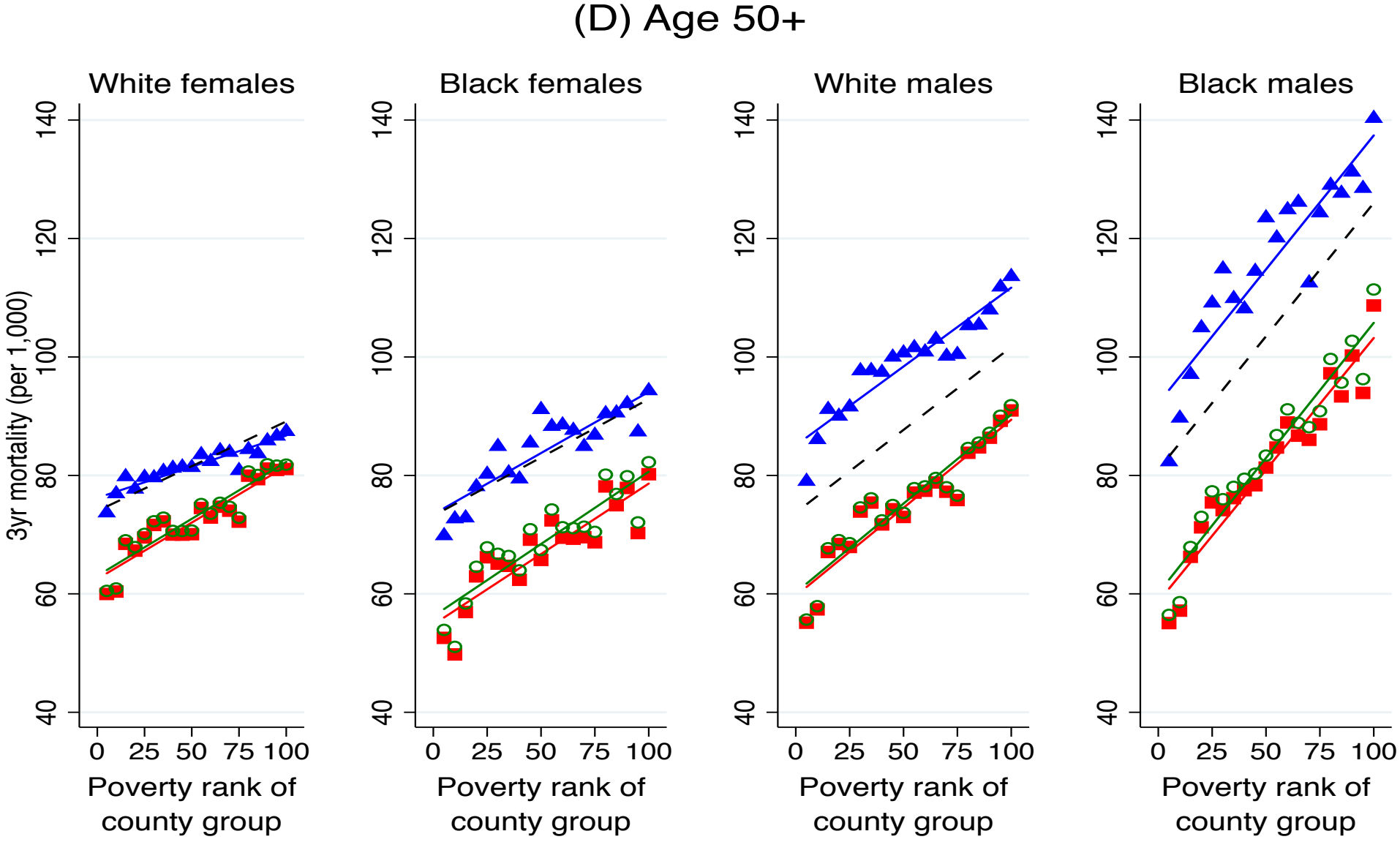


Male Mortality Gradients by 5-Year Age Categories - Children

Age Category	1990	2010	P-value of difference
<1	.083	.036	<.001
1-4	.008	.003	<.001
5-9	.004	.002	<.001
10-14	.009	.004	<.001
15-19	.031	.010	<.001
20-24	.034	.005	<.001

Female Mortality Gradients by 5-Year Age Categories - Children

Age Category	1990	2010	P-value of difference
<1	.071	.032	<.001
1-4	.005	.003	<.001
5-9	.003	.001	.003
10-14	.003	.002	.049
15-19	.006	.002	<.001
20-24	.009	.001	<.001

Male Mortality Gradients by 5-Year Age Categories - Adults

Age Category	1990	2010	P-value of difference
25-29	.051	.018	<.001
35-39	.080	.038	<.001
45-49	.120	.095	.035
55-59	.196	.187	.602
65-69	.229	.268	.192
75-79	.195	.320	.025

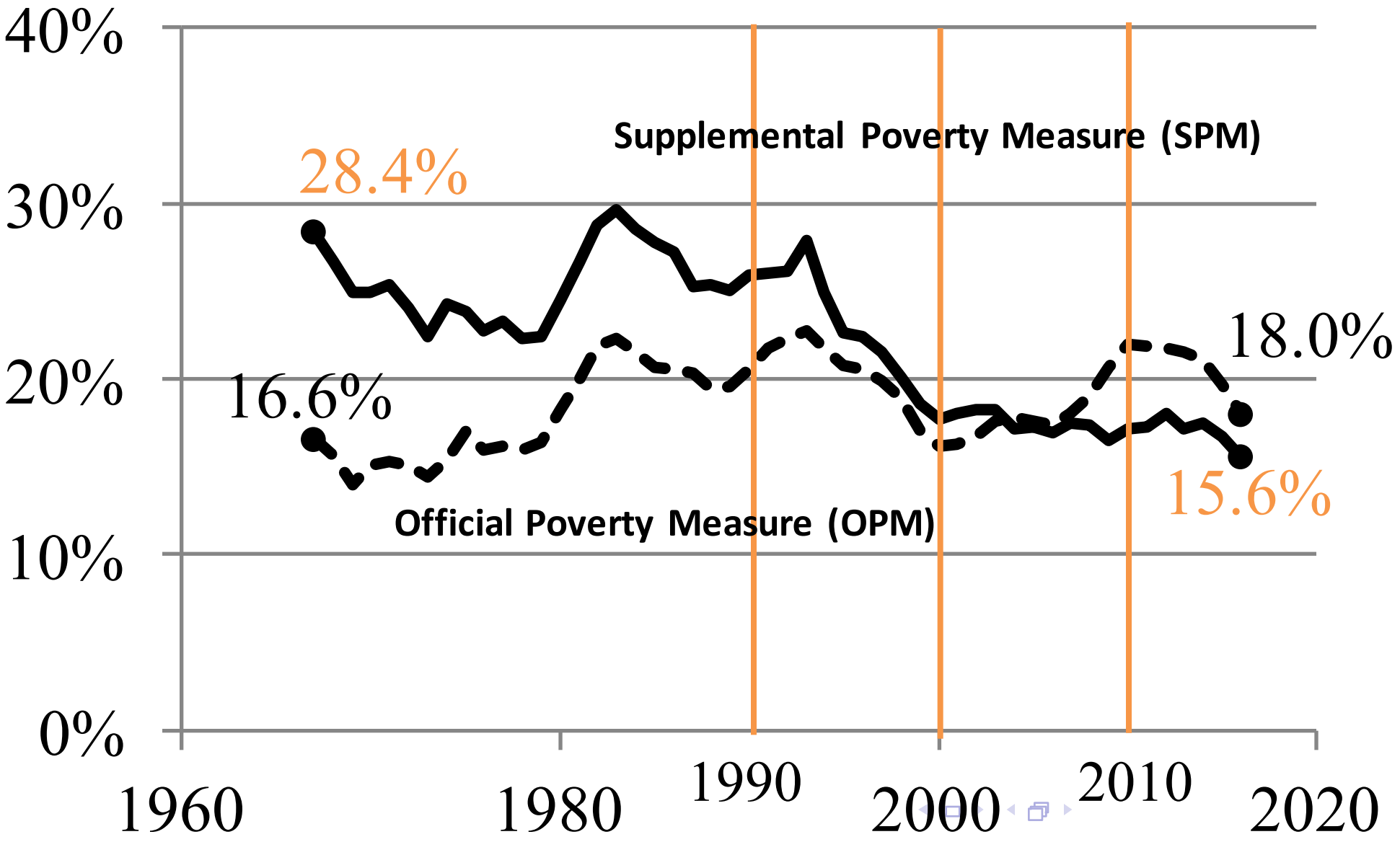
Female Mortality Gradients by 5-Year Age Categories - Adults

Age Category	1990	2010	P-value of difference
25-29	.014	.008	.004
35-39	.028	.025	.380
45-49	.046	.059	.041
55-59	.077	.098	.027
65-69	.105	.147	.019
75-79	.043	.183	<.001

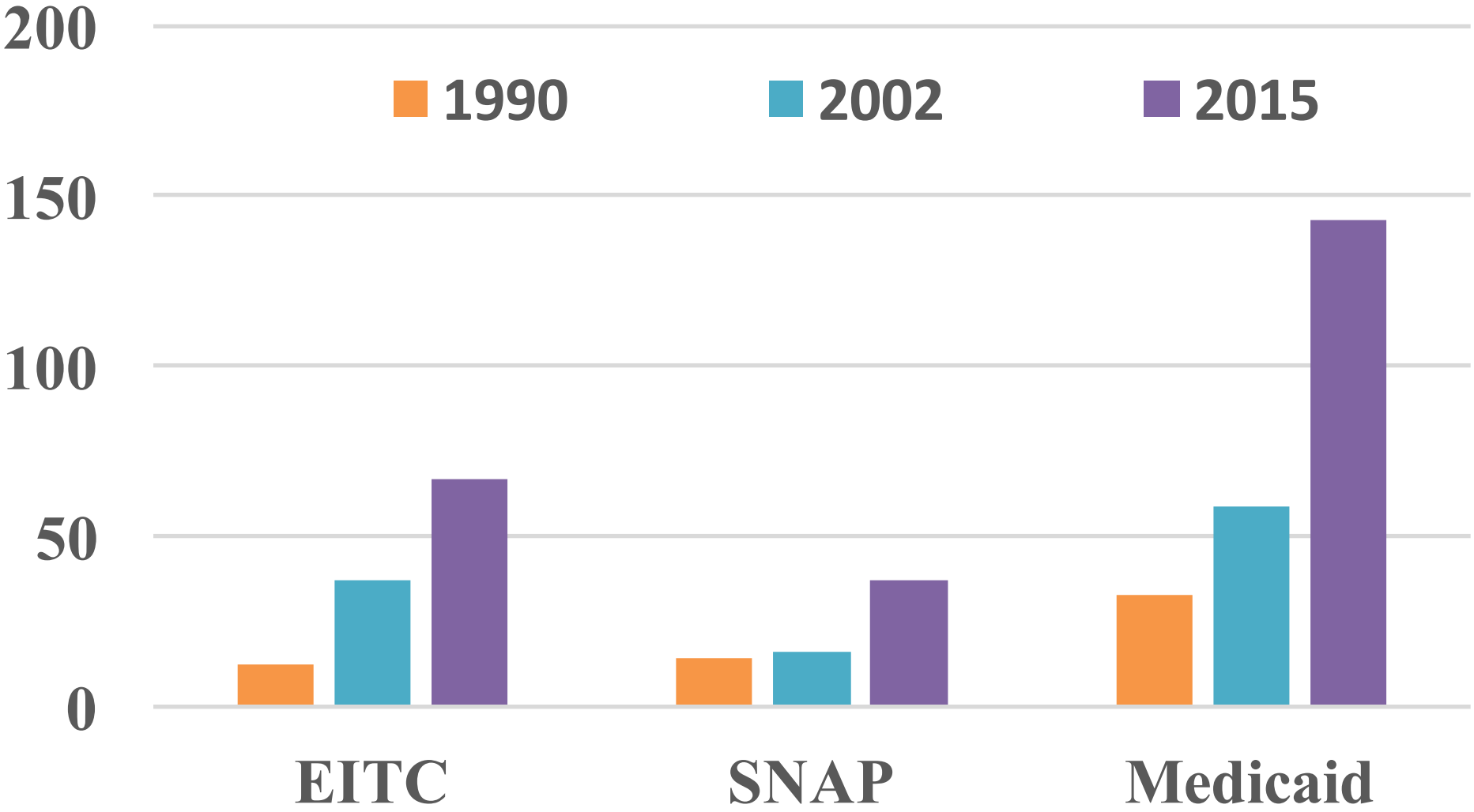
These results suggest that…

- There are very different trends in inequality in mortality for children and adults.
- Inequality in mortality fell for U.S. children between 1990 and 2010.
- What changed?
    - Declining poverty
    - Higher spending on social programs
    - Larger shares covered by insurance prenatally and in childhood

