Early Life and the Roots of Inequality: Examples Illustrating the Use of Administrative Data

Janet Currie

CENTER FOR HEALTH AND WELLBEING
PRINCETON UNIVERSITY

Main Research Questions:

- Which environmental factors affect early life health?
- How does the early life health and environment affect later life outcomes?
- “Environment” is interpreted broadly to include anything from maternal behaviors, pollution, child care, and the disease environment.

What could be done with the new tool?

- Knowing where people are born (county/MSA) can be helpful.
- E.g. forthcoming paper by Isen, Rossen-Slater, and Walker "Every Breath You Take – Every Dollar You'll Make: The Long-Term Consequences of the Clean Air Act of 1970."
- Shows that children born in counties subject to the Clean Air Acts in the 1970s have higher employment and earnings and lower levels of disability as adults than children born in other similar counties.

Most health data is “owned” by states

- States vary in terms of their technical capabilities and how far back data is available
- States vary in openness to data sharing

Important health data sources that could be linked to Census

- Vital Statistics Natality
- Vital Statistics Mortality
- Hospital Discharge and Emergency Room visit records

Data sources

- Vital Statistics Natality
  - Completed by facilities and mothers
  - CDC makes recommendations as to content, but data is collected by county registrar-recorders and compiled *at the state level*
  - Redacted data *without identifiers* is sent to the federal National Center for Health Statistics

Vital Statistics Natality Data is very rich

U.S. STANDARD CERTIFICATE OF LIVE BIRTH

LOCAL FILE NO. BIRTH NUMBER:

CHILD

1. CHILD'S NAME (First, Middle, Last, Suffix)
2. TIME OF BIRTH (24 hr)
3. SEX
4. DATE OF BIRTH (Mo/Day/Yr)
5. FACILITY NAME (If not institution, give street and number)
6. CITY, TOWN, OR LOCATION OF BIRTH
7. COUNTY OF BIRTH

MOTHER

8a. MOTHER'S CURRENT LEGAL NAME (First, Middle, Last, Suffix)
8b. DATE OF BIRTH (Mo/Day/Yr)
8c. MOTHER'S NAME PRIOR TO FIRST MARRIAGE (First, Middle, Last, Suffix)
8d. BIRTHPLACE (State, Territory, or Foreign Country)
9a. RESIDENCE OF MOTHER-STATE
9b. COUNTY
9c. CITY, TOWN, OR LOCATION
9d. STREET AND NUMBER
9e. APT. NO.
9f. ZIP CODE
9g. INSIDE CITY LIMITS? ☐ Yes ☐ No

FATHER

10a. FATHER'S CURRENT LEGAL NAME (First, Middle, Last, Suffix)
10b. DATE OF BIRTH (Mo/Day/Yr)
10c. BIRTHPLACE (State, Territory, or Foreign Country)

CERTIFIER

11. CERTIFIER'S NAME: _____
TITLE: ☐ MD ☐ DO ☐ HOSPITAL ADMIN. ☐ CNM/CM ☐ OTHER MIDWIFE
☐ OTHER (Specify)_____
12. DATE CERTIFIED _____/_____/_____ MM DD YYYY
13. DATE FILED BY REGISTRAR _____/_____/_____ MM DD YYYY

INFORMATION FOR ADMINISTRATIVE USE

MOTHER

14. MOTHER'S MAILING ADDRESS: 9 Same as residence, or: State: City, Town, or Location:
Street & Number: Apartment No.: Zip Code:
15. MOTHER MARRIED? (At birth, conception, or any time between) ☐ Yes ☐ No
IF NO, HAS PATERNITY ACKNOWLEDGEMENT BEEN SIGNED IN THE HOSPITAL? ☐ Yes ☐ No
16. SOCIAL SECURITY NUMBER REQUESTED FOR CHILD? ☐ Yes ☐ No
17. FACILITY ID. (NPI)
18. MOTHER'S SOCIAL SECURITY NUMBER:
19. FATHER'S SOCIAL SECURITY NUMBER:

INFORMATION FOR MEDICAL AND HEALTH PURPOSES ONLY

MOTHER

20. MOTHER'S EDUCATION (Check the box that best describes the highest degree or level of school completed at the time of delivery)
- ☐ 8th grade or less
- ☐ 9th - 12th grade, no diploma
- ☐ High school graduate or GED completed
- ☐ Some college credit but no degree
- ☐ Associate degree (e.g., AA, AS)
- ☐ Bachelor's degree (e.g., BA, AB, BS)
- ☐ Master's degree (e.g., MA, MS, MEng, MEd, MSW, MBA)
- ☐ Doctorate (e.g., PhD, EdD) or Professional degree (e.g., MD, DDS, DVM, LLB, JD)

21. MOTHER OF HISPANIC ORIGIN? (Check the box that best describes whether the mother is Spanish/Hispanic/Latina. Check the "No" box if mother is not Spanish/Hispanic/Latina)
- ☐ No, not Spanish/Hispanic/Latina
- ☐ Yes, Mexican, Mexican American, Chicana
- ☐ Yes, Puerto Rican
- ☐ Yes, Cuban
- ☐ Yes, other Spanish/Hispanic/Latina

(Specify)_____

22. MOTHER'S RACE (Check one or more races to indicate what the mother considers herself to be)
- ☐ White
- ☐ Black or African American
- ☐ American Indian or Alaska Native (Name of the enrolled or principal tribe)_____
- ☐ Asian Indian
- ☐ Chinese
- ☐ Filipino
- ☐ Japanese
- ☐ Korean
- ☐ Vietnamese
- ☐ Other Asian (Specify)_____
- ☐ Native Hawaiian
- ☐ Guamanian or Chamorro
- ☐ Samoan
- ☐ Other Pacific Islander (Specify)_____
- ☐ Other (Specify)_____

MOTHER

29a. DATE OF FIRST PRENATAL CARE VISIT
_____/_____/_____ ☐ No Prenatal Care
MM DD YYYY

29b. DATE OF LAST PRENATAL CARE VISIT
_____/_____/_____
MM DD YYYY

30. TOTAL NUMBER OF PRENATAL VISITS FOR THIS PREGNANCY
_____ (If none, enter "0".)

31. MOTHER'S HEIGHT
_____ (feet/inches)

32. MOTHER'S PREPREGNANCY WEIGHT
_____ (pounds)

33. MOTHER'S WEIGHT AT DELIVERY
_____ (pounds)

34. DID MOTHER GET WIC FOOD FOR HERSELF DURING THIS PREGNANCY? ☐ Yes ☐ No

35. NUMBER OF PREVIOUS LIVE BIRTHS (Do not include this child)

35a. Now Living
Number _____
☐ None

35b. Now Dead
Number _____
☐ None

36. NUMBER OF OTHER PREGNANCY OUTCOMES (spontaneous or induced losses or ectopic pregnancies)

36a. Other Outcomes
Number _____
☐ None

37. CIGARETTE SMOKING BEFORE AND DURING PREGNANCY
For each time period, enter either the number of cigarettes or the number of packs of cigarettes smoked. IF NONE, ENTER "0".

Average number of cigarettes or packs of cigarettes smoked per day.

