ASSESSING THE IMPACT OF SOCIAL POLICIES ON HEALTH AND HEALTH INEQUALITIES: THEORY, METHODS, AND EVIDENCE

Technical Meeting on Measuring & Monitoring Action on the Social Determinants of Health

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20 June 2016
I. WHY EVALUATE?
Social factors and health: a conceptual model

- Socioeconomic & political context
  - Governance
  - Policy (Macroeconomic, Social, Health)
  - Cultural and societal norms and values

- Social position
  - Education
  - Occupation
  - Income
  - Gender
  - Ethnicity / Race

- Material circumstances
  - Social cohesion
  - Psychosocial factors
  - Behaviours
  - Biological factors

- Health-Care System

Source: Amended from Solar & Irwin, 2007
What does the evidence tell us?

- Most studies concerning the social determinants of health are **descriptive analyses** that track the social patterning of health\(^1\)

- **Association ≠ causation** (an association does not imply that intervening to change a social factor would alter the outcome)

- Comparatively few studies focus on understanding the **causal effects** of social exposures, such as education, on health

- Moreover, not all causal evidence is necessarily policy relevant, motivating calls for **evaluation studies** to prioritize the “**assessment of the potential contribution to population health of particular interventions implemented**”\(^2\)

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1 Nandi and Harper (2014); 2 Galea (2013)
What can we do about it?
... public health researchers should generate evidence that is closely aligned with what policy makers and program planners can use (O’Campo, 2012)

<table>
<thead>
<tr>
<th>TABLE 2</th>
<th>Type of evidence that public health and epidemiology scientists should produce for solutions to complex social determinants of health and health inequities</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>A comprehensive picture on the multilevel determinants of health inequities, produced by piecing together from different types and sources of evidence</td>
</tr>
<tr>
<td></td>
<td>Evaluations of existing macro-social policies and programs that (1) go beyond demonstrating effectiveness to reveal underlying theories of causation and/or uncover the specific “effective” ingredients in programs and policies and (2) provide short- and long-term guidance for their implementation, tailoring, and adaptation</td>
</tr>
</tbody>
</table>

Source: O’Campo, 2012
Evaluation promotes evidence-based public health

- Evidence-based public health calls for “a solid knowledge base on disease frequency and distribution, on the determinants and consequences of disease, and on the safety, efficacy, and effectiveness of interventions and their costs”\(^1\)

- The results of a well-conducted impact evaluation study provides causal evidence on the effect of a particular program or policy and can help assess if the intervention was effective

- Undertaking “evaluation research to generate sound evidence [is] fundamental to achieving a more evidence-based approach to public health practice”\(^2\)

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\(^1\)Victora (2004); \(^2\)Brownson (2009)
II. WHAT IS IMPACT EVALUATION?
It’s evaluation for cause-and-effect questions

- Impact evaluation studies are among a range of complementary techniques for supporting evidence-based policymaking

- An **impact evaluation** “assesses the changes in the well-being of individuals that can be attributed to a particular project, program, or policy”\(^1\), which we generally call **interventions**

- “Impact evaluation asks about the difference between what happened with the program and what would have happened without it (referred to as the **counterfactual**)... This difference is the impact of the program.”\(^2\)

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\(^1\) Gertler (2011); \(^2\) CGD (2006)
What impact evaluation is not

- Some erroneously equate monitoring, health impact assessment, and impact evaluation

- **Monitoring** refers to “the process of collecting data and analyzing it to verify whether programs were implemented according to plan, whether financial resources and inputs were applied as intended, whether the expected outputs were realized, whether intended beneficiaries were reached, and whether time schedules were met.”\(^1\)

- **Health impact assessment:** “A combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of the population, and the distribution of those effects”\(^2\)

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\(^1\) CGD (2006); \(^2\) WHO
Potential outcomes framework

- What-if or counterfactual questions about the impact of an intervention are hypotheticals—so how can we answer them?

- The **potential outcomes** framework provides us with a guide for posing and answering counterfactual questions; it is the common language for impact evaluation in the social sciences.

- The potential outcomes framework uses the specification of well-defined causal states to which all members of the population of interest could be exposed to identify **what would have been** under an alternative counterfactual scenario.
True (unobserved) impact of an intervention

\[ E(\delta_i) = E(y_i^1) - E(y_i^0) \]
Fundamental problem of causal inference

- As with individuals, it is not possible to observe the same target population simultaneously under two different conditions.
- Unlike their individual-level analogues, we can use our observed data to estimate $E(y_i)$ and calculate a “naïve” estimate of the ATE.
Fundamental problem of causal inference

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- Alternatively, we can observe a different group that was unexposed.
- Either way, the substitutes were not reasonable counterfactuals.
  - The pre-post comparison ignores “secular trends” (changes in other factors influencing the outcome since the intervention).
  - The comparison of exposed and unexposed neglects that exposed individuals generally differ from unexposed individuals.
III. HOW TO EVALUATE?
IDENTIFY “POLICY EXPERIMENTS”.
Prioritizing specific policy reforms with the potential to affect major sources of global morbidity and mortality prioritized by the UN Development Goals

SUPPORT EVIDENCE-BASED DECISION MAKING.
Translating research findings for academic and non-academic audiences and identifying practical solutions for improving socioeconomic development and health

EVALUATE.