Child poverty (inclusive of taxes and transfers) fell

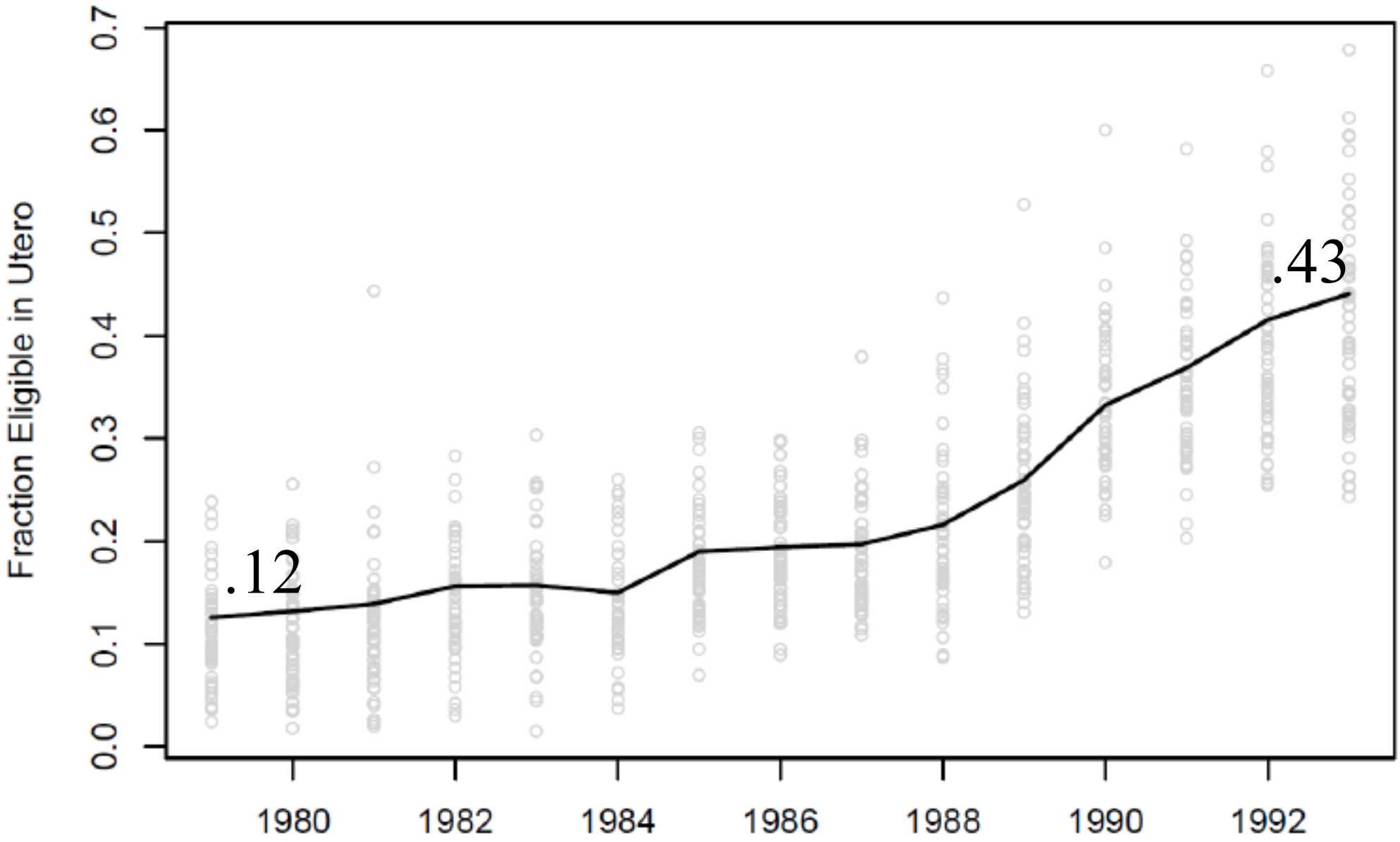


Overall Amounts Spent on Children Have Greatly Increased (billions $2015)

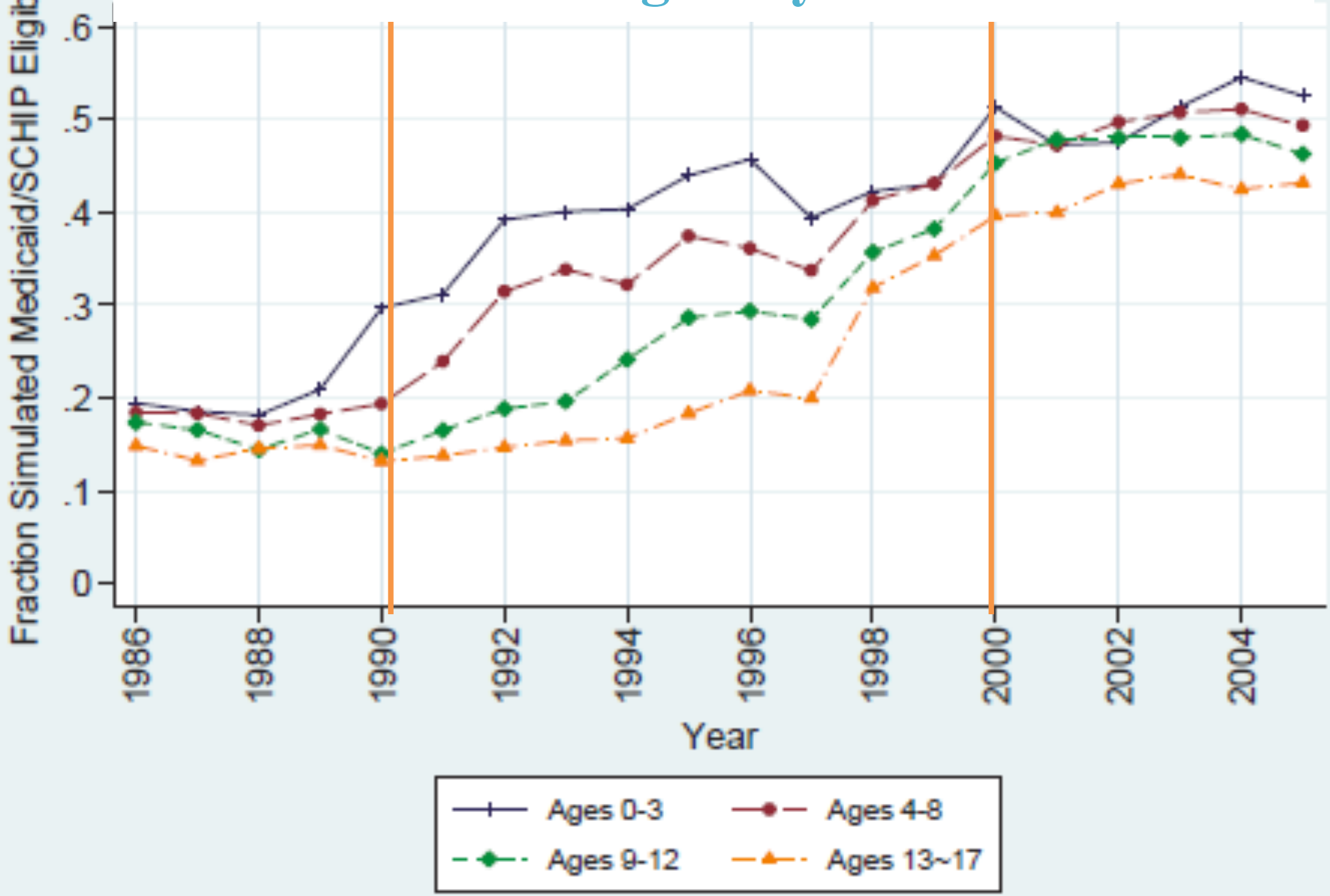


Note: Only Medicaid for children and non-disabled adults is included. Assumed that ½ of Food Stamp/SNAP payments go to families with children.

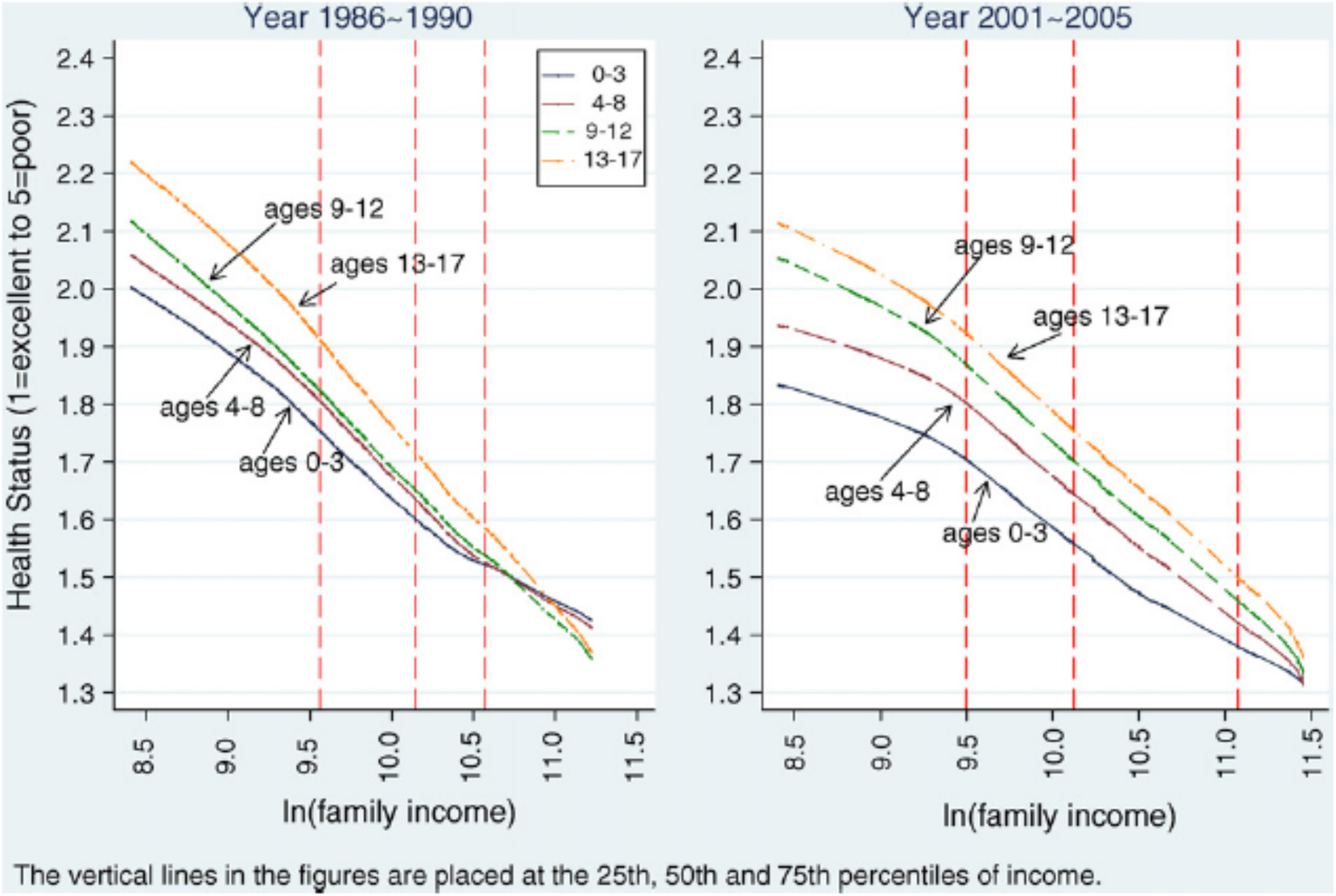
Rising Fraction 18-44 Year Old Women Eligible for Medicaid Coverage of Pregnancy, 1979-1993



Child Medicaid Eligibility Rose



Flattening of Income-Health "Gradient"



The vertical lines in the figures are placed at the 25th, 50th and 75th percentiles of income.

Effect family income on p(no doctor visits in year)

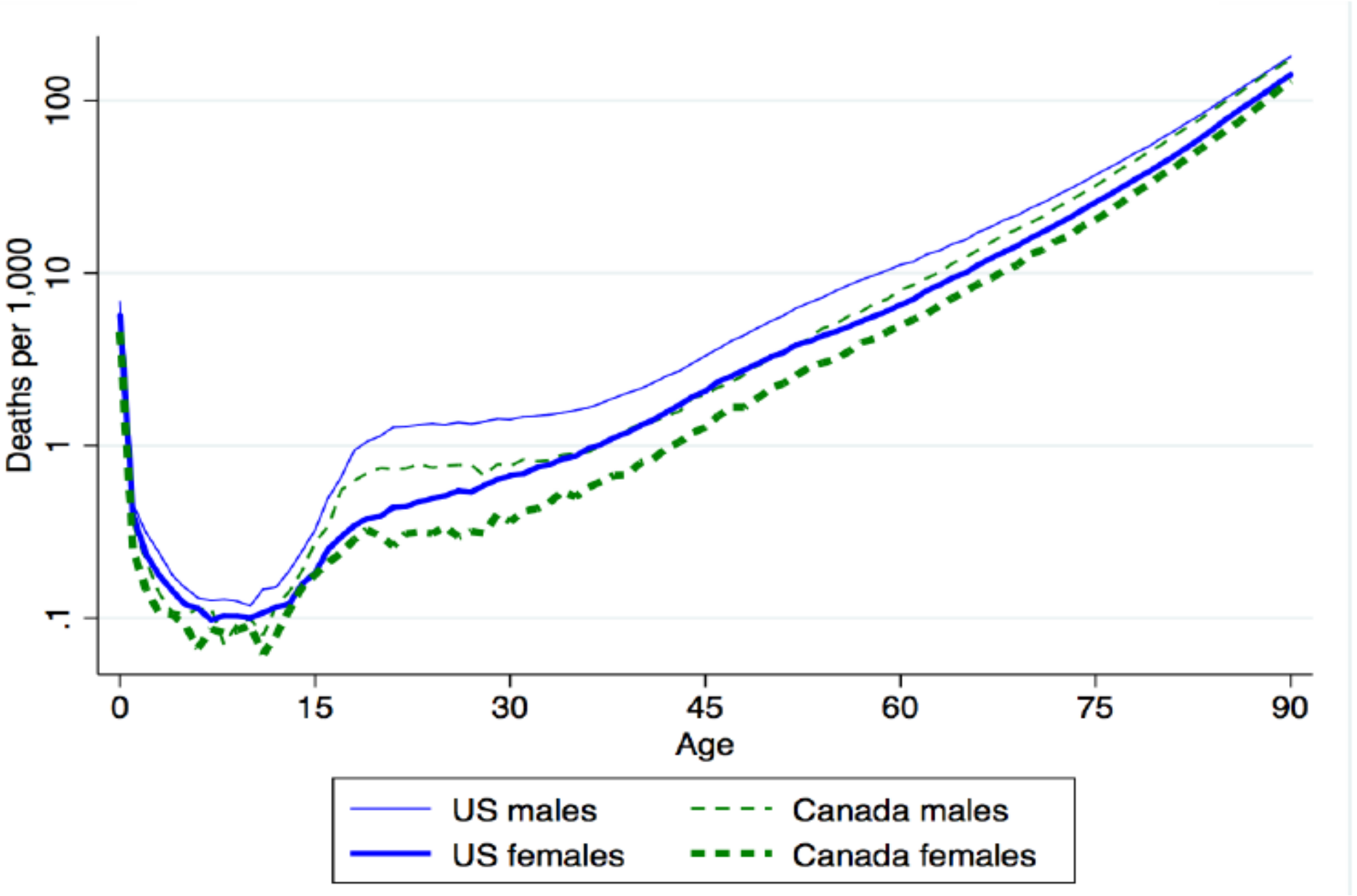
	Ages 0–3
Log family income ($1986)	−0.014 [0.003]***
1991–1995 time period*	0.006 [0.003]**
1996–2000 time period*	0.008 [0.004]**
2000–2005 time period*	0.009 [0.003]***

	Ages 4–8
Log family income ($1986)	−0.037 [0.003]***
1991–1995 time period*	0.015 [0.003]***
1996–2000 time period*	0.016 [0.004]***
2000–2005 time period*	0.023 [0.005]***

How can we see whether these improvements are likely to be due to expansions of insurance for U.S. children?