	# of cigarettes		# of packs
Three Months Before Pregnancy	_____	OR	_____
First Three Months of Pregnancy	_____	OR	_____
Second Three Months of Pregnancy	_____	OR	_____
Third Trimester of Pregnancy	_____	OR	_____

38. PRINCIPAL SOURCE OF PAYMENT FOR THIS DELIVERY
☐ Private Insurance
☐ Medicaid
☐ Self-pay
☐ Other
(Specify) _____

35c. DATE OF LAST LIVE BIRTH
_____/_____
MM YYYY

36b. DATE OF LAST OTHER PREGNANCY OUTCOME
_____/_____
MM YYYY

39. DATE LAST NORMAL MENSES BEGAN
_____/_____/_____
MM DD YYYY

40. MOTHER'S MEDICAL RECORD NUMBER

MEDICAL AND HEALTH INFORMATION

41. RISK FACTORS IN THIS PREGNANCY
(Check all that apply)

Diabetes
- ☐ Prepregnancy (Diagnosis prior to this pregnancy)
- ☐ Gestational (Diagnosis in this pregnancy)

Hypertension
- ☐ Prepregnancy (Chronic)
- ☐ Gestational (PIH, preeclampsia)
- ☐ Eclampsia

☐ Previous preterm birth

☐ Other previous poor pregnancy outcome (Includes perinatal death, small-for-gestational age/intrauterine growth restricted birth)

☐ Pregnancy resulted from infertility treatment-If yes, check all that apply:
- ☐ Fertility-enhancing drugs, Artificial insemination or Intrauterine insemination
- ☐ Assisted reproductive technology (e.g., in vitro fertilization (IVF), gamete intrafallopian

43. OBSTETRIC PROCEDURES (Check all that apply)

☐ Cervical cerclage
☐ Tocolysis

External cephalic version:
- ☐ Successful
- ☐ Failed

☐ None of the above

44. ONSET OF LABOR (Check all that apply)

☐ Premature Rupture of the Membranes (prolonged, ≥12 hrs.)

☐ Precipitous Labor (<3 hrs.)

☐ Prolonged Labor (≥ 20 hrs.)

☐ None of the above

45. CHARACTERISTICS OF LABOR AND DELIVERY

46. METHOD OF DELIVERY

A. Was delivery with forceps attempted but unsuccessful?
☐ Yes ☐ No

B. Was delivery with vacuum extraction attempted but unsuccessful?
☐ Yes ☐ No

C. Fetal presentation at birth
- ☐ Cephalic
- ☐ Breech
- ☐ Other

D. Final route and method of delivery (Check one)
- ☐ Vaginal/Spontaneous
- ☐ Vaginal/Forceps
- ☐ Vaginal/Vacuum
- ☐ Cesarean

If cesarean, was a trial of labor attempted?
☐ Yes

Main Advantages:

- Of both national and state data:
  - Complete coverage of all births, and all mothers.
  - Relatively rich demographic and behavioral information including race, education, marital status, number of children, smoking, use of WIC and prenatal care, health conditions.
- Of state data bases only:
  - Since states have identifiers, one can geocode residential location and link births to the same mother in order to identify siblings.

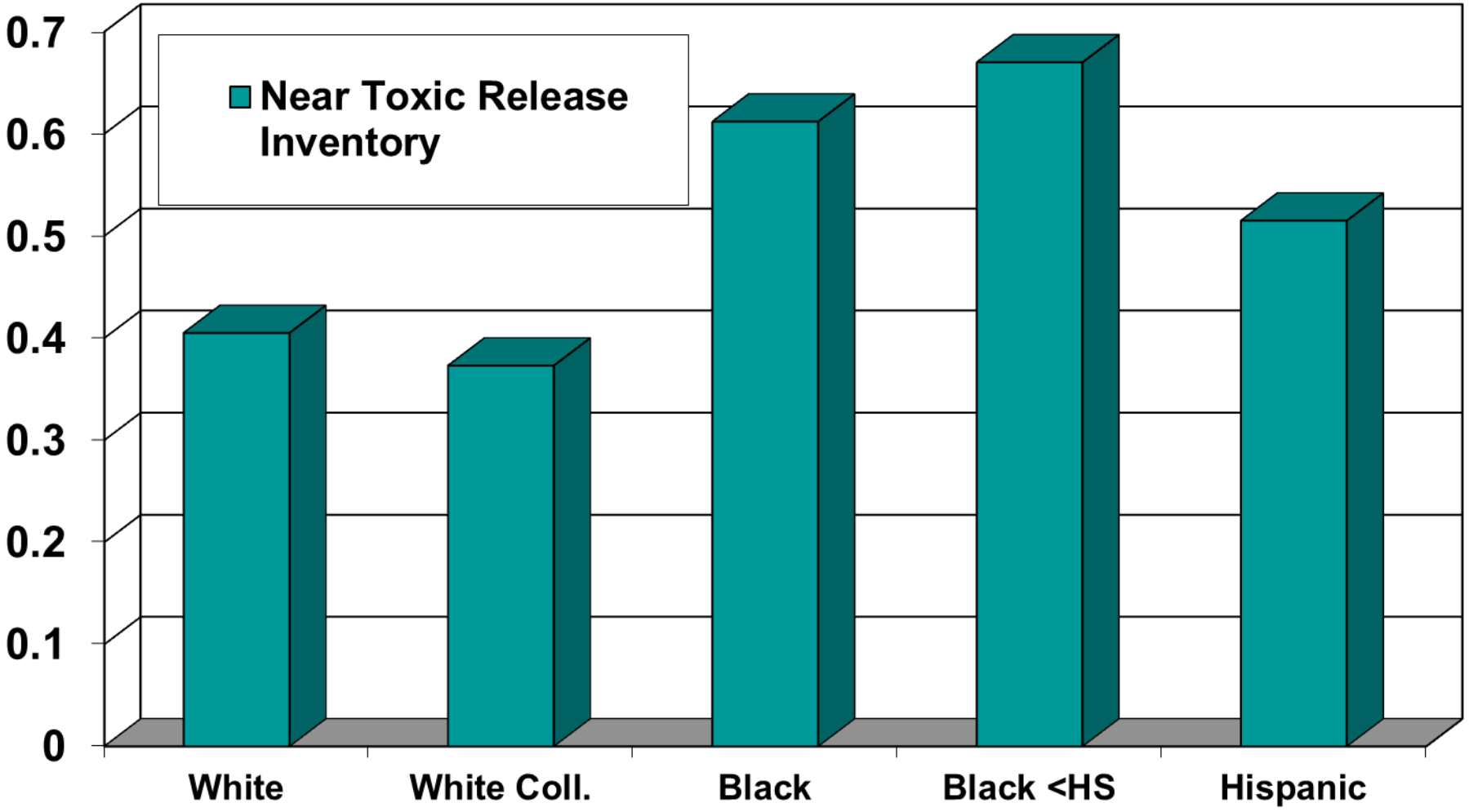
Main Disadvantages:

- National data have no identifiers so cannot be linked
- Relatively few states make their data available for research
- Data ends at birth, so no information about future health outcomes.
- No data on income, a key variable in many applications.
- Data quality issues for some items.

