The Long-Term Impacts of Medicaid Exposure in Early Childhood

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Medicaid

• Provides health insurance coverage to low income mothers and children
• Joint effort of the states and federal government
  – Consumes about 16% of state budgets and 8% of federal spending
  – Finances 48% of all childbirths
  – Covers 35% of all children under 19
• Little information on the long term impacts of having Medicaid in childhood on adult health and economic status
Acknowledgments

• Funding
  – UofM Interdisciplinary Doctoral Fellowship
  – AHRQ Dissertation Grant
    • All errors and opinions are my own

• Co-authors
  – Ezra Golberstein
  – Donna McAlpine
Aim and Approach

• Research Question
  – Does exposure to Medicaid in early childhood improve health and economic outcomes in adulthood?

• Empirical Challenges
  – Unobserved selection into the program
    • Use the state-by-time variation in Medicaid using difference-in-differences to measure the effect of exposure to policy
  – Long follow-up period
    • Focus on Medicaid’s original introduction in 1966 using data from the Panel Study of Income Dynamics
Medium-term impacts of Medicaid

• Medicaid exposure earlier in childhood improves outcomes later in childhood
  – Self Reported Health (Currie et al., 2008)
  – Mortality (Meyer & Wherry, 2012)
  – Academic Achievement (Levine et al., 2009)
Mechanisms

• Improvements in short-run health
  – Fetal origins hypothesis and emerging evidence on later childhood disease
    • Heart disease, type II diabetes, cancer, obesity, respiratory disease, rheumatism
    • Education, wages, employment status

• Improvements in family economic resources
  – Additional investments in childhood development
  – Reduced stress

Barker 2007; Gluckman and Hanson 2004; Montez and Hayward 2011; Kuh et al. 2003; Warren et al. 2013, Almond & Currie 2010; Black et al. 2007; Duncan et al. 2002
The long-run effects of early childhood health services

- NICU Services for at-risk newborns
  - Academic test scores
- Antibiotics to treat child pneumonia
  - Income, employment, disability
- Hospital desegregation (Chay et al, 2009)
  - Improved cognitive ability

Bharadwaj et al. 2012; Bhalotra and Venkataramani 2012; Chay et al. 2009
Hoynes, Shanzenbach, & Almond (2012)

• Long run impact of food stamp program on health and SES

• Exposure to FSP from ages 0-5
  – 0.3 SD improvement to health index
  – 0.3 SD improvement to SES index for women
The long-run impact of Medicaid

Child Health → Access to Care → Medicaid → Economic Resources → Adult Health/SES
The long-run impact of Medicaid

Child Health → Access to Care → Medicaid

Medicaid → Economic Resources → Adult Health/SES

$u$
Study setting

• Staggered timing of Medicaid’s introduction across the states
  – Created variation in the amount of early life exposure to Medicaid

• Enacted in 1965
  – Roll out mainly occurred between 1966-1970
  – By 1972, all but Arizona had a program
The situation before Medicaid: Health insurance in 1963

1963 National Health Interview Survey
Components of Medicaid

• Mandated that all people on Aid to Families with Dependent Children (cash welfare) be automatically enrolled

• Covered services with no copay
  – Physician services, hospital stays, lab and x-ray (Holahan, 1975)

• 8.5 million Medicaid participants by 1970
The short-term effect of Medicaid’s introduction

• Only two studies document the effect of Medicaid’s introduction on child health
  – In groups targeted by Medicaid
    • 60% reduction in the incidence of low birth weight
    • 24% reduction in child mortality

(Decker and Gruber 1993; Goodman-Bacon 2013)
Medicaid adoption by quarter and year
Data

• 1968-2009 Panel Study of Income Dynamics
  – Follows respondents and their descendants
  – A large oversample of low income families

• Key measures
  – Health (chronic conditions)
  – Economic status (education, income, wealth)
  – Demographic information (place and time of birth and family structure)
Sample selection