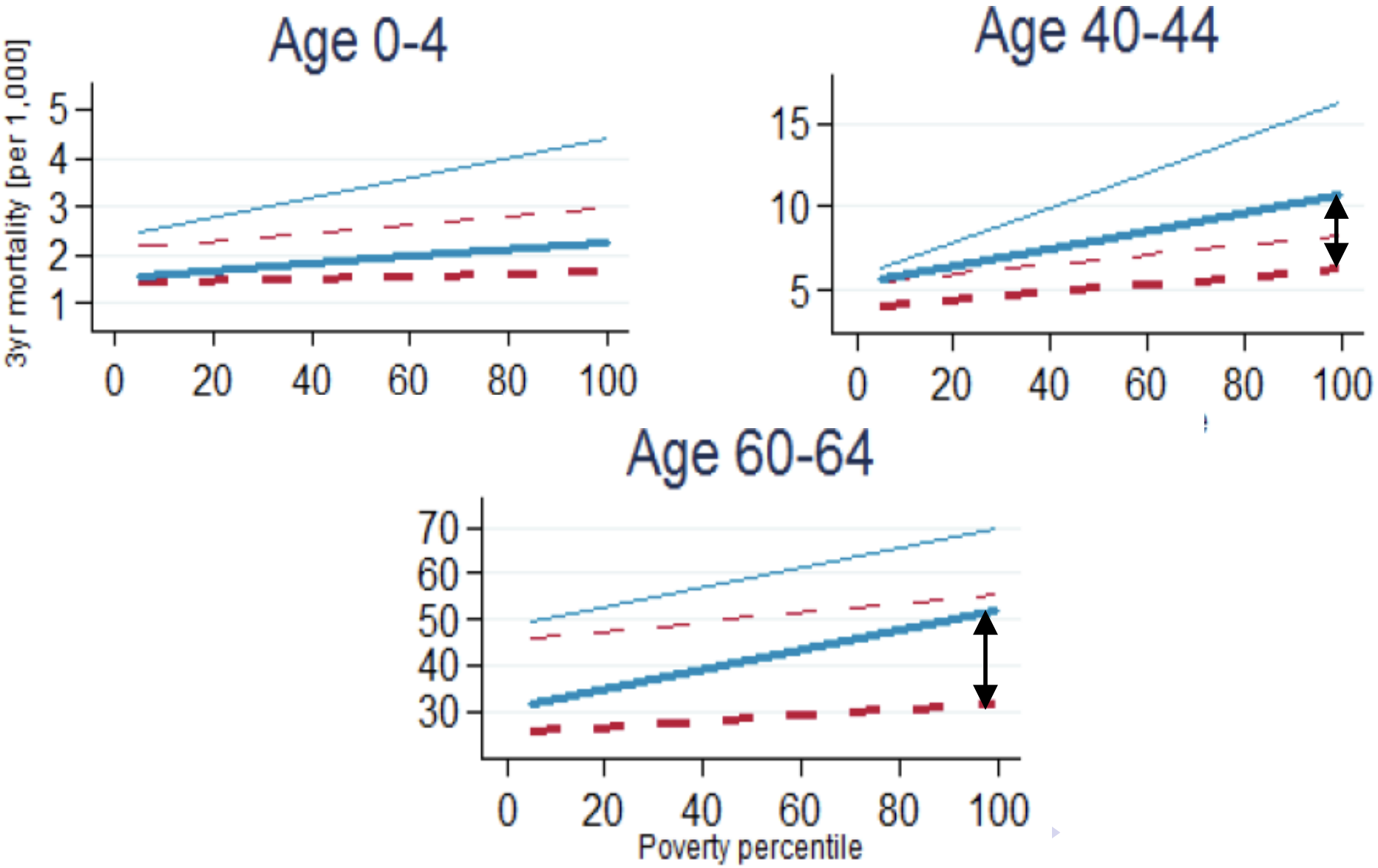
- Canada is a good comparison
- Factors such as access to technology, smoking, driving, product safety are similar in the two countries, and poverty rates showed similar declines.
- Canadian children had health insurance throughout the period.
- Compare trends in mortality and mortality inequality by age across the two countries.

Mortality Rates in Canada and the US 2009-2011

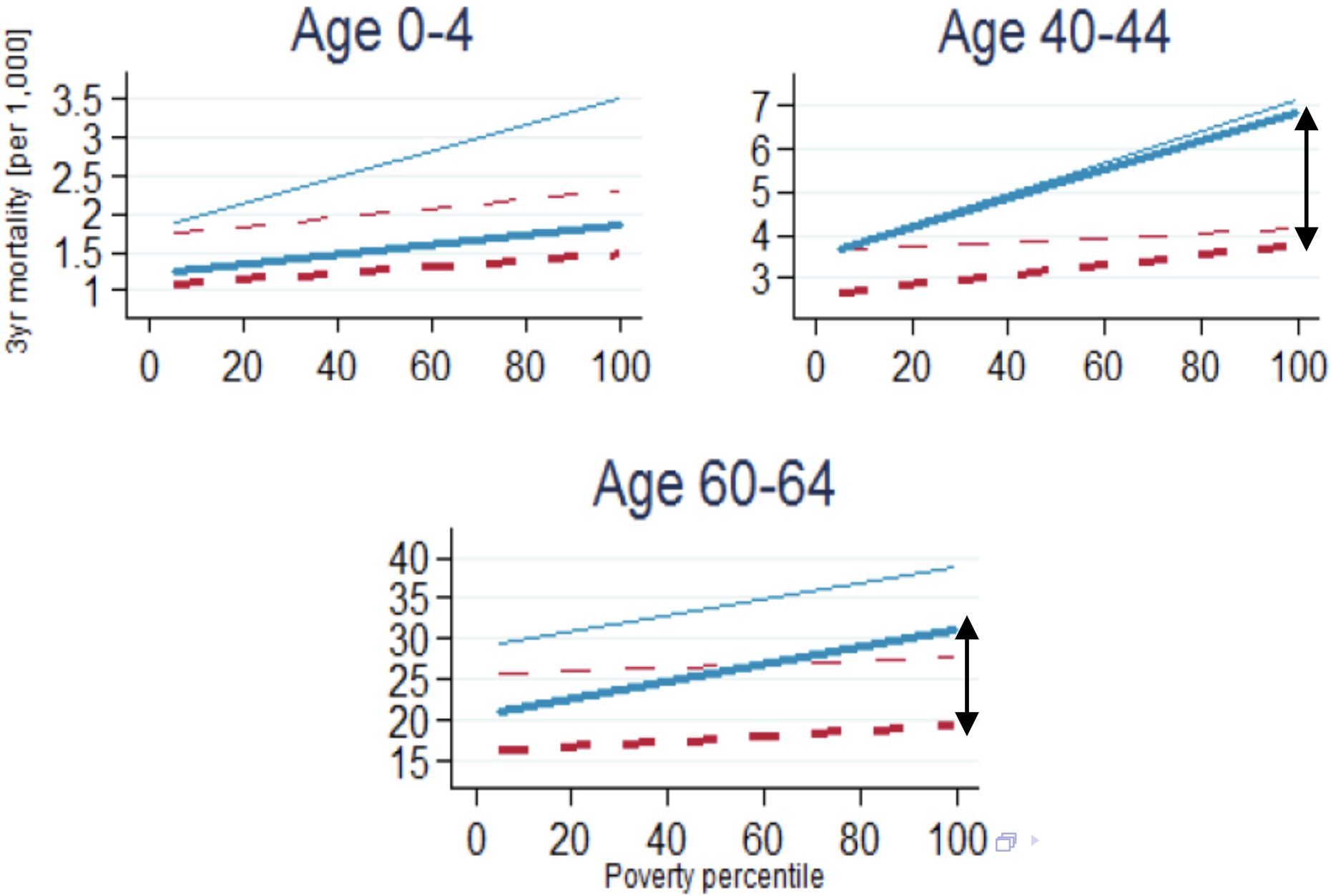


Males: Canada (red) vs. US (blue) mortality, 1990/91 (thin) vs. 2010/11 (thick) by poverty

(Baker, Currie, and Schwandt, 2018)



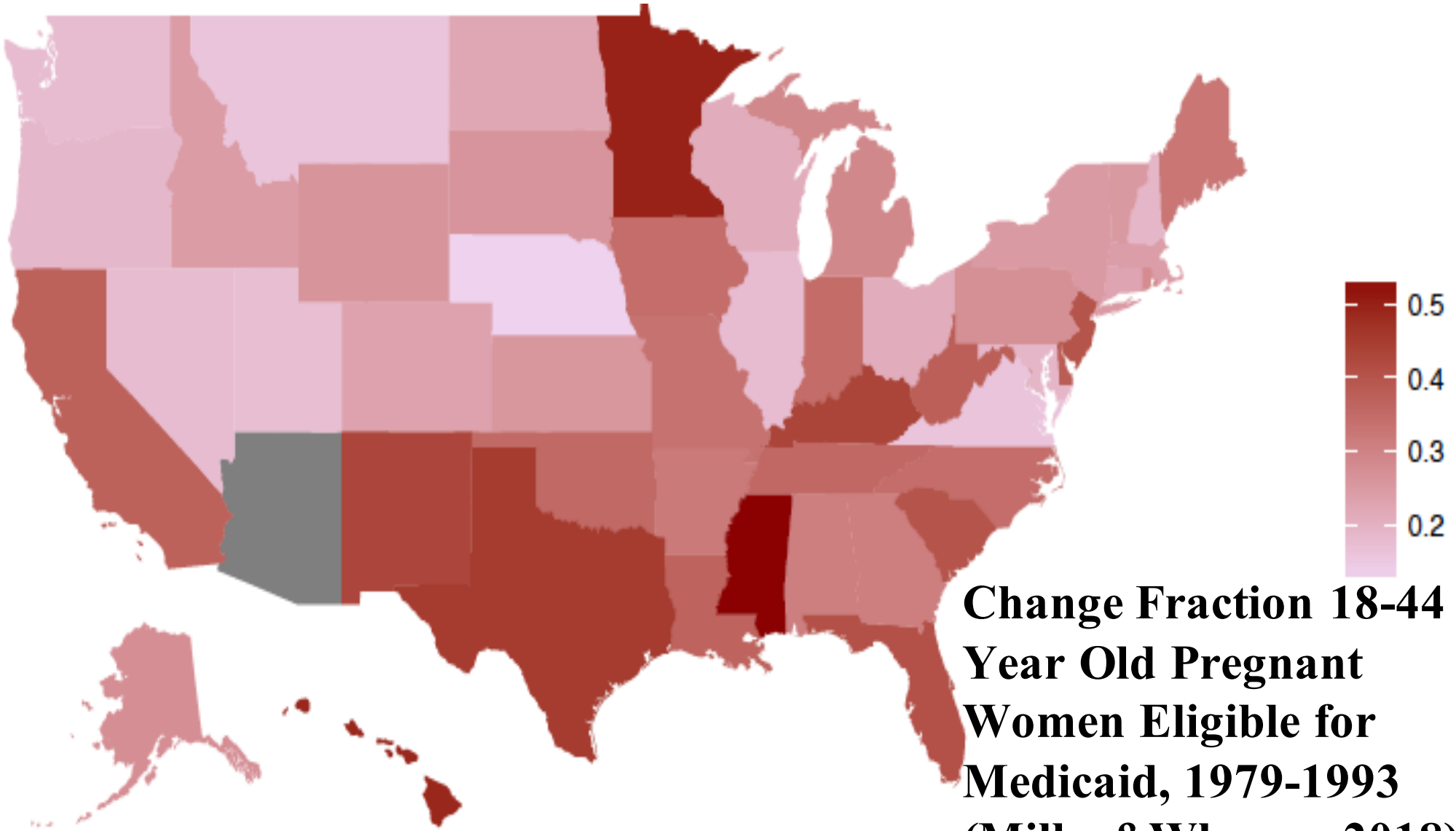
Females: Canada (red) vs. US (blue) mortality, 1990/91 (thin) vs. 2010/11 (thick) by poverty



Summary Canada-U.S. Comparison

- Mortality for the young and old fell in both countries. Mortality stalled among middle-aged U.S. women.
- U.S. child mortality converged towards the lower Canadian rate.
- Did not see such convergence for other age groups.
- Since the Medicaid expansion was the largest social policy affecting children, and the largest policy difference between U.S. and Canada, it was likely to have been an important factor.