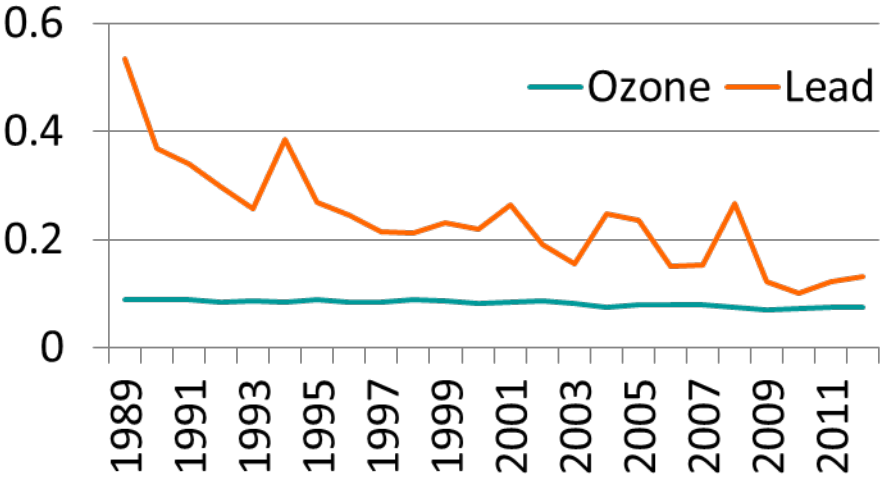
Application: Environmental Justice

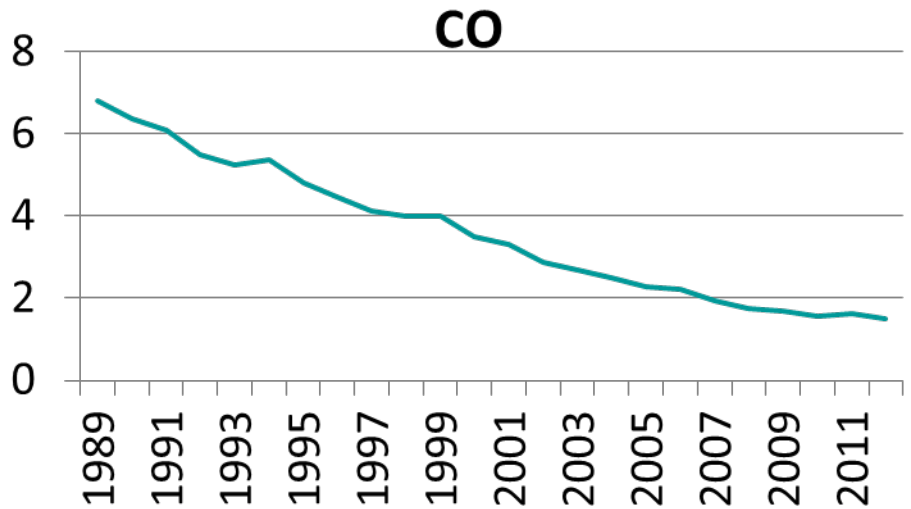
Result: Minority mothers more likely to be exposed to harmful chemicals during pregnancy

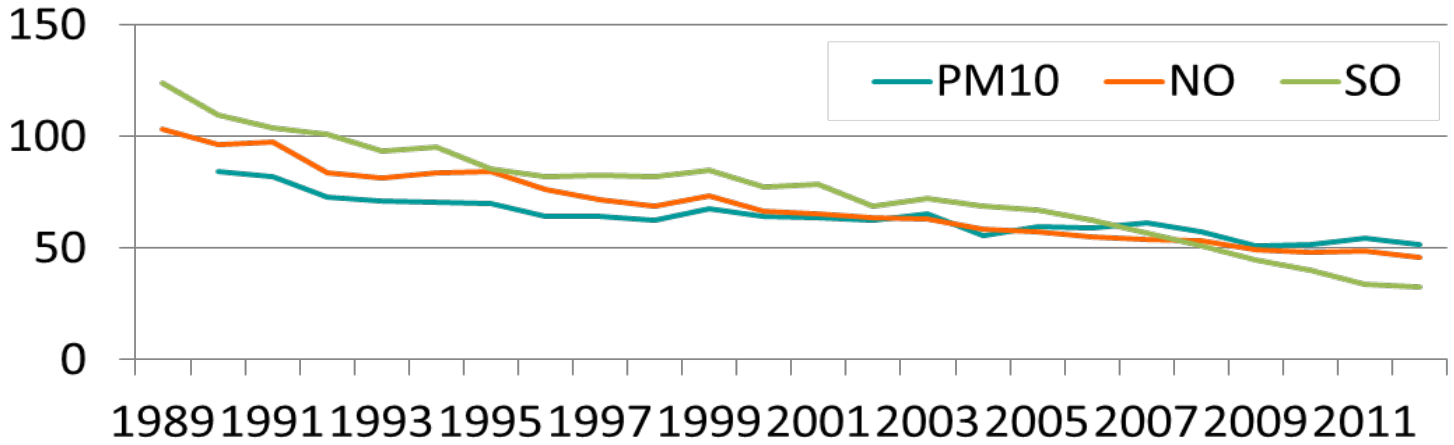
There are large differences by race/ethnicity and education in the probability of being <1.24 miles (2000m) from a Toxic Release Inventory site



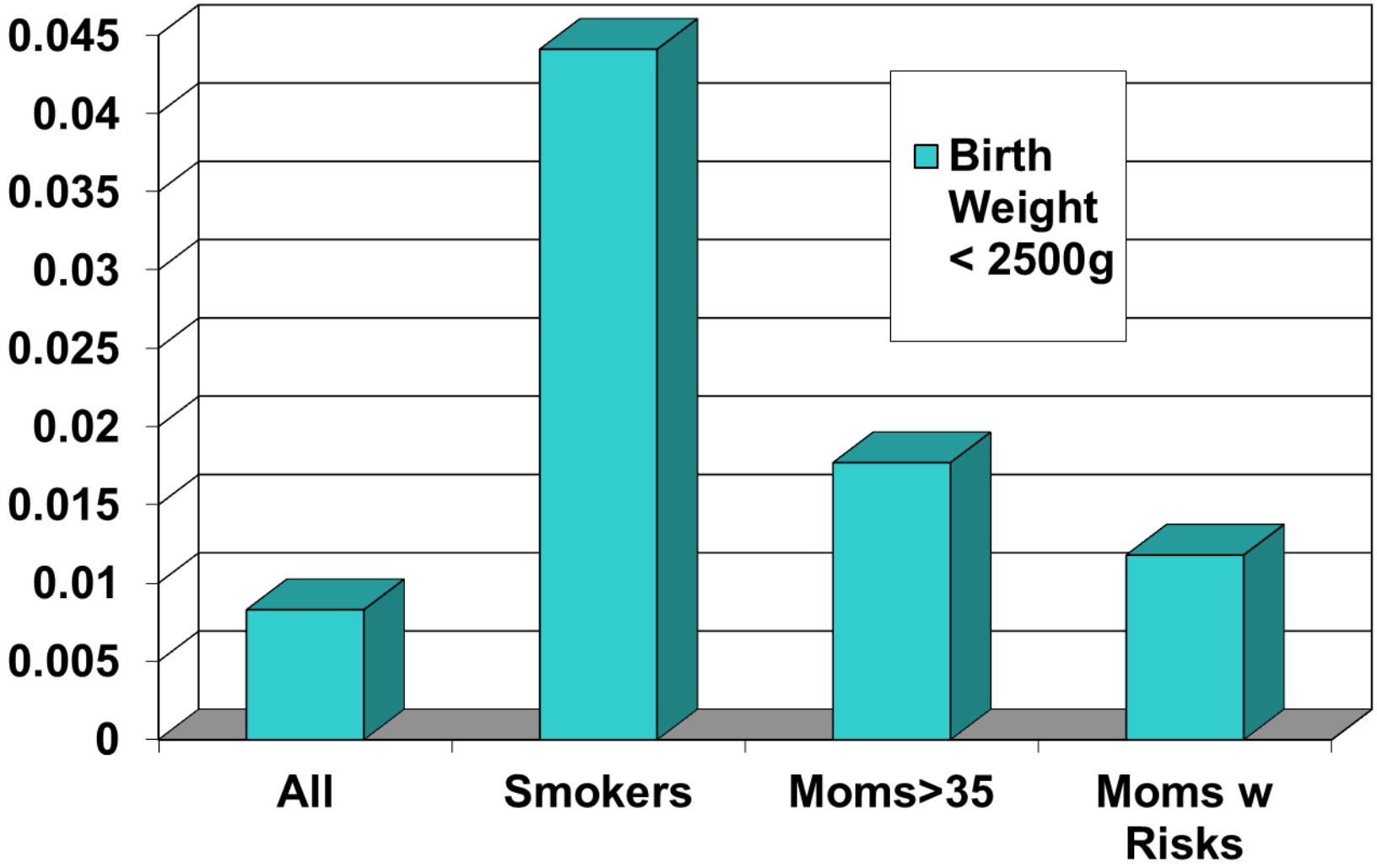
Application 2: Measuring the Effect of Local Changes in Pollution During Pregnancy