• 1955-1980 birth cohorts
  – 6 cohorts with no Medicaid exposure prior to age 6
  – 10 cohorts w/exposure starting in early childhood
  – 10 cohorts exposed starting *in utero*
    • I drop AZ (< 1% of sample)

• A sample of adults (Age 18-54)
  – Attach childhood characteristics
    • Define childhood exposure and isolate subgroups targeted by the program

• Household heads and their spouses
Demographics of the sample

<table>
<thead>
<tr>
<th></th>
<th>n</th>
</tr>
</thead>
<tbody>
<tr>
<td>Person Years</td>
<td>18,243</td>
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<tr>
<td>Unique Persons</td>
<td>3,863</td>
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<table>
<thead>
<tr>
<th></th>
<th>Mean (SD)</th>
<th>Min</th>
<th>Max</th>
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</thead>
<tbody>
<tr>
<td>Age</td>
<td>32.1 (7.8)</td>
<td>18</td>
<td>54</td>
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<tr>
<td>Male</td>
<td>.46</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>White</td>
<td>.82</td>
<td>0</td>
<td>1</td>
</tr>
<tr>
<td>Married</td>
<td>.65</td>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>
Treatment variable

• Medicaid exposure
  – Share of months from conception to 6\textsuperscript{th} birthday ("early childhood")
    • Range is $[0, 1]$
    • A function of time and place of birth
    • Measures exposure to policy, not participation
Average months exposed
Adult health outcomes

• Health conditions (Measured in 1999-2009):
  – High blood pressure (14%)
  – Heart disease or heart attack (3%)
  – Adult onset diabetes (2%)
  – Obesity (24%)

• Condition Index ($\bar{x}=-0.03; \text{sd}=0.6$)
  – Equally weighted mean of z-scores
  – Improves power and reduces problems of multiple comparisons
Adult Economic Outcomes (Age 25+)

• Economic Indicators (Measured in 1999-2009)
  – Years of education ($\bar{x}=13.4; \text{sd}=2.1$)
  – Income-to-poverty ($\bar{x}=4.6; \text{sd}=6.2$)
  – Family wealth ($\bar{x}=6.1; \text{sd}=2.9$)
    • Measured in deciles
• Economic index ($\bar{x}=0.3; \text{sd}=0.9$)
Contextual Controls

• Many things were changing around Medicaid’s introduction

• 3 strategies
  – Time trends
  – Control for as much as I can
  – Triple differencing
State-of-Birth Controls

• Per Capita AFDC Caseloads and benefit standards
  – Average in early childhood
• Unemployment rates
  – Average in early childhood
• Legalized abortion
  – Indicator at conception
County-of-Birth Controls

- Per Capita Doctors and Hospitals
  - Average in early childhood
- Per Capita Spending on public assistance
  - Average in early childhood
- Food stamps, head start, community heath centers, family planning grants, MCH grants, job training grants
  - Fraction of months in early childhood

*Data generously provided Amy Finkelstein, Douglas Almond, Hillary Hoynes, and Martha Bailey*
Models

\[ y_{\text{insct}} = \lambda MCAIDSHARE_{st} + \beta X_{\text{insct}} + \phi STATECON_{st} + \varphi CNTYCON_{ct} + \rho_n + \delta_t + \gamma_s + (\gamma_s * t) + e_{\text{insct}} \]

- OLS
- Sample weights adjust for initial selection and attrition
- Standard errors clustered on state of birth (Bertrand et al. 2004)
Subgroups targeted by Medicaid

- **PSID collects AFDC information but I avoid using it to reduce the risk of compositional shifts that could bias the results**
- **Low income (< 150% FPL)**
  - Average level in the early childhood period
  - Any AFDC in childhood: 40%
- **Low education (< H.S.)**
  - Status of family head at birth
  - Any AFDC in childhood: 22%
The effect of Medicaid in childhood on adult health and economic status