Staggered Phase-in of Medicaid Expansions for Pregnant Women Can be Used to Identify Effects



Change Fraction 18-44 Year Old Pregnant Women Eligible for Medicaid, 1979-1993 (Miller&Wherry, 2018)

Short Term Effects of Medicaid Eligibility Expansions for Pregnant Women of late 80s, early 90s.

Currie and Gruber (1996)

- 8.5% reduction infant mortality
- 50% reduction in delay in obtaining prenatal care among highest poverty group.

New Evidence on Long-Term Effects Prenatal and Infant Coverage

Miller and Wherry (2018): Young adult children of mothers who were eligible are overall:

- 1/3 of an SD less likely to have a chronic condition
- Have 0.56 fewer hospital visits (on a mean of 25.3 per 1,000)
- Are 0.011pp more likely to graduate high school (mean is 0.92).

Bigger Effects Among the Poorest…

- 2/3 of an SD less likely to have a chronic condition
- Have 0.83 fewer hospital visits
- Are 0.031pp more likely to graduate high school
- Increase of .04pp in probability some college
- 0.20 increase in ln(personal income)
- -0.041 decrease in probability of using SNAP (Food Stamps)
- *Decline of -2.185 on the Kessler 6 mental distress score*

Consistent with New Evidence on the Rollout of NHS

Wilson and Lührmann (2018):

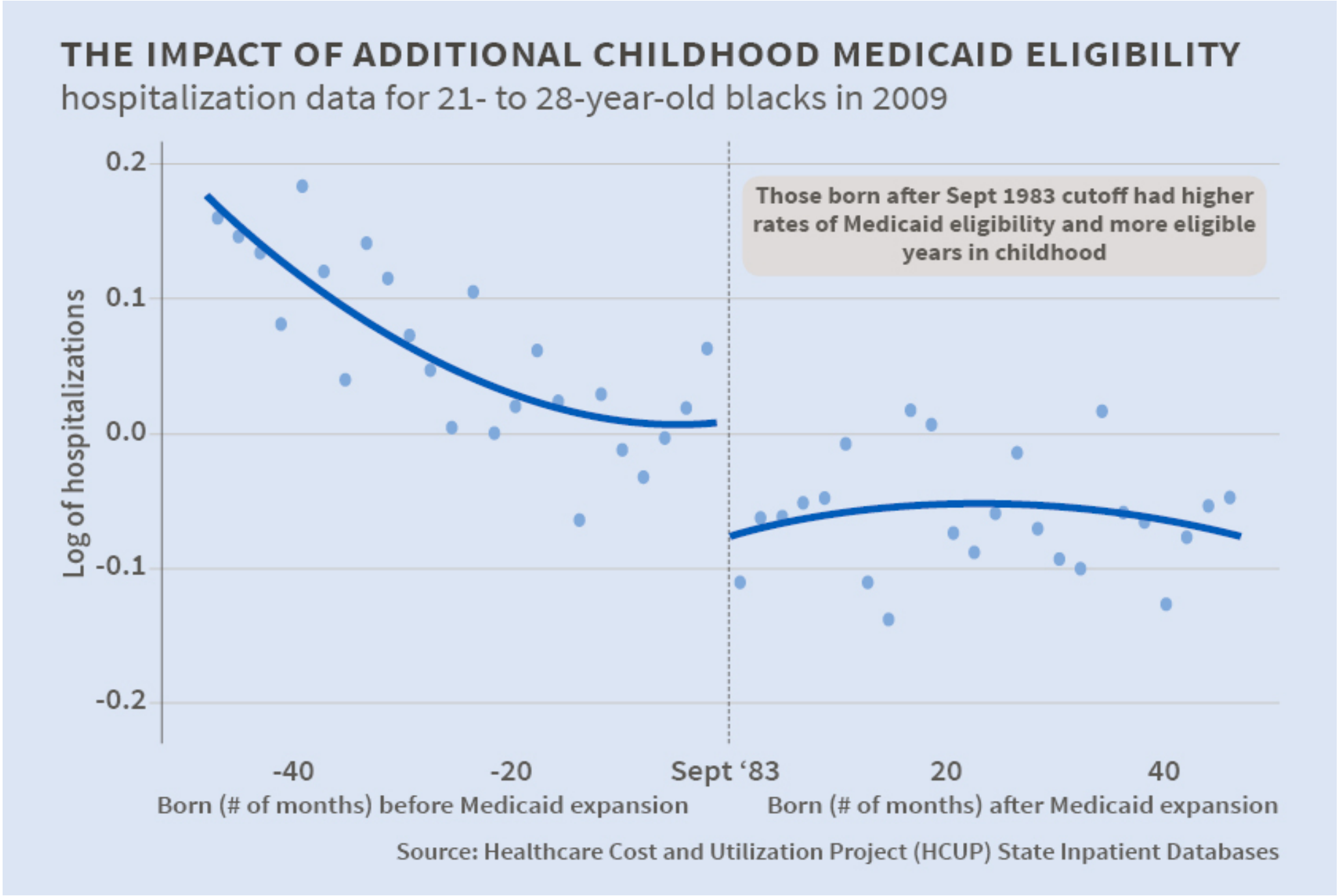
- Investigate the roll out of the NHS
- Show an immediate drop in infant mortality when NHS reached an area
- Find an effect of coverage in the prenatal and infant period 50 years later, with a 14% reduction in mortality at age 58 among affected cohorts.

Among U.S. children, a sharp cutoff in eligibility can be used to identify the effects of public insurance

Only children born after September 1, 1983 were eligible for expansions, creating a discontinuity.

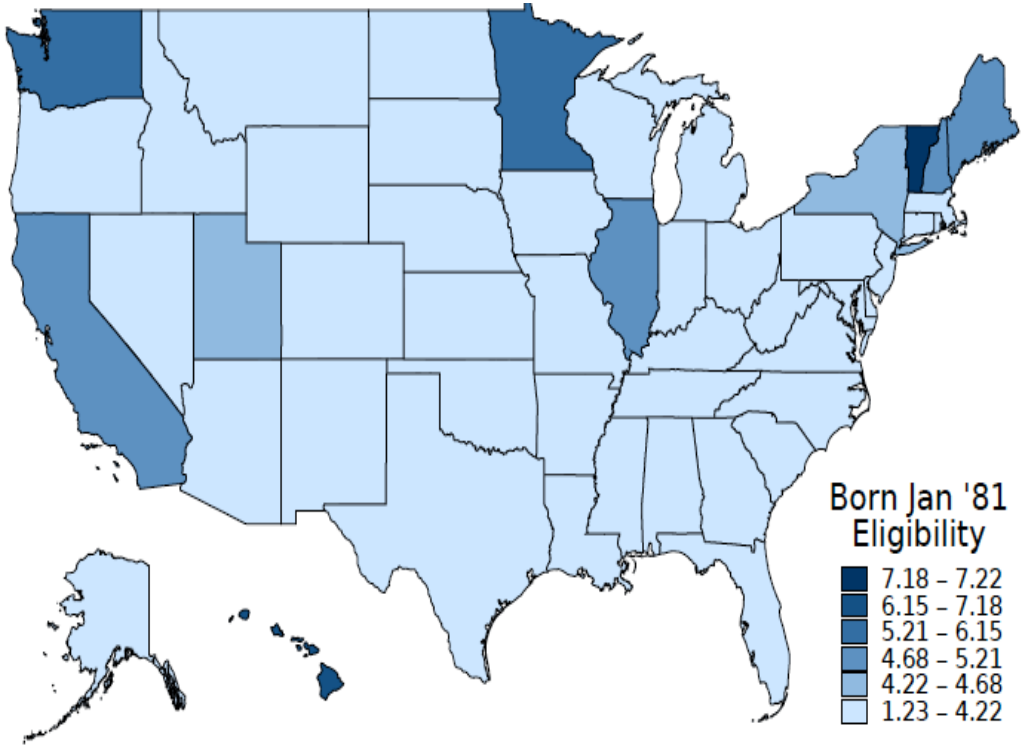
Recent research shows long term effects on the health of children who became eligible (Currie, Decker, Lin, 2008; Wherry et al. 2015; Meyer and Wherry, 2016; Kowalski et al. 2015: Goodman-Bacon, 2016, Cohodes et al. 2015)

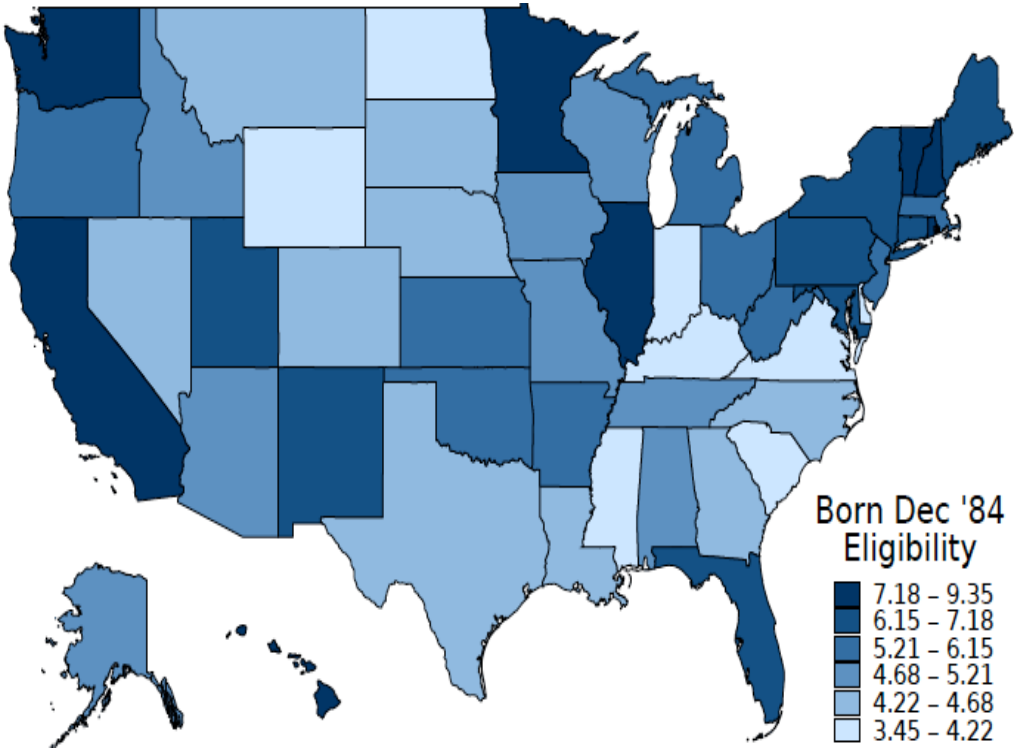
Wherry et al. 2018



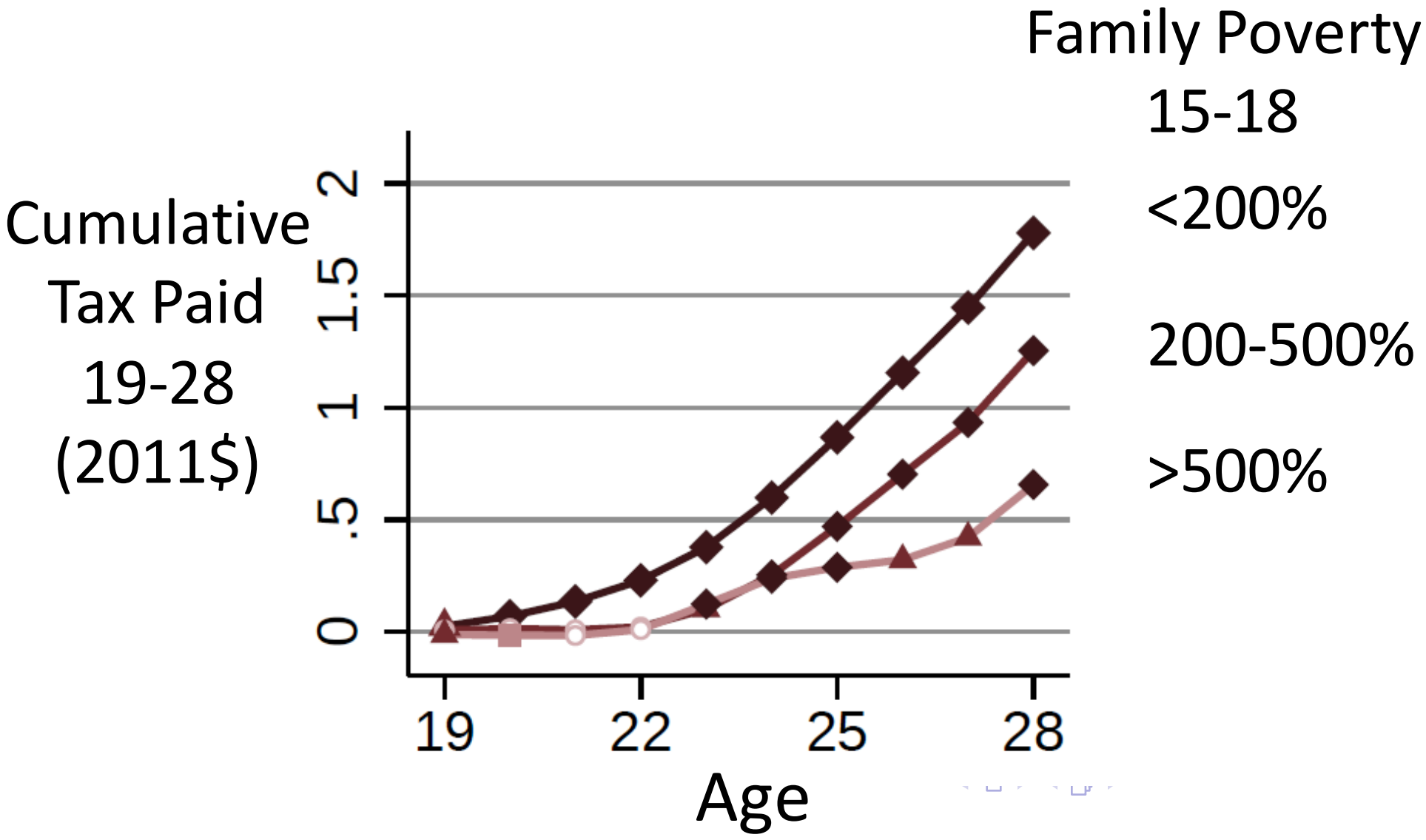
Cumulative Years of Medicaid Eligibility 0-18 for Children born 1981 vs. 1984

(Brown, Kowalski, and Lurie 2018).