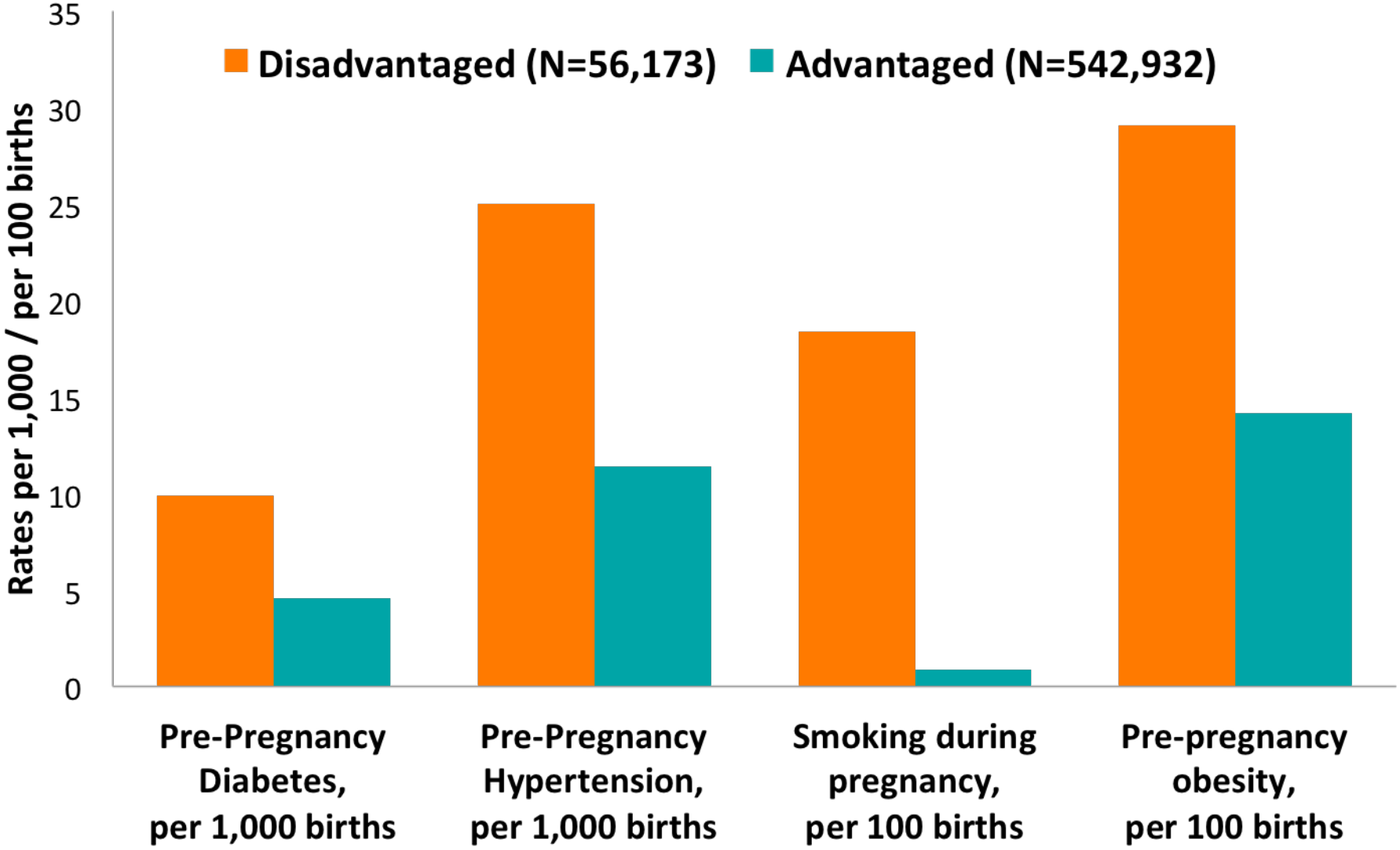




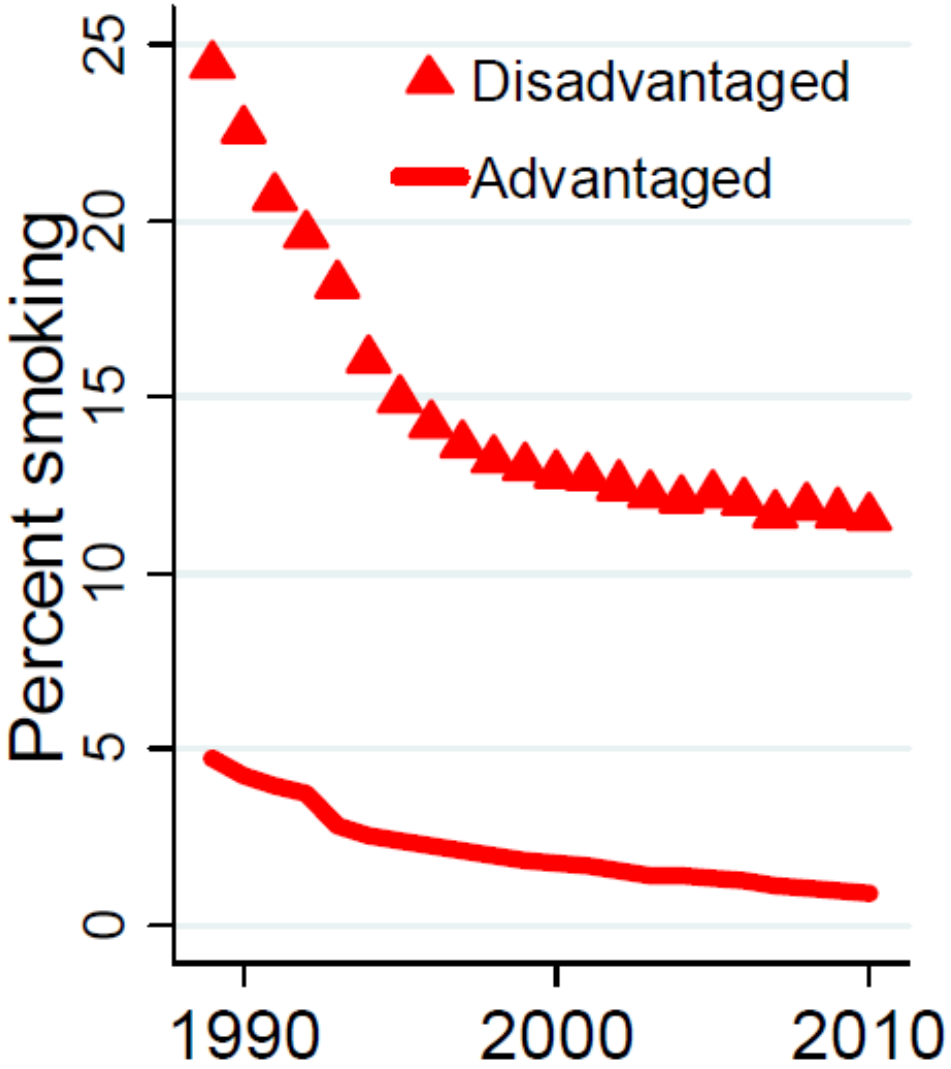
A 1 Unit Change in CO (Mean=1.6, SD=13) Changes the Incidence of Low Birth Weight