<table>
<thead>
<tr>
<th></th>
<th>Low Income</th>
<th>Low Education</th>
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<tbody>
<tr>
<td></td>
<td>Effect of Medicaid</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Exposure</td>
<td>SE</td>
</tr>
<tr>
<td>Condition Index</td>
<td>-0.36**</td>
<td>0.13</td>
</tr>
<tr>
<td>Sample Size</td>
<td>5,926</td>
<td>6,960</td>
</tr>
<tr>
<td>Mean of Y</td>
<td>-0.01</td>
<td>-0.01</td>
</tr>
<tr>
<td>R²</td>
<td>0.21</td>
<td>0.18</td>
</tr>
<tr>
<td>Economic Index</td>
<td>-0.11</td>
<td>.21</td>
</tr>
<tr>
<td>Sample Size</td>
<td>5,973</td>
<td>7,181</td>
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<tr>
<td>Mean of Y</td>
<td>-0.24</td>
<td>-0.10</td>
</tr>
<tr>
<td>R²</td>
<td>0.33</td>
<td>0.30</td>
</tr>
</tbody>
</table>

*p<0.1; **p<0.05; ***p<0.01

Models control for demographics, contextual controls, fixed effects
Interpretation

• Condition Index
  – Coefficient in low-income sample suggests that exposure to Medicaid reduces the probability of having one of the conditions measured by the index by 0.4

• Economic Index
  – Confidence intervals cannot exclude a large range of potentially meaningful effect sizes
## The effect of Medicaid in placebo groups

<table>
<thead>
<tr>
<th>Condition Index</th>
<th>Moderate Income</th>
<th>High Education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Effect of Medicaid Exposure</td>
<td>Effect of Medicaid Exposure</td>
<td></td>
</tr>
<tr>
<td></td>
<td>0.05</td>
<td>0.01</td>
</tr>
<tr>
<td></td>
<td>0.12</td>
<td>0.09</td>
</tr>
<tr>
<td>Sample Size</td>
<td>5,695</td>
<td>10,802</td>
</tr>
<tr>
<td>Mean of Y</td>
<td>-0.14</td>
<td>-0.18</td>
</tr>
<tr>
<td>R²</td>
<td>.15</td>
<td>.09</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Economic Index</th>
<th>Moderate Income</th>
<th>High Education</th>
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<td></td>
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<td>0.12</td>
</tr>
<tr>
<td></td>
<td>0.14</td>
<td>0.09</td>
</tr>
<tr>
<td>Sample Size</td>
<td>11,210</td>
<td>19,557</td>
</tr>
<tr>
<td>Mean of Y</td>
<td>-0.2</td>
<td>-0.32</td>
</tr>
<tr>
<td>R²</td>
<td>.12</td>
<td>.07</td>
</tr>
</tbody>
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Models control for demographics, contextual controls, fixed effects
Interaction models (triple diff.)

• Formalize the comparison between impact groups using a triple difference approach
  – Interact the exposure variable with predicted probability of participation

• Provide sharper focus on targeted groups
  – Using a different set of eligibility proxies that are less controllable than income

See Hoynes et al. 2012; Hoyt 2007
Measuring the Predicted Probability of Participation

• Participation rates obtained from 1977-1978 PSID (Medicaid or AFDC)

• Defined for 24 demographic groups
  – Age by Race by Education by Marriage

• Probabilities are merged back to the analytical sample according to the record’s childhood characteristics
  – Mean: 0.05
  – Min: 0.01
  – Max: 0.44
Model and Interpretation

• Same demographic controls, contextual controls, and fixed effects
• Main effect of Medicaid exposure
  – Should be small (part. rate = 0)
• Interaction
  – The effect of exposure as predicted participation approaches 1
The effects of Medicaid

<table>
<thead>
<tr>
<th></th>
<th>Condition Index</th>
<th>Economic Index</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coef.</td>
<td>SE</td>
</tr>
<tr>
<td>Medicaid Exposure</td>
<td>-0.03</td>
<td>0.08</td>
</tr>
<tr>
<td>Exposure*Participation</td>
<td>-0.88*</td>
<td>0.45</td>
</tr>
<tr>
<td>Sample Size</td>
<td>18,094</td>
<td></td>
</tr>
<tr>
<td>Mean of Y</td>
<td>-0.04</td>
<td></td>
</tr>
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Models control for demographics, contextual controls, fixed effects
Robustness