Effect of Years of Medicaid Eligibility 0-18
(Brown, Kowalski, and Lurie, 2018)



Why is mental health a possible mechanism?

- Mental health is one of the most important determinants of adult outcomes.

- Many mental health problems manifest in childhood, but start in early childhood or the prenatal period.

- Maternal mental health has an important impact on the child.

Many "Non cognitive" skill measures are related to mental health

e.g. Edin et al. (2017) document high and rising labor market returns to non-cognitive skills using Swedish registry data where all draftees were tested.

Non-cognitive skills include:

(i) social maturity,
(ii) psychological energy (e.g., focus),
(iii) intensity (e.g., internal motivation) and
(iv) emotional stability (e.g., tolerance to stress).

These measures will be affected by common mental health conditions including ADHD, depression, and anxiety.

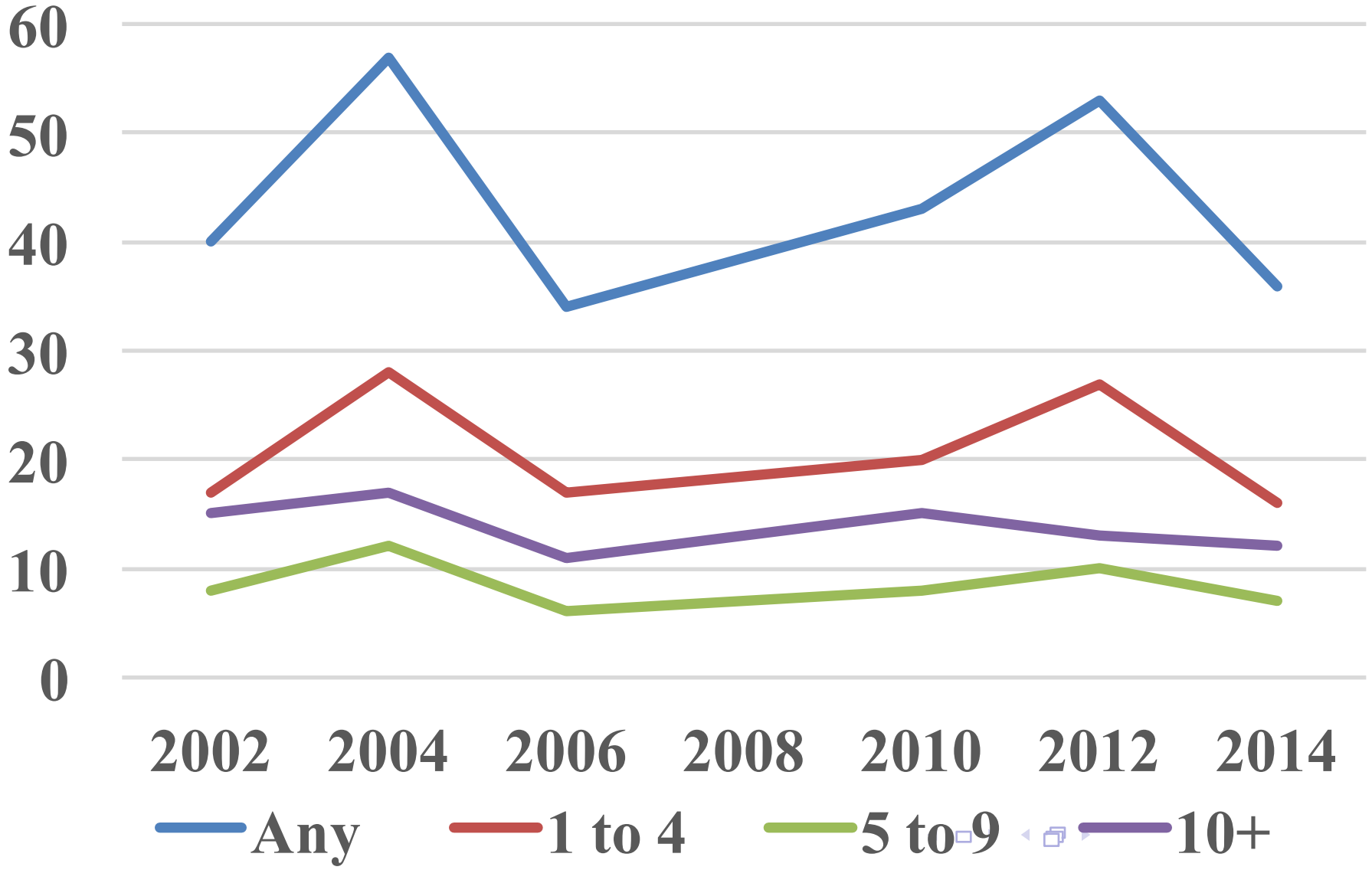
Mental health conditions are common

- An estimated 4-6% of U.S. children have ADHD (common UK estimate: 3.62% of boys and 0.85% of girls, likely under-diagnosis in girls.)

- In 2014, 12.7% of Americans over 12 took an anti-depressant in the last 30 days. (In the UK, 64.7 million anti-depressant scripts compared to 71.5 million for high blood pressure).

- Mental health is costly in terms of both health care expenditures and working days lost.

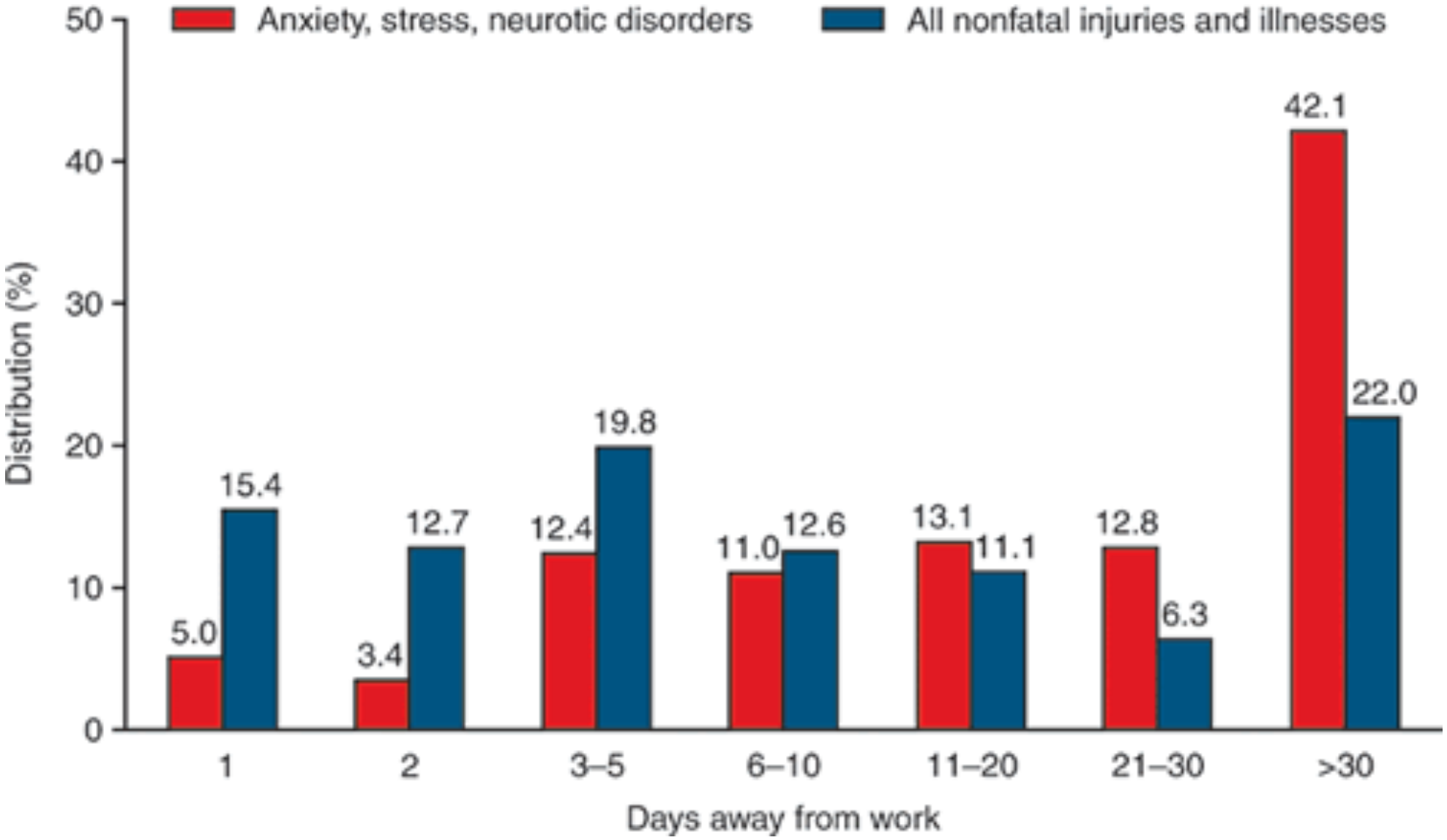
Number days in past 30 when mental health was not good: Percent of Employed U.S. General Social Survey Respondents



Breakdown of ER visits per 1,000 population, 2014, mean (standard deviation), 5 U.S. states

	Level	Percent
All ER visits, any cause	379.93 (98.28)	100.0
Any mental health issue	50.93 (20.58)	13.4
Substance abuse only	10.57 (5.06)	2.8
Mood Disorder	19.17 (12.56)	5.0
Anxiety	18.55 (9.62)	4.9

U.S. BLS survey of Occupational Injuries and Illnesses (SOII), 2001 (private sector w >=11 workers) on distribution of work days lost if >0.



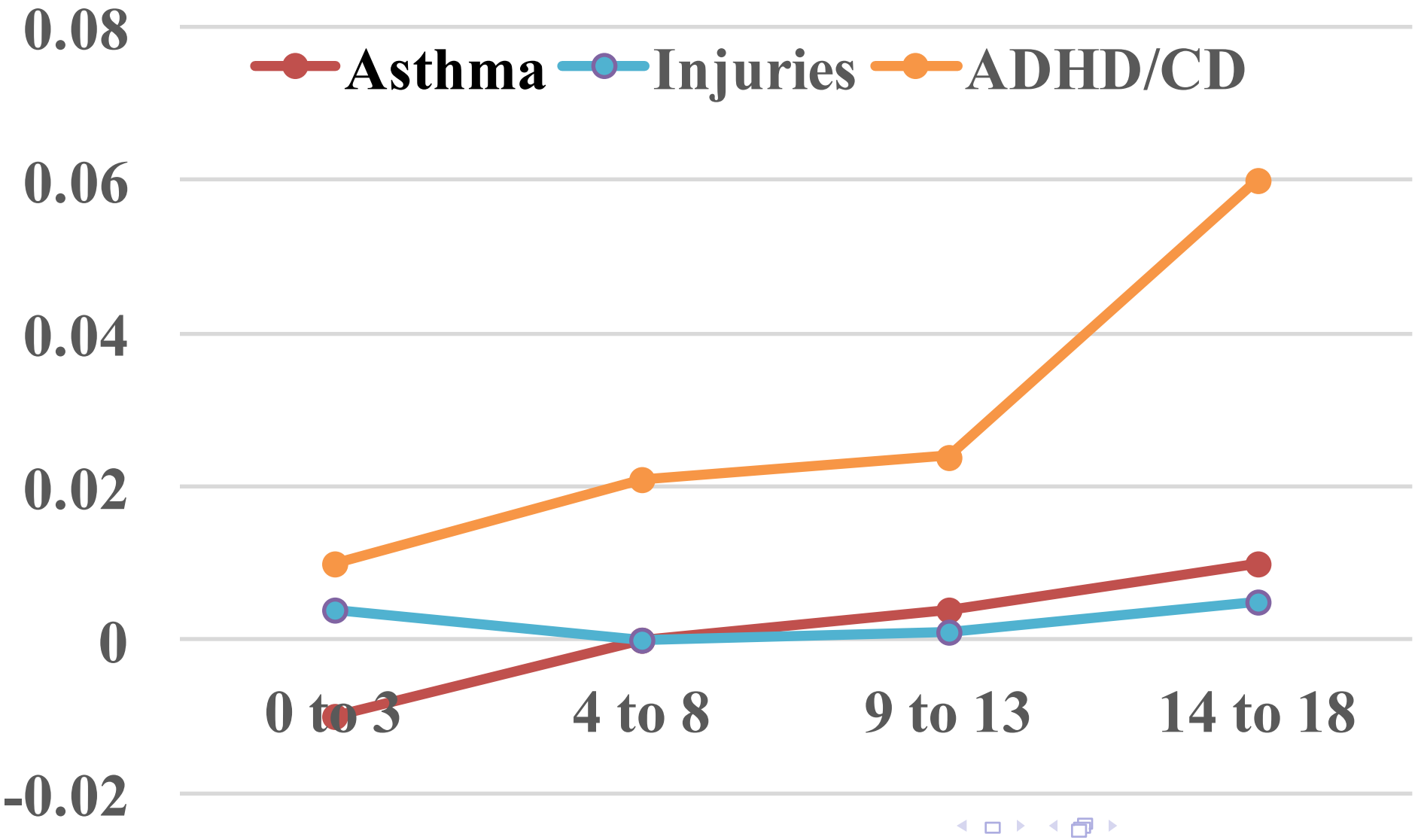
Mental Health Problems Often Begin in Childhood and Continue into Adulthood

- Currie et al. (2010) use administrative health data to examine effects of child health conditions on young adults
- Compare the effects of common physical conditions (asthma, injuries) to those of mental health conditions (ADHD, Conduct Disorder).
- Examine effects of diagnosis at four age ranges, and effect of persistent conditions.