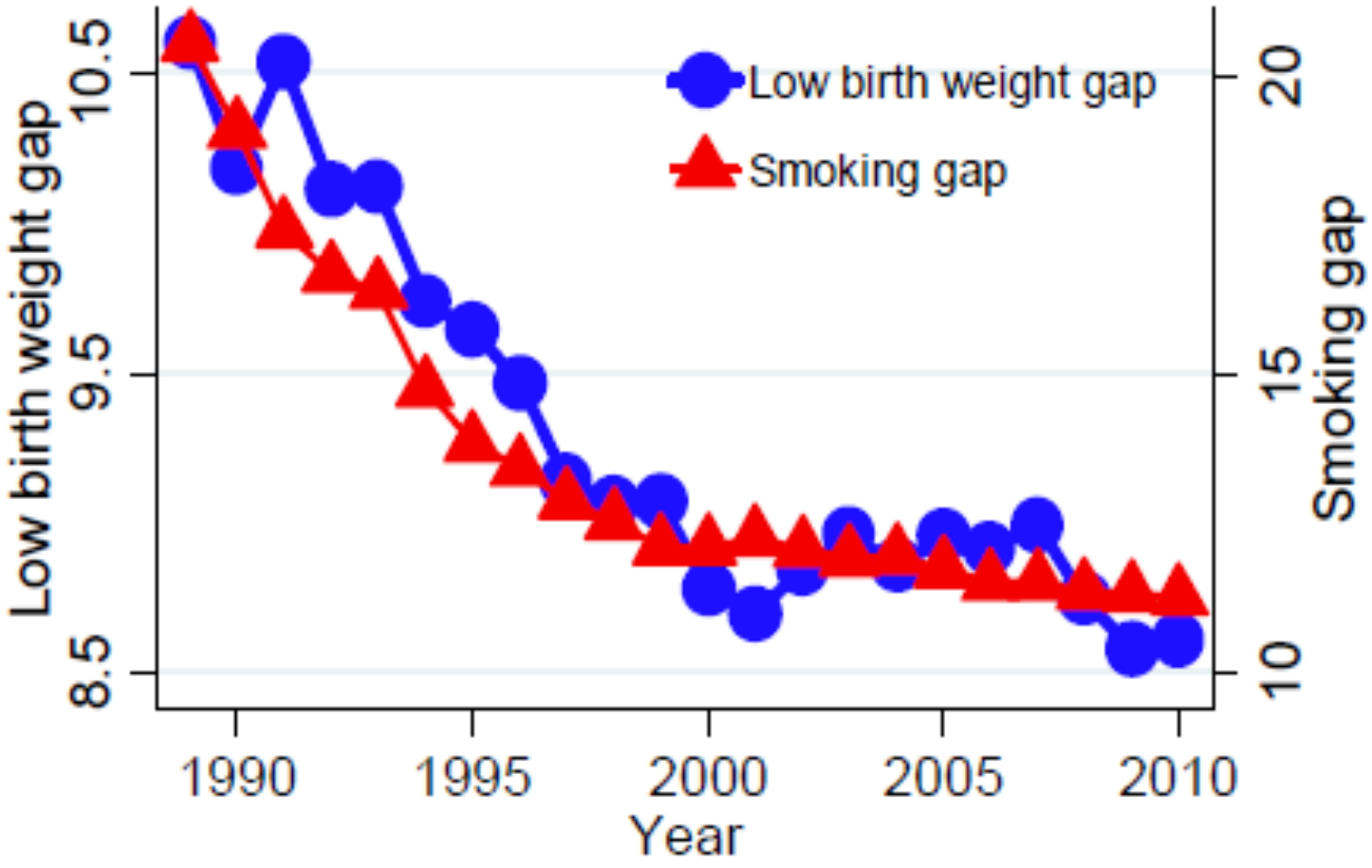
Application 3: Differences in Maternal Health and Behavior by Maternal SES, U.S. 2011



Disadvantaged women are more likely to smoke during pregnancy, but the gap is falling



Reductions in smoking gaps track reductions in LBW gaps remarkably closely



Notes: Singleton births, moms age 19-39 only. Excl.: CA, FL, GE, IN, MI, NY, SD

Summary re: Natality Data

- We have a lot of data about factors that affect health at birth but currently no way to examine the longer term effects of those factors.
- Linkage to Census data would be a powerful way to follow children through time.
- Very little evidence about intergenerational health effects.

Mortality Data

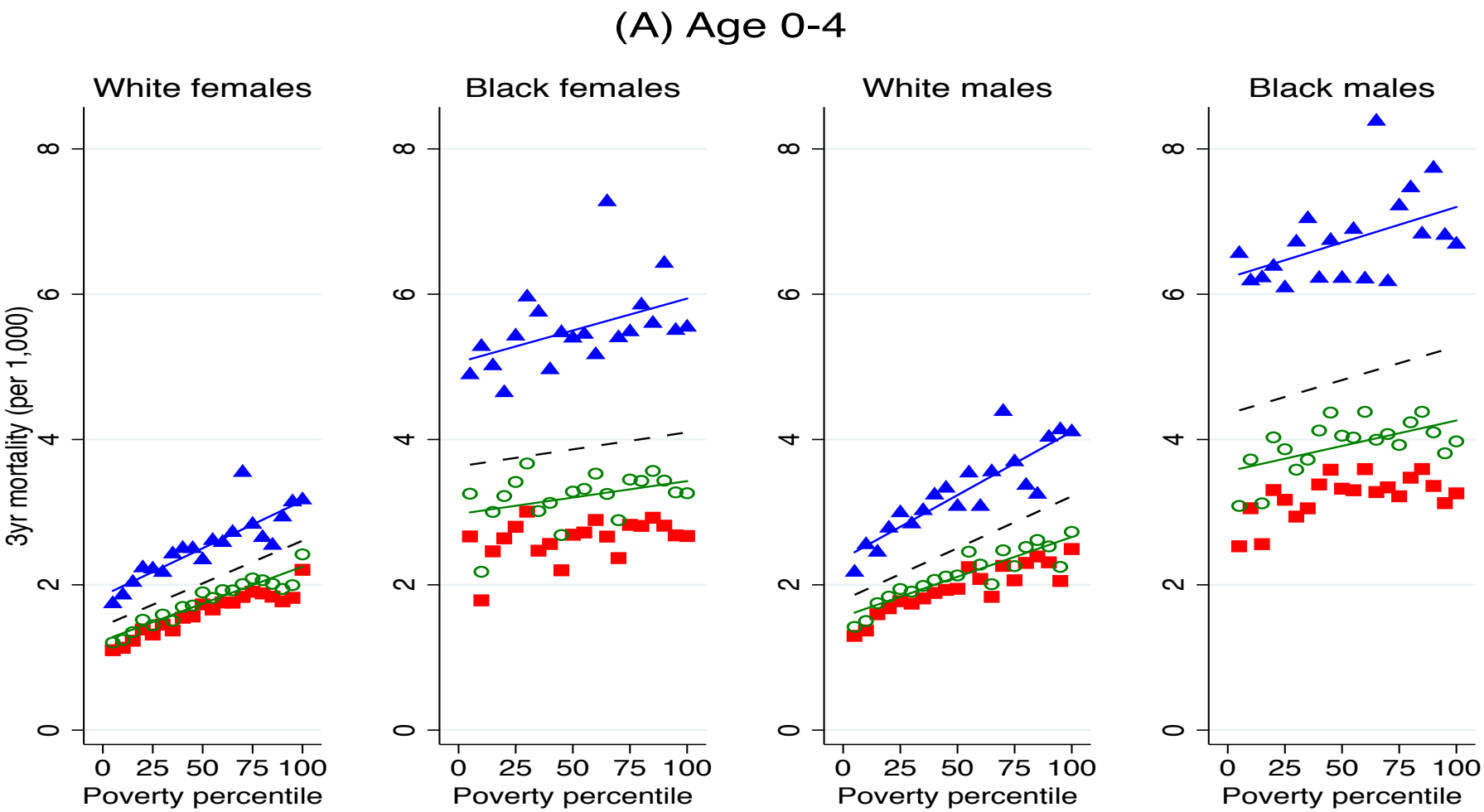
- Largely filled in by funeral homes
- Advantages
  - Complete Coverage
  - Definitive Outcome
  - Data elements such as occupation (for adults)
- Disadvantages
  - Quality of cause of death data
  - Little information about parents for child deaths
  - Must choose a denominator to construct rates