• School and Hospital desegregation
  – Results robust to removing southern born non-whites

• Selective migration
  – Robust to removing cases that moved states in the early childhood period

• Contextual controls
  – Robust to removing contextual controls
Summary

• Exposure to Medicaid in early childhood appears to decrease the prevalence of adult chronic conditions
  – A reduction of one chronic condition

• No evidence of improved economic status
  – Wide confidence intervals cannot exclude a large range of potential effects
Limitations

• I can not identify exact mechanisms
  – Economic resources
  – Health
    • But what services specifically?
• Can not determine if there is a critical period embedded in the early childhood years
  – There has been a lot of attention to the prenatal period, but I cannot isolate it with these data
Contributions

• First examination of long run outcomes of Medicaid
  – Consequences of childhood health
    • Policy interventions
  – Medicaid evaluation literature
    • Benefits persist over time
Policy Implications

• This study suggests that providing health insurance at early ages produces long term benefits for low income children
  – Improves individual health
  – Could produce down-stream savings

• 5.5 million children uninsured in 2011
  – The benefit of covering these children through the ACA could extend beyond contemporaneous measures
Thank You

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Table 2. Coefficients on MCAIDSHARE in Health Models, by Impact Group

<table>
<thead>
<tr>
<th></th>
<th>High Impact</th>
<th>Low Impact (Placebo)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Low Income</td>
<td>Low Education</td>
</tr>
<tr>
<td>Chronic Condition Index</td>
<td>(-0.36^{**}) 0.17</td>
<td>(-0.18) 0.18</td>
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<tr>
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<td>5.926</td>
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<td>0.09</td>
<td>0.1</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.2</td>
<td>0.18</td>
</tr>
<tr>
<td>Fair Health or Worse</td>
<td>0.03 0.07</td>
<td>0.01 0.05</td>
</tr>
<tr>
<td>High Blood Pressure</td>
<td>(-0.23^{**}) 0.10</td>
<td>(-0.24^{**}) 0.11</td>
</tr>
<tr>
<td>Heart Disease/Heart Attack</td>
<td>(-0.01) 0.05</td>
<td>(-0.03) 0.04</td>
</tr>
<tr>
<td>Adult Onset Diabetes</td>
<td>(-0.05) 0.06</td>
<td>0.03 0.04</td>
</tr>
<tr>
<td>Obesity (BMI≥30)</td>
<td>(-0.20) 0.14</td>
<td>(-0.13) 0.16</td>
</tr>
</tbody>
</table>

### Table 3. Coefficients on MCAIDSHARE in Economic Models, by Impact Group

<table>
<thead>
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</tr>
<tr>
<td>R²</td>
<td>0.33</td>
<td>0.30</td>
<td>0.14</td>
<td>0.16</td>
</tr>
<tr>
<td>Years of Education</td>
<td>-0.04</td>
<td>0.52</td>
<td>-0.28</td>
<td>0.6</td>
</tr>
<tr>
<td>Continuous Income to Poverty Ratio</td>
<td>-1.06*</td>
<td>0.59</td>
<td>-0.91</td>
<td>0.81</td>
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<tr>
<td>Decile of Family Wealth</td>
<td>-0.11</td>
<td>0.74</td>
<td>-0.33</td>
<td>0.59</td>
</tr>
</tbody>
</table>

### Table 4. Triple Difference Models

<table>
<thead>
<tr>
<th></th>
<th>Chronic Condition Index</th>
<th>Economic Index</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Coef.</td>
<td>SE</td>
</tr>
<tr>
<td><strong>With Contextual Controls</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>MCAIDSHARE</td>
<td>-0.03</td>
<td>0.08</td>
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<tr>
<td>MCAIDSHARE</td>
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<tr>
<td>MCAIDSHARE*PRATE</td>
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