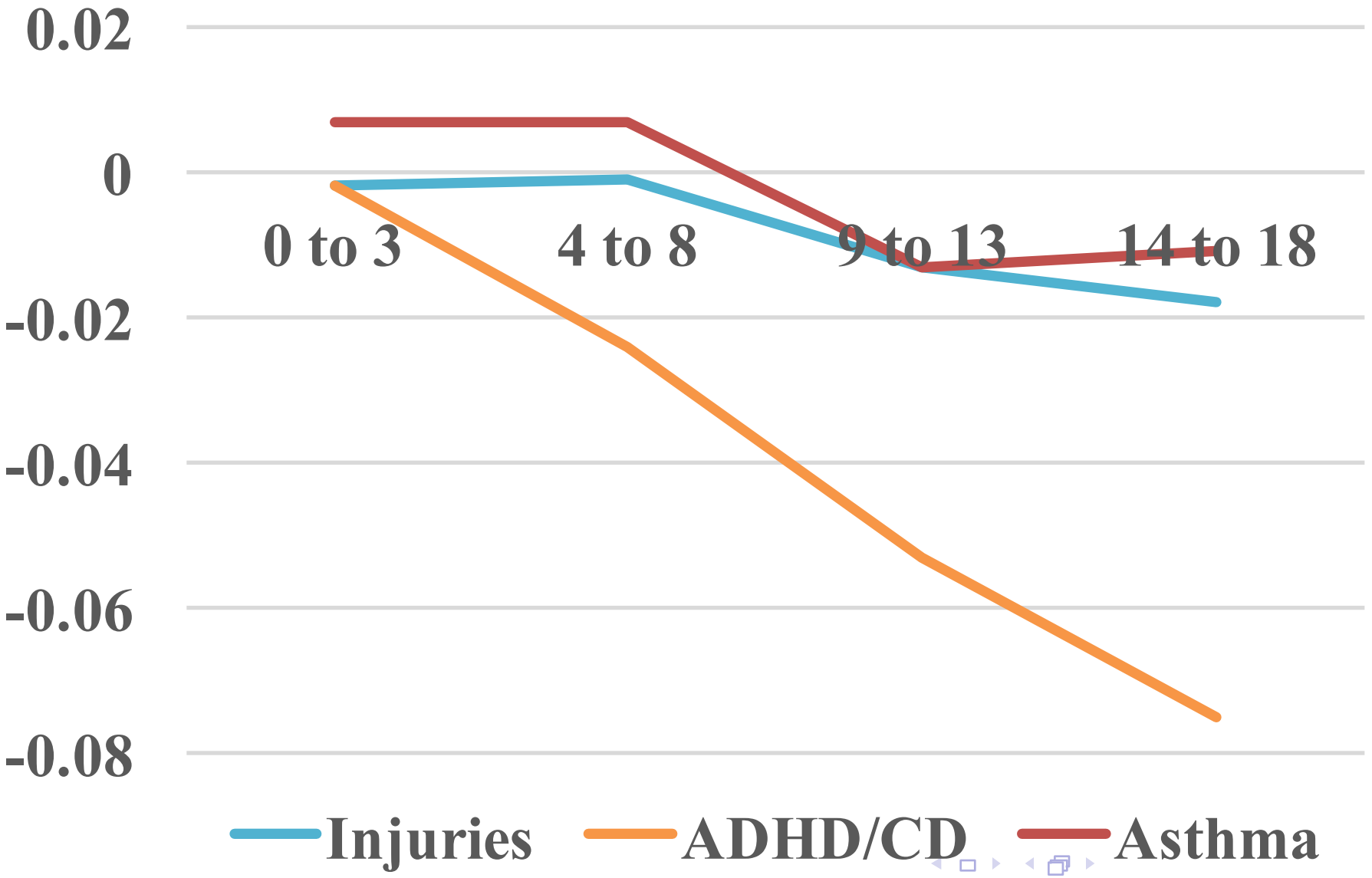
Currie et al. (2010)

- 50,000 Canadian children and their siblings. Health records merged to data on educational attainment and welfare use.
- Compare affected children to siblings without these conditions.
- Outcomes: Welfare use after age 18, being in Grade 12 by age 17, taking college-prep math courses in high school.

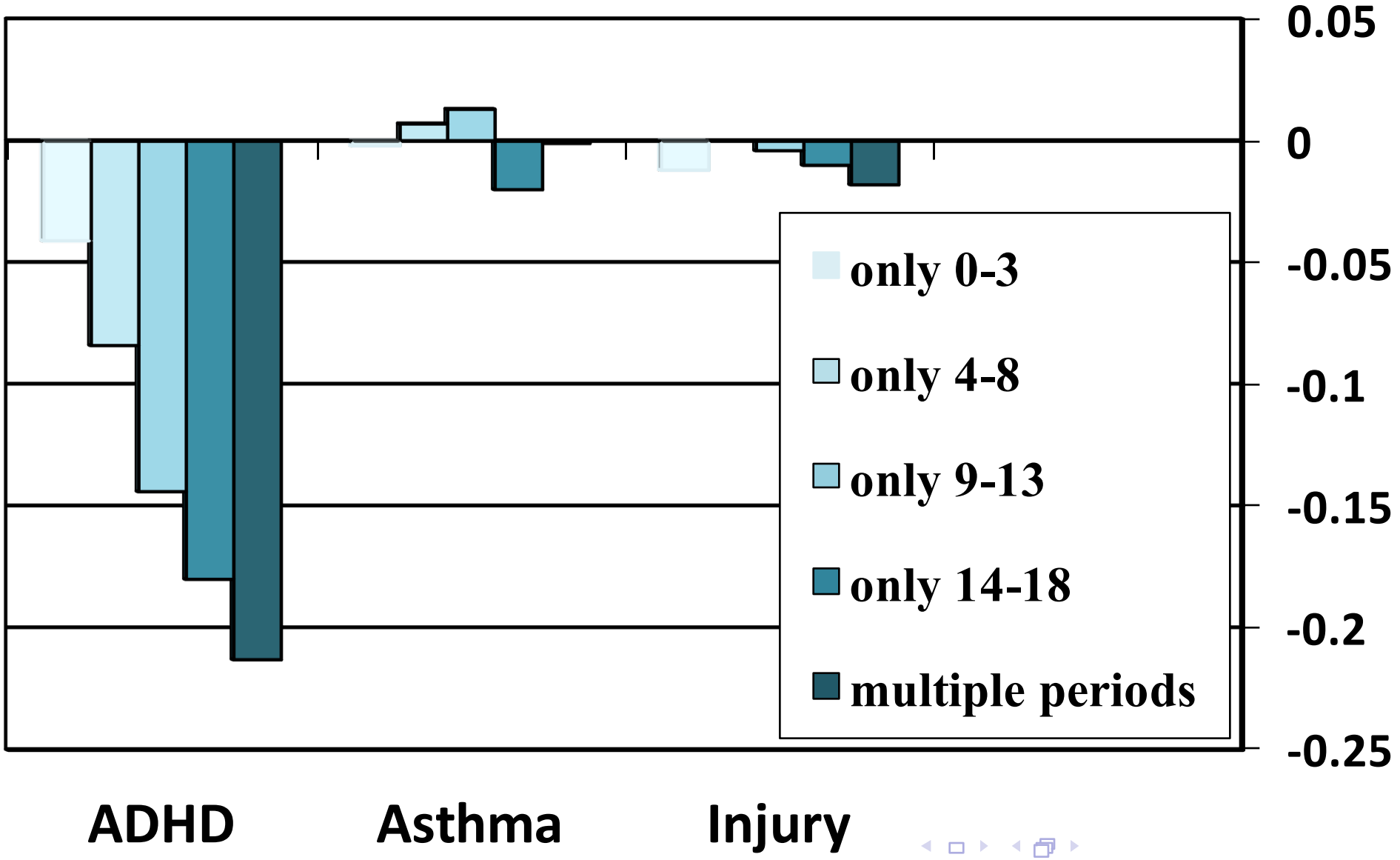
Estimated effect of condition on receipt of social assistance after age 18, by age (sibling FE models)



Estimated Effect on Taking College Prep Math in HS for each Condition and Age



Effects of Persistent Health Problems on P(grade 12 by age 17)



Prenatal conditions can place children at higher risk of poor mental health

- Evidence linking Dutch "Hunger Winter" to schizophrenia (Susser 1992, 1996, 1998)
- Malaspina et al. (2008) find a relationship between exposure to the 6-day war in Israel and schizophrenia.
- Petterson et al. (2015) use Danish twins and find a strong association between birth weight and ADHD symptoms, even in MZ twins.

Persson and Rossin-Slater (2018)

Use Swedish registry data and find that the death of a close maternal relative during pregnancy has negative effects relative to a death in the months after birth:

* The probability of using an ADHD drug increases 25% in childhood
* The probability of using drugs for anxiety or depression in adulthood rises by 13 and 8%.

Can Interventions in Pregnancy Prevent Mental Health Problems?

- Miller and Wherry (2018) find improvements in Kessler scores of children affected by the Medicaid expansions prenatally.
- Chorniy and Currie (2018a) examine prenatal WIC participation and the mental health of South Carolina children 6-11 years old.
- WIC is a nutrition program but also improves access to medical care.
- Children were born between 2004 and 2009, and can be followed up to 2015 in the administrative Medicaid data.

Prenatal WIC and Mental Health in Children 6-11 Sibling FE Models, (Chorniy and Currie, 2018a)

	Full Sample	Non-Hispanic whites	African-Americans	Lower Income
Mental conditions				
ADHD	-0.0089*	-0.0015	-0.0144**	-0.0127*
	(0.0050)	(0.0074)	(0.0069)	(0.0076)
Mean of Dep. Var.	0.1664	0.1861	0.1508	0.1994
Childhood mental, excl. ADHD	-0.0119**	-0.0076	-0.0160**	-0.0073
	(0.0054)	(0.0079)	(0.0074)	(0.0078)
Mean of Dep. Var.	0.1863	0.1973	0.1778	0.2018
Depression/Anxiety	-0.0004	0.0034	-0.0025	0.0016
	(0.0026)	(0.0043)	(0.0031)	(0.0038)
Mean of Dep. Var.	0.0301	0.0403	0.0214	0.0347

If Access to Care is Making Child Mental Health Better, Why Does it Seem Like it is Getting Worse?

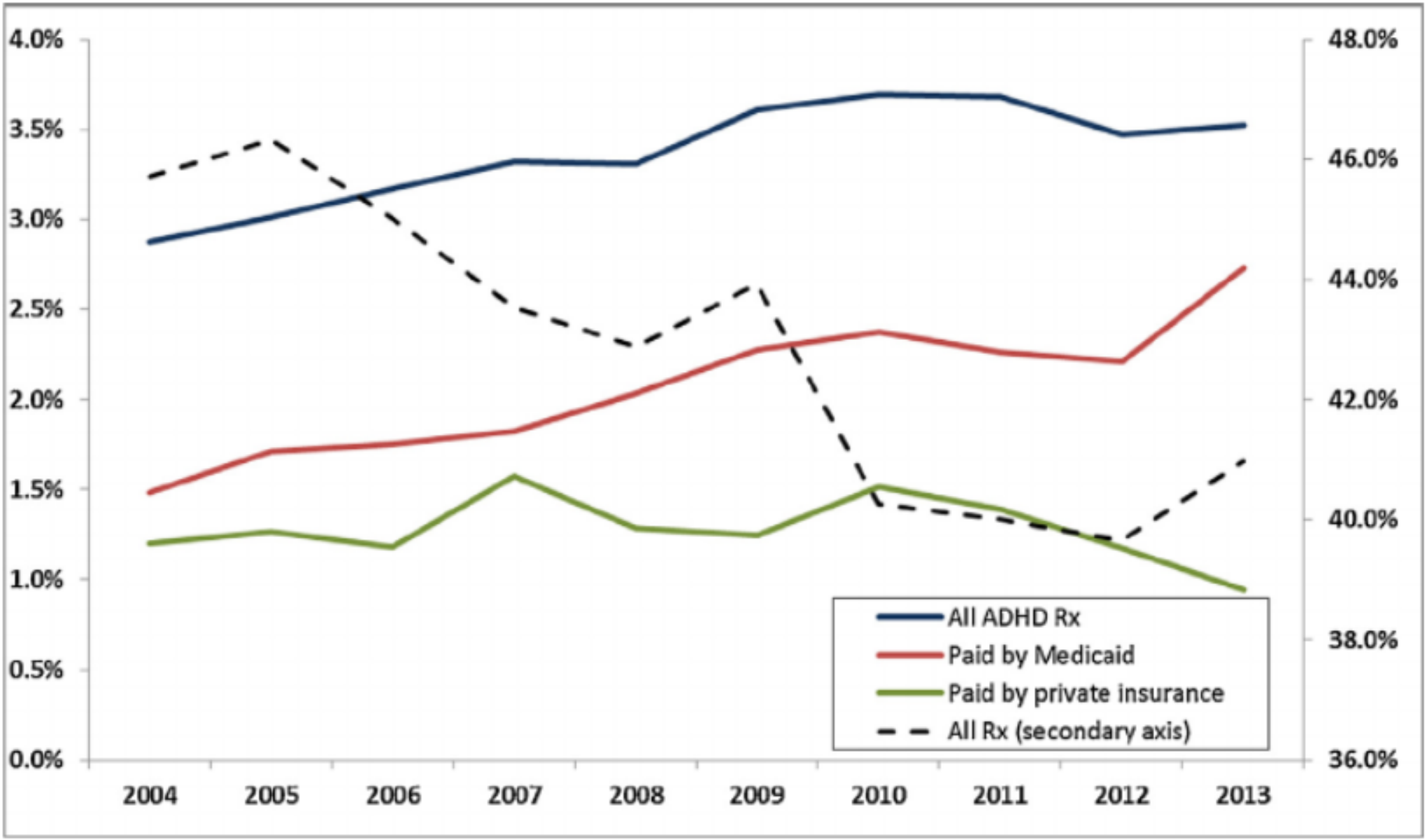
- Diagnostic standards for many conditions are changing.