Application: Examine Trends in Health Inequality

- Changes in reporting of race, and in levels of education can complicate analyses of mortality data.

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

(Blue triangle=1990, Green Circle=2010, Red Square=2010 with multiple race)



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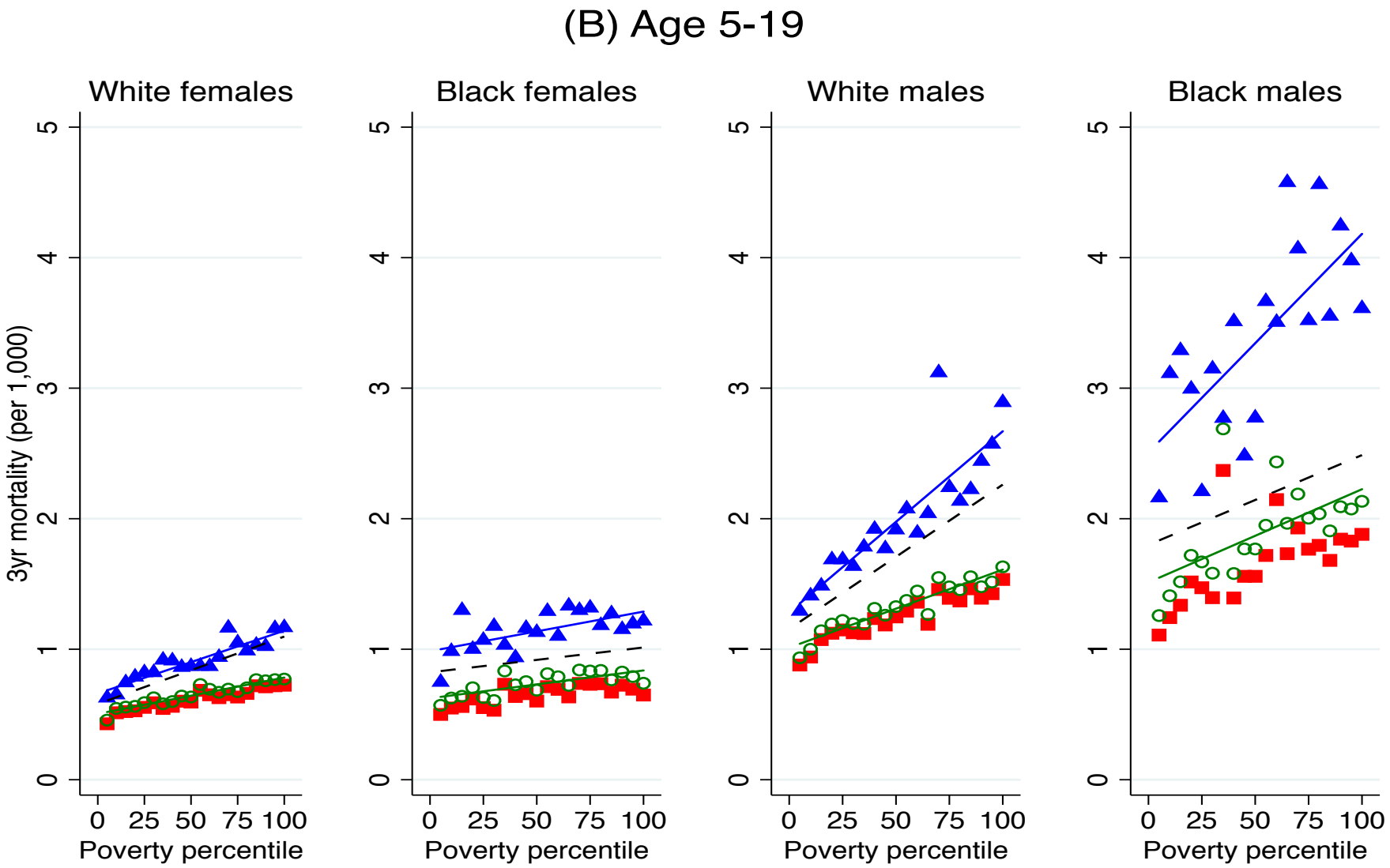

3-Year Mortality Rates Across County Groups Ranked by Poverty Rates, by Race and Gender.