- Changes in incentives facing providers have resulted in more screening.

- Other things being equal, more access = more screening = more cases.

In the U.S. increases in ADHD occurred mainly in the Medicaid population

(data from MEPS, children <17, Chorniy and Currie, 2018b)



Changes in Medicaid encouraged screening

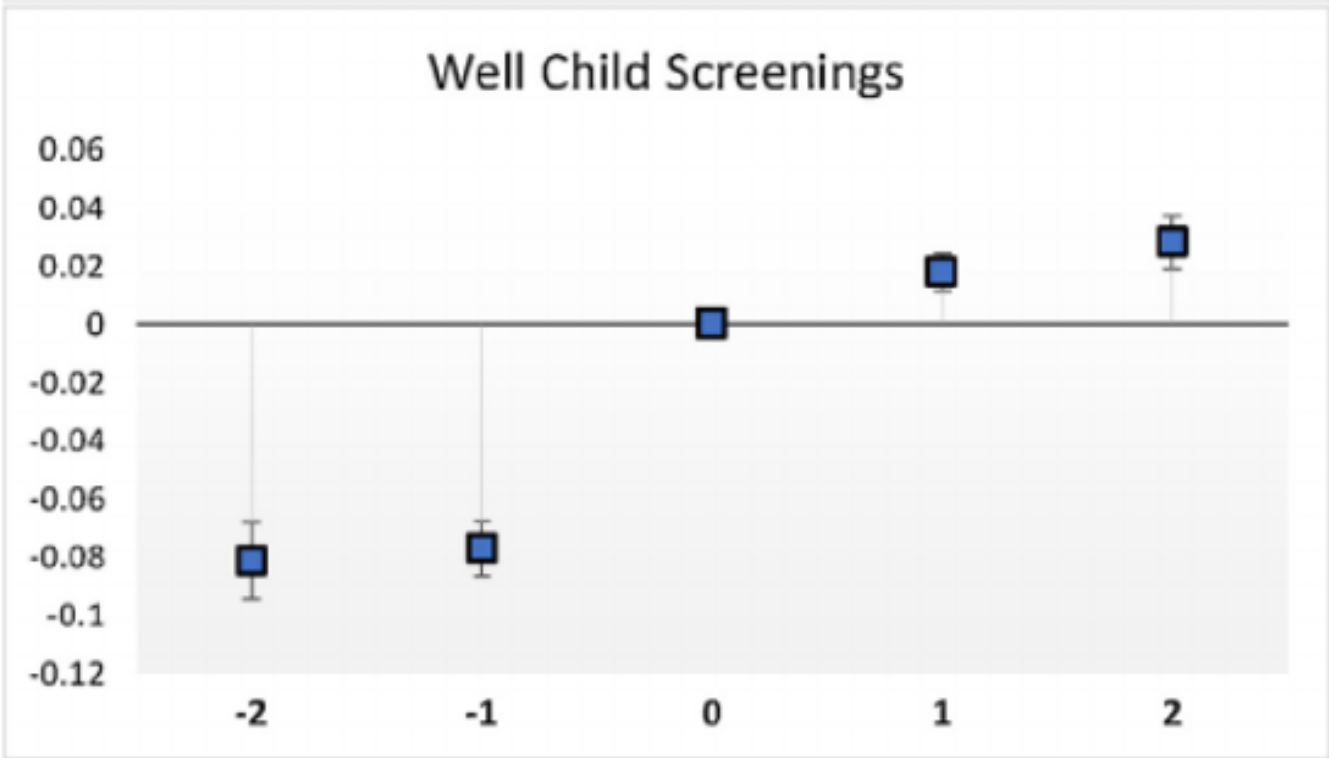
- Switch from fee-for-service to managed care. Easier for government to hold managed care organization accountable for screening than individual providers.

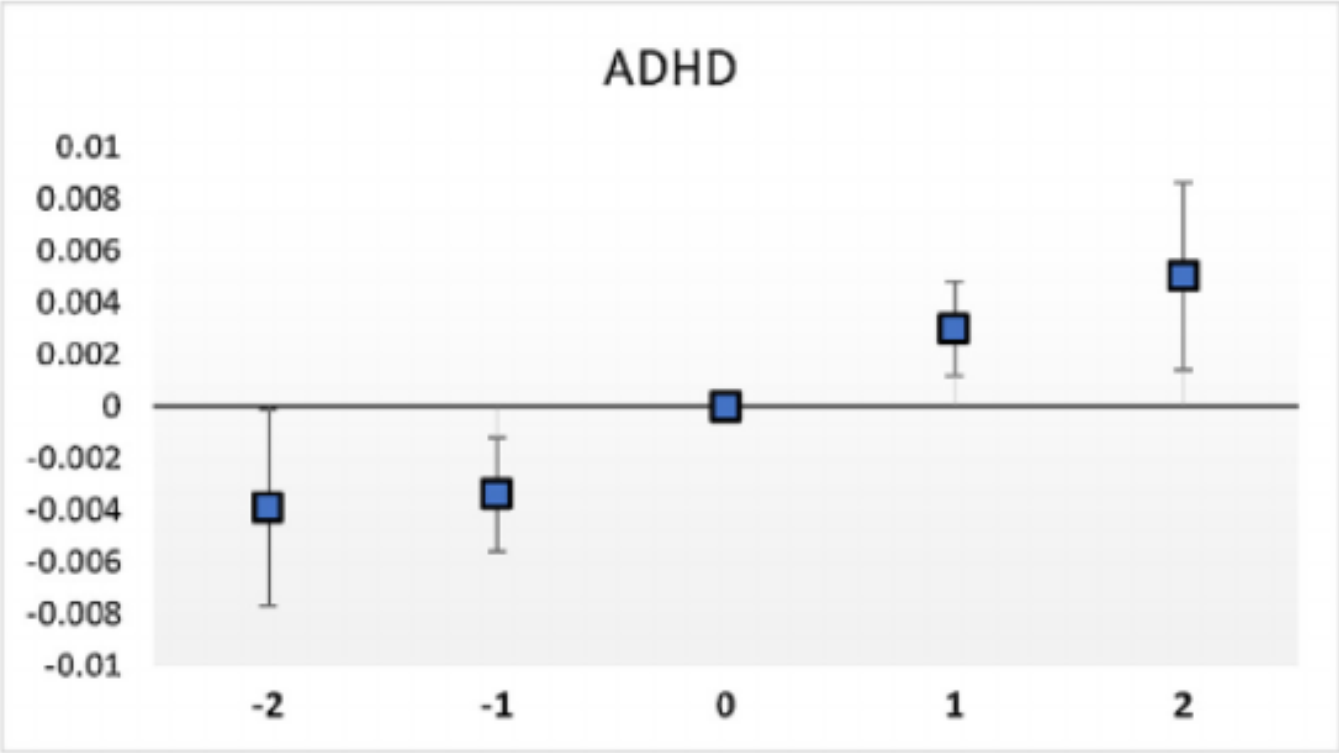
- Managed care plans have incentives to promote screening because capitated reimbursement rates are higher for children with chronic conditions.

Chorniy and Currie (2018b) examine effects of Switching to Managed Care in South Carolina Medicaid

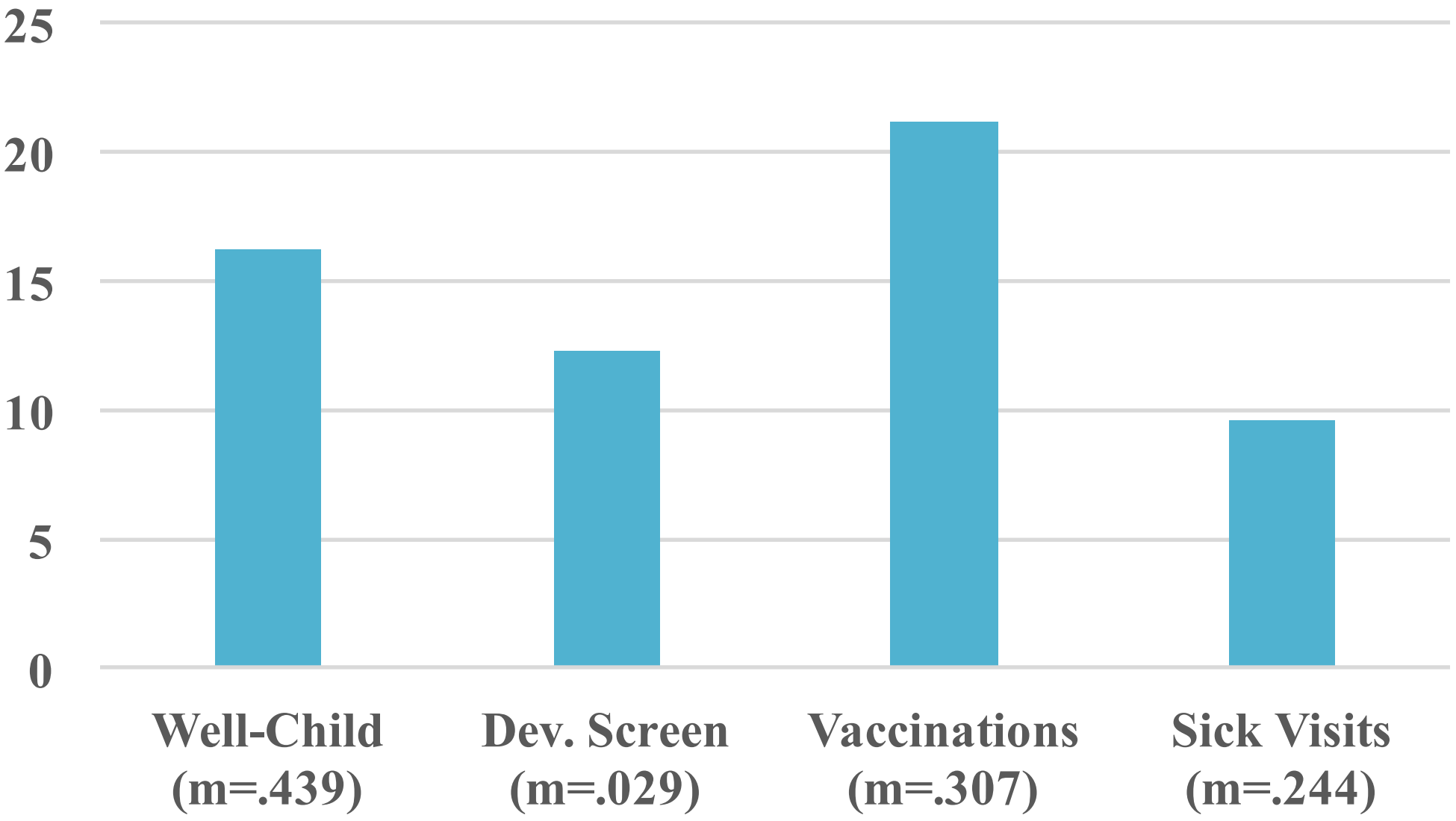
- SC switched the "default" plan to managed care between Oct. 2007 and May 2008.
- Use a 60% random sample of all children <17 in Medicaid any time between 2004 and 2015.
- Event study: All children sampled anytime in the 2 years before and after switch to MC, n=409,230.
- Individual child fixed effects: All children whose individual plan type changed, n=209,607.

Event Studies with county fixed effects

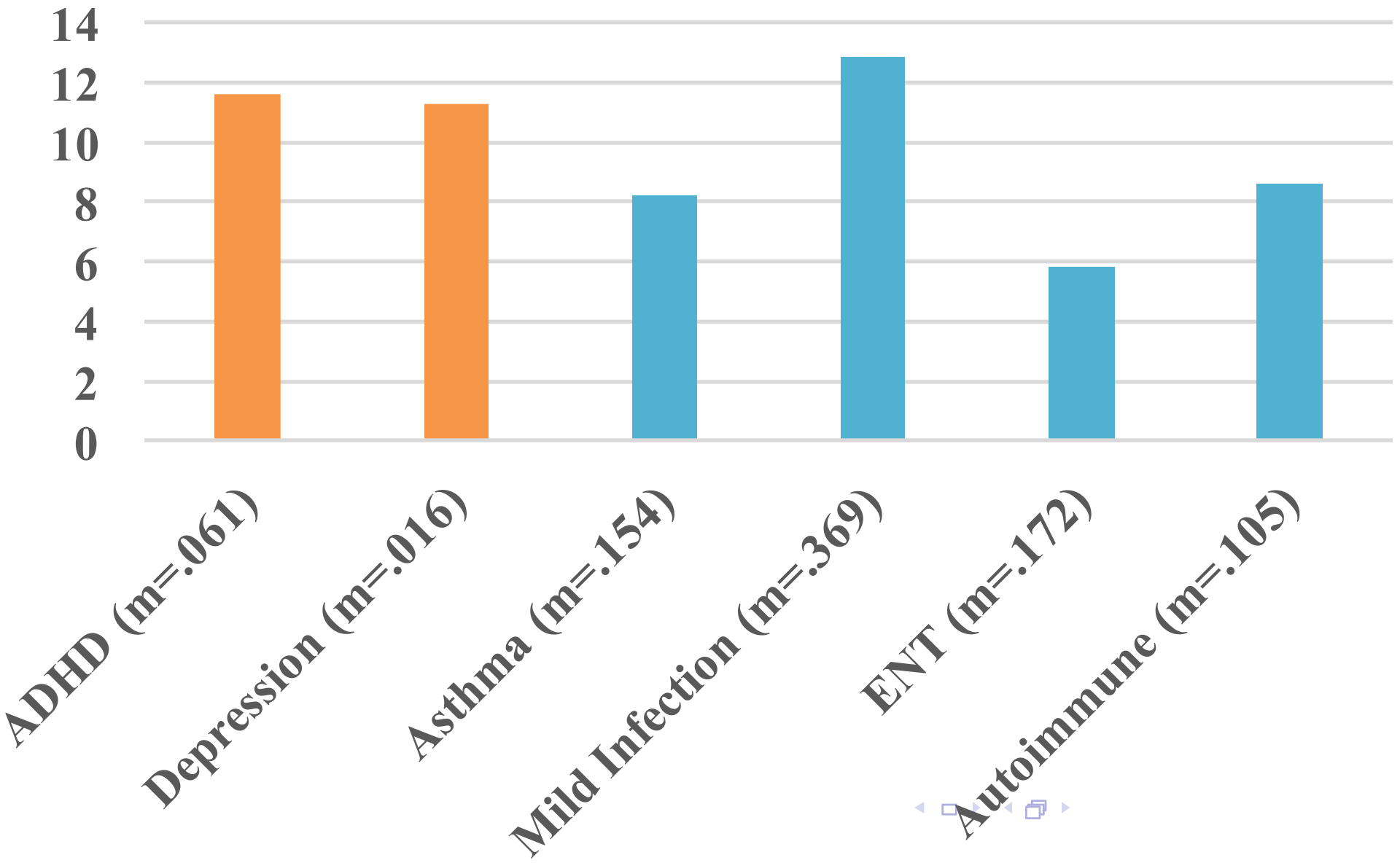




Estimated % increase in access in 12 mo. after switch to MC, child FE models



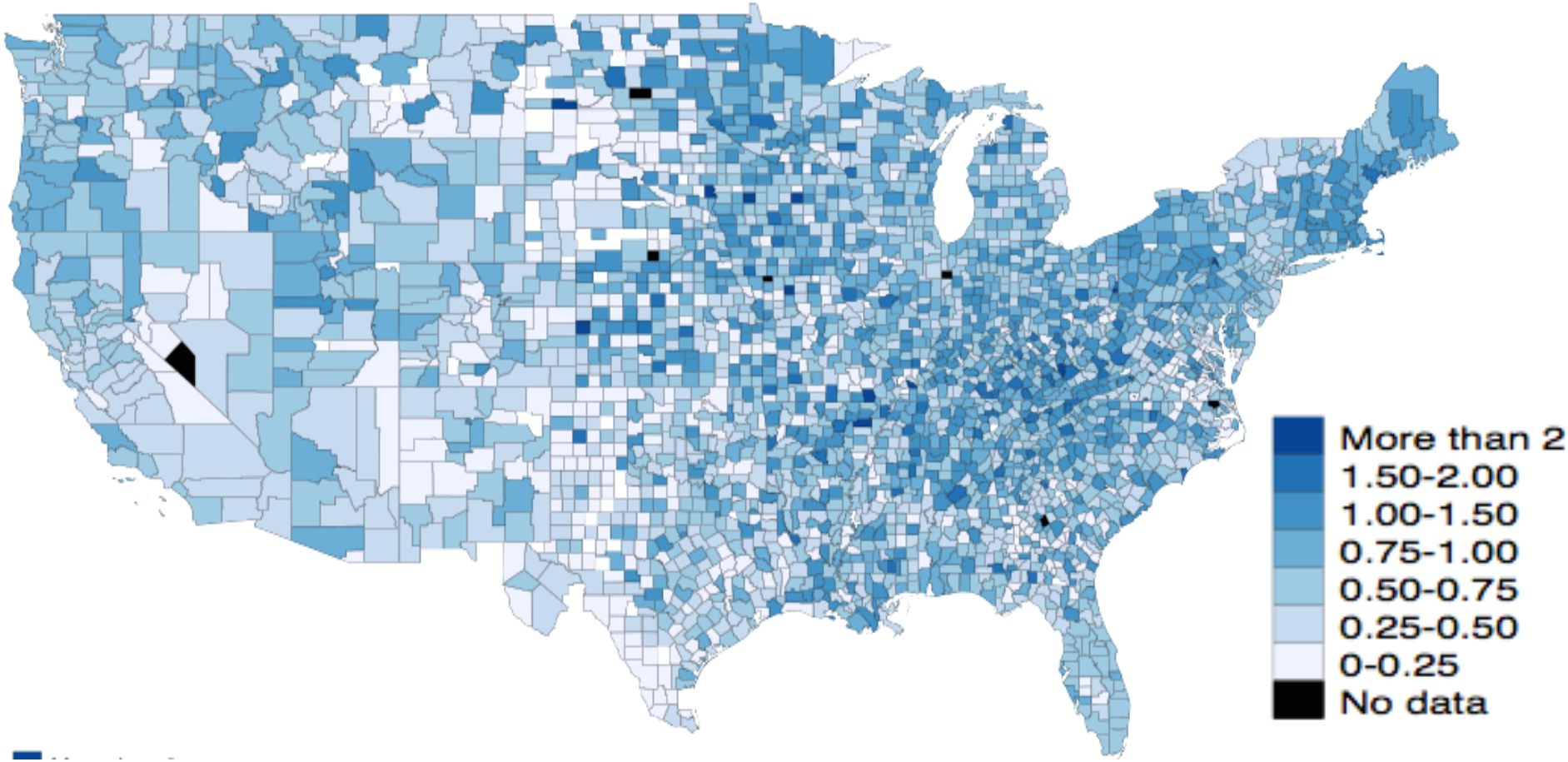
Estimated % increase in diagnoses in 12 mo. after Switch to MC, Child FE Models



We have discussed prevention and diagnosis of mental health but what can we say about treatment?

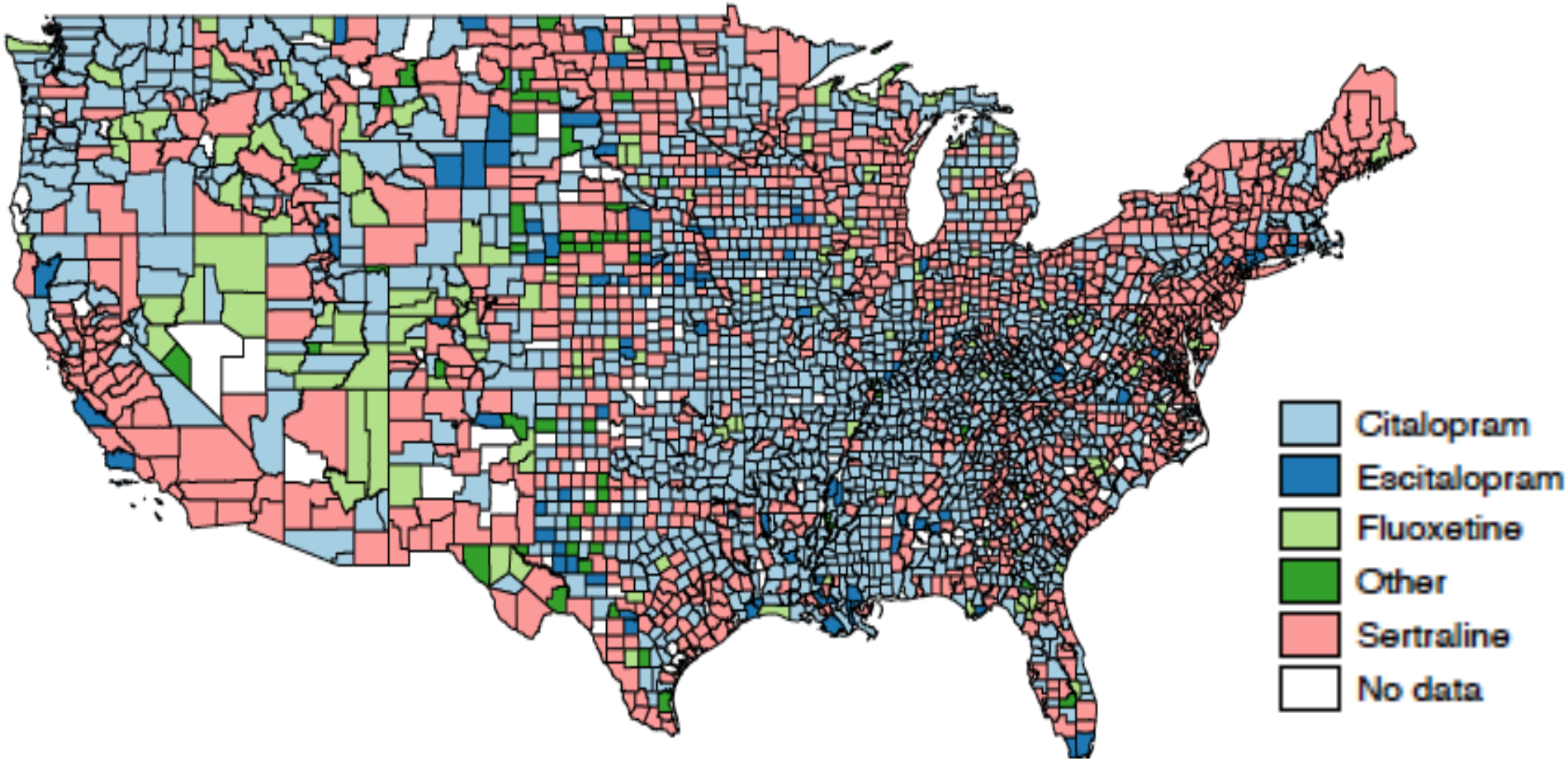
- U.S. may again serve as a laboratory for understanding the effectiveness of treatment given large variations in practice style across and within regions (at the level of the individual provider).
- Increasing availability of administrative data on treatment, outcomes.
- We can look at whether some treatment patterns are associated with better or worse outcomes.

U.S. Annual Anti-Depressant Prescriptions per Person, 2014, by county (Source=Currie and MacLeod (2018)



Most popular anti-depressants, by county, by active ingredient, 2014

(Source=Currie and MacLeod (2018)



Treatment Guidelines are Available for Depression

- UK National Institute for Health Care Excellence: Start with an SSRI. If an anti-depressant doesn't work, try another class of drugs.
- Canada: Some drugs are more effective than others. If one drug doesn't work, try a more effective drug.
- US American Psychiatric Association. Most patients can be treated using: SSRIs, SNRIs, mirtazapine, and bupropion. Excludes drugs that make up 17.4% of market in 2014.
- Drug "cocktails" are not generally recommended; guidelines express concerns about "polypharmacy."

Currie and MacLeod (2018) evaluate "violations" of these guidelines using claims

- 592,147 Blue Cross/Blue Shield members being treated for depression, 6.37 million obs.
- Use patient FE models to control for unobserved differences in condition.
- Use costs, visits to ER, hospitalizations as outcomes.
- Look at the effect of a violation in treatment guidelines between month t-2 and t-1 on outcomes at month t.
- Can examine the effect of all treatment guidelines, plus polypharmacy.

Outcomes at t when drug transition between t-2 & t-1 violated guidelines.

Source=(Currie and MacLeod, 2018)

Outcome:	ln(total cost)	ln(non-drug costs)	ER or Hospital
Violation UK Guidelines	0.255	0.265	0.004
	(0.028)	(0.034)	(0.002)
Violation US Guidelines	0.288	0.303	0.004
	(0.006)	(0.007)	(0.0004)
Violation Can. Guidelines	0.482	0.407	0.004
	(0.007)	(0.008)	(0.0005)
Drug Cocktail	0.504	0.356	0.005
	(0.008)	(0.008)	(0.0005)
Mean Dep. Variable	4.057	2.561	0.025
Adj. R2	0.389	0.314	0.101

Summary and Conclusions:

- Access to health care starting in the prenatal period improves child and adult health and productivity.
- The roll out of public insurance for pregnant women and children in the U.S. (and the U.K.) reduced mortality and improved adult health.
- U.S. reductions in inequality in mortality among children occurred against a backdrop of increasing inequality in mortality among adults, and brought child mortality rates close to much lower Canadian levels.

Summary and Conclusions:

- Prevention of mental health problems may be one important mechanism for improvements in outcomes.
- Although mental health diagnoses in children are increasing, this may be largely due to the improvements in access to screening, diagnosis, and treatment.
- Economists may be able to contribute to evaluating the effectiveness of prevention and treatment using large scale administrative data sets.

Institute for Fiscal Studies

IFS Annual Lecture 2018

Professor Janet Currie: Life, Death, and Mental Health: How Access to Care Helps Children Succeed

27 September 2018

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