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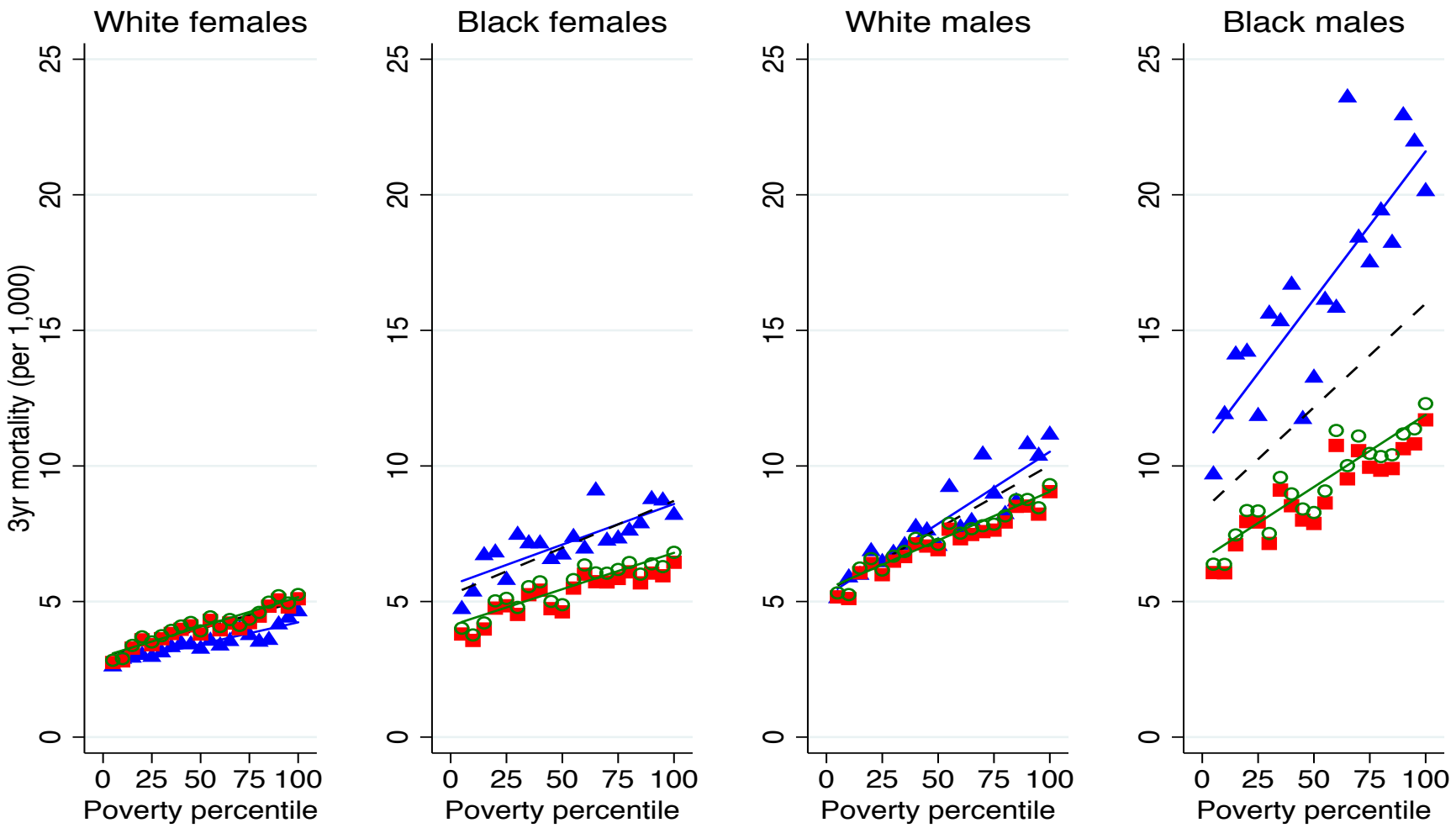
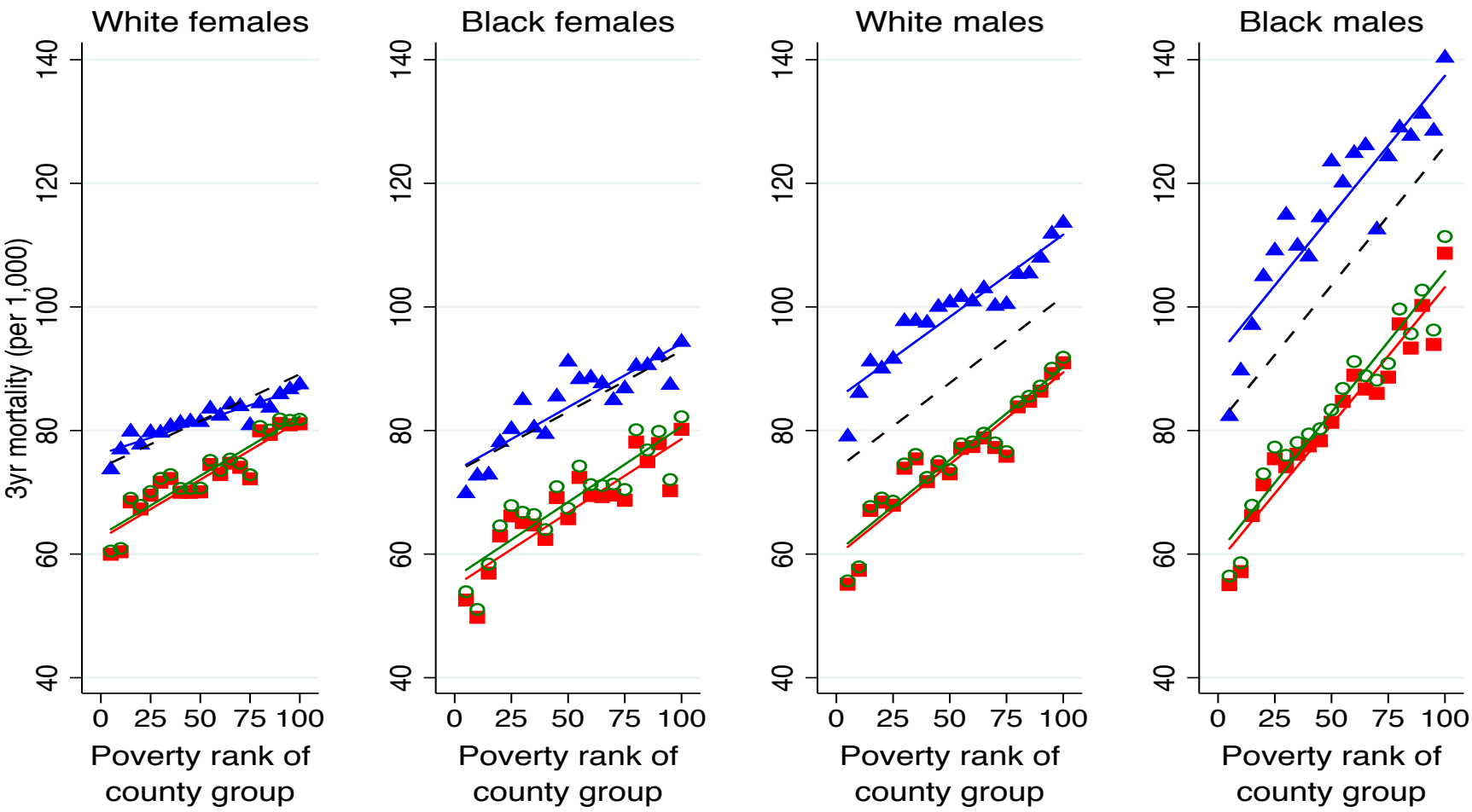
(C) Age 20-49



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

(Blue triangle=1990, Green Circle=2010, Red Square=2010 with multiple race)

(D) Age 50+



Summary

- This literature on inequality in mortality is all cross-sectional though there are large cohort effects
- People only die once, but communities vary in terms of mortality rates it would be useful to be able to follow up on these effects over time.

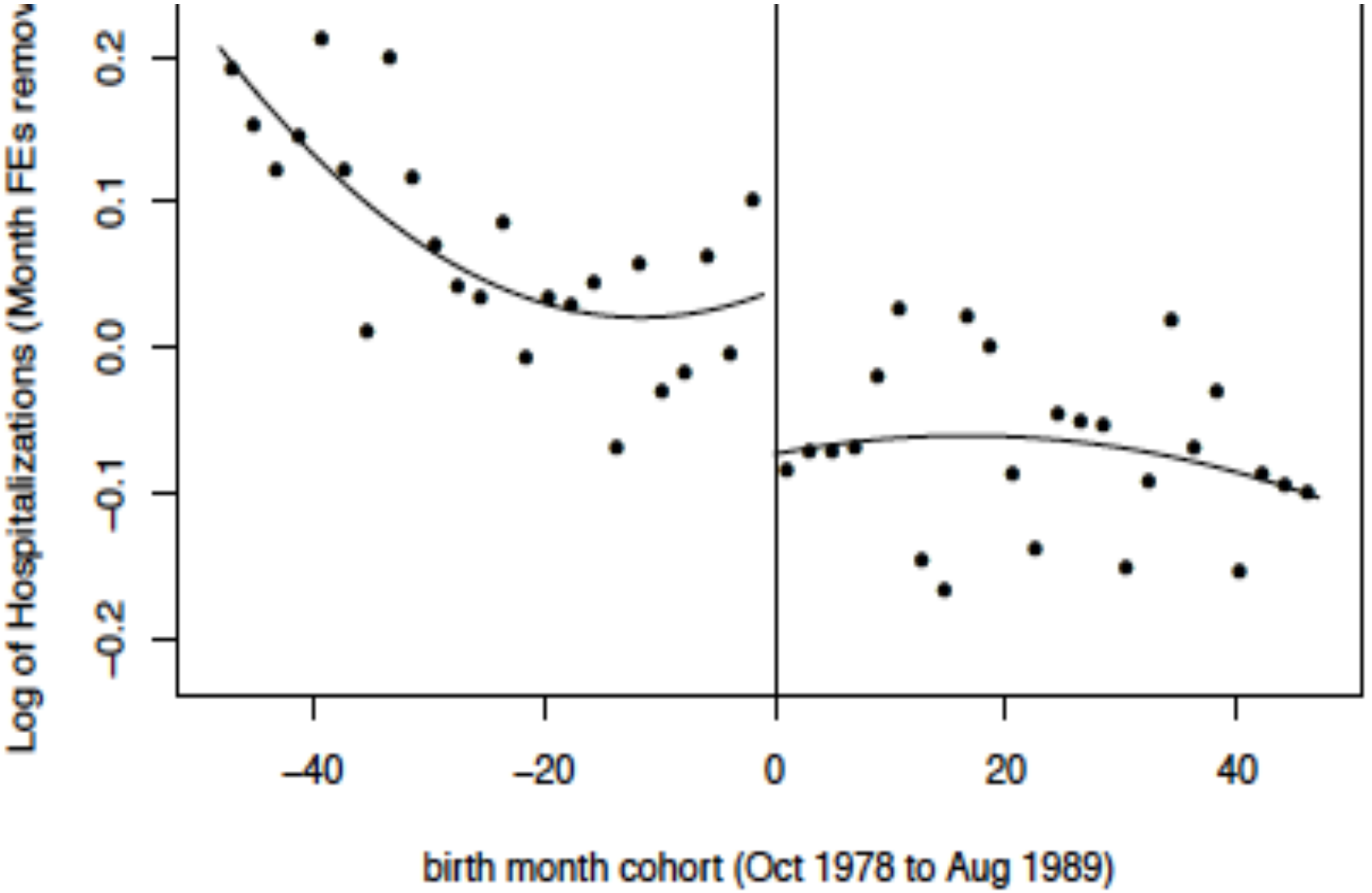
Hospital Discharge and ER Data

- Source: Hospital required to file reports for every visit with state agencies
- Advantages
  - Complete reporting of visits with detailed information about diagnoses and procedures
  - Readily available in fairly standardized formats through HCUP

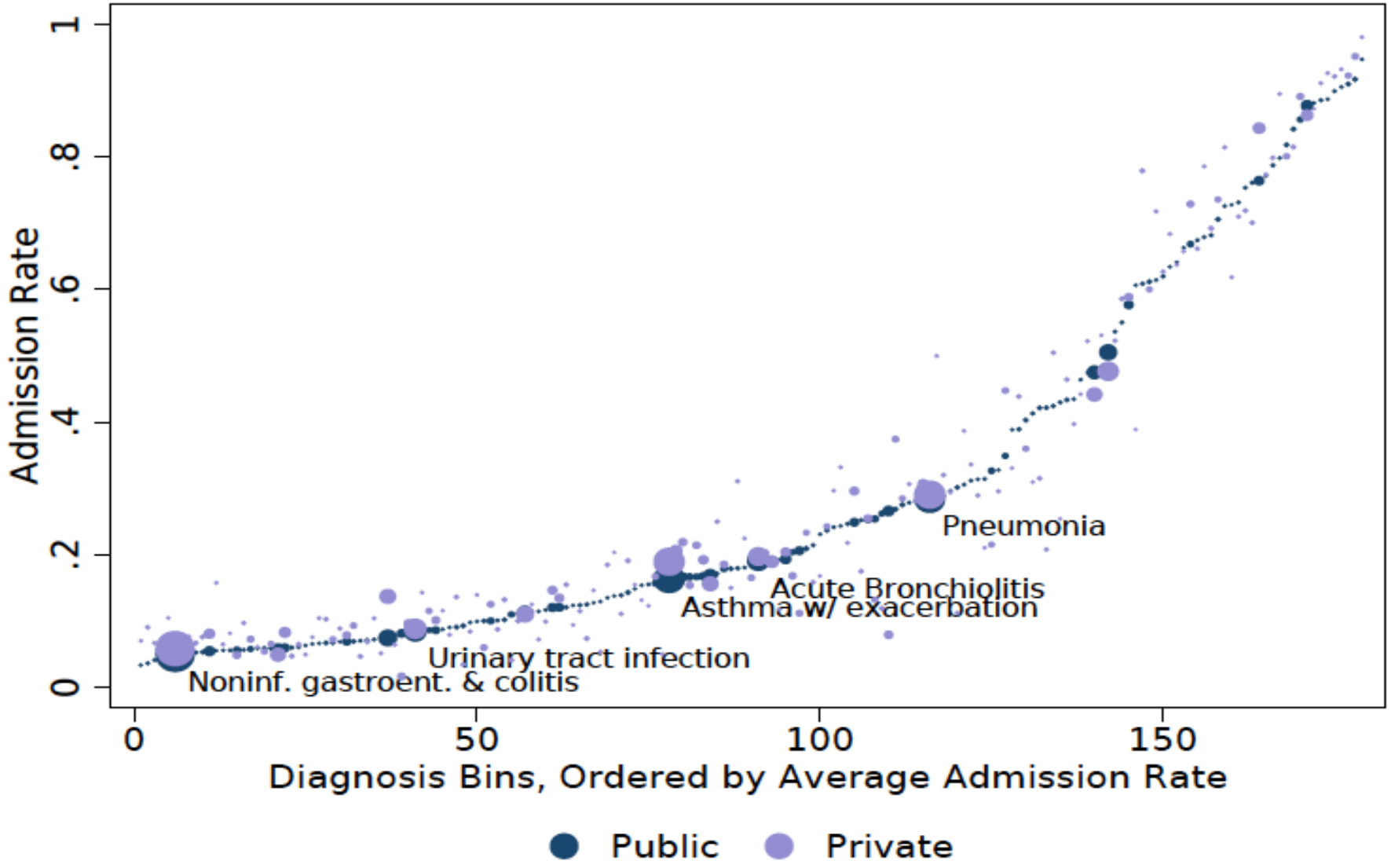
- Disadvantages
  - Selectivity in hospitalization and ER use
  - HCUP records do not include identifiers (though state agencies have this information)
  - Little background demographic information is available

Application 1: Long-term effects of Medicaid expansions.

Wherry et al. (2015) show drop in 2009 hospitalizations for chronic illness in black children born after Sept. 1, 1983



Application 2: Investigating Differential Admission Patterns by Private and Public Insurance Status



Adding a Longitudinal Aspect

- Linkage to Census data could help to determine how much differential treatment matters

Intergenerational panel data: Suggestions for administrative data linkages

- Would be extremely useful for such a panel to be linked to birth and mortality data
- Identifiers in birth data could be used to identify parents and siblings of the index panel members
- A key difficulty is that this would require buy in from individual state governments who control the vital data

- Also useful to link to hospital discharge and ER data in order to follow children after birth and into adulthood
- With this additional data it would be possible to directly examine the long-run effects of factors known to affect health at birth.
- The majority of states already cooperate with HCUP and so it might be possible to build on this collaboration.