Quasi-experiments.
Estimating policy impact, and inequalities by gender, SES, and urban-rural residence

Mediation analysis.
Examining mechanisms through which policies influence health targets

Cost-effectiveness.
Comparing the costs and benefits of policies that have a robust effect on health

FEEDBACK.
Refining research priorities based on knowledge created and changing priorities of network partners
Building data infrastructure
Building data infrastructure

- We collect longitudinal data on social policies related to poverty, income and gender inequality for all LMICs
  - Breastfeeding breaks at work (1995-current)
Were breastfeeding breaks guaranteed at work?

1995

2014
Building data infrastructure

- We collect longitudinal data on social policies related to poverty, income and gender inequality for all LMICs
  - Breastfeeding breaks at work (1995-current)
  - Minimum wage (1999-current)
How have minimum wages evolved over time?
Building data infrastructure

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  - Minimum wage (1999-current)
  - Maternal and paternal leave policies (1995-current)
  - Minimum age of marriage (1995-current)
  - Family cash benefits (1999-current)
  - Child labour (1995-current)
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  - Breastfeeding breaks at work (1995-current)
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  - Minimum age of marriage (1995-current)
  - Family cash benefits (1999-current)
  - Child labour (1995-current)
  - Expanding to other public policy areas...

- Join policy data to survey data from harmonized DHS/MICS or other sources to create multilevel datasets
Applying empirical methods

- **Difference-in-differences (DD)** can be used to compare the change over time in an outcome for a treatment group that experienced a reform vs. a control group that did not when a policy is adopted or modified in some areas but not others.
Increased Duration of Paid Maternity Leave Lowers Infant Mortality in Low- and Middle-Income Countries: A Quasi-Experimental Study

Arijit Nandi¹,²*, Mohammad Hajizadeh³, Sam Harper², Alissa Koski², Erin C. Strumpf²,⁴, Jody Heymann⁵

Background
Maternity leave reduces neonatal and infant mortality rates in high-income countries. However, the impact of maternity leave on infant health has not been rigorously evaluated in low- and middle-income countries (LMICs). In this study, we utilized a difference-in-differences approach to evaluate whether paid maternity leave policies affect infant mortality in LMICs.

Methods and Findings
We used birth history data collected via the Demographic and Health Surveys to assemble a panel of approximately 300,000 live births in 20 countries from 2000 to 2008; these observational data were merged with longitudinal information on the duration of paid maternity leave provided by each country. We estimated the effect of an increase in maternity leave in the prior year on the probability of infant (<1 y), neonatal (<28 d), and post-neonatal (between 28 d and 1 y after birth) mortality. Fixed effects for country and year were included to control for, respectively, unobserved time-invariant confounders that varied across countries and temporal trends in mortality that were shared across countries. Average rates of infant, neonatal, and post-neonatal mortality over the study period were 55.2, 30.7, and 23.0 per 1,000 live births, respectively. Each additional month of paid maternity leave was associated with 7.9 fewer infant deaths per 1,000 live births (95% CI 3.7, 12.0), reflecting a 13% relative reduction. Reductions in infant mortality associated with increases in the duration of paid maternity leave were concentrated in the post-neonatal period. Estimates were robust to adjustment for individual, household, and country-level characteristics, although there may be residual confounding by unmeasured time-varying confounders, such as coincident policy changes.

Conclusions
More generous paid maternity leave policies represent a potential instrument for facilitating early-life interventions and reducing infant mortality in LMICs and warrant further discussion in the post-2015 sustainable development agenda. From a policy planning perspective, further work is needed to elucidate the mechanisms that explain the benefits of paid maternity leave for infant mortality.
<table>
<thead>
<tr>
<th>Country</th>
<th>DHS Survey Years</th>
<th>Infant Sample</th>
<th>Neonatal Sample</th>
<th>Post-Neonatal Sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Number of Births</td>
<td>Weighted Percent Death</td>
<td>Number of Births</td>
</tr>
<tr>
<td><strong>Treated countries</strong>&lt;sup&gt;a&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bangladesh</td>
<td>2004, 2007, 2011</td>
<td>11,739</td>
<td>5.98%</td>
<td>13,943</td>
</tr>
<tr>
<td>Kenya</td>
<td>2003, 2008</td>
<td>9,547</td>
<td>6.04%</td>
<td>9,015</td>
</tr>
<tr>
<td>Lesotho</td>
<td>2004, 2009</td>
<td>5,774</td>
<td>8.74%</td>
<td>6,696</td>
</tr>
<tr>
<td>Uganda</td>
<td>2006, 2011</td>
<td>13,093</td>
<td>6.79%</td>
<td>15,330</td>
</tr>
<tr>
<td>Zimbabwe</td>
<td>2005, 2010</td>
<td>8,035</td>
<td>5.54%</td>
<td>8,955</td>
</tr>
<tr>
<td>All treated countries</td>
<td></td>
<td>48,188</td>
<td>6.08%</td>
<td>53,939</td>
</tr>
<tr>
<td><strong>Control countries</strong>&lt;sup&gt;b&lt;/sup&gt;</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Armenia</td>
<td>2005, 2010</td>
<td>2,211</td>
<td>2.15%</td>
<td>2,450</td>
</tr>
<tr>
<td>Bolivia</td>
<td>2003, 2008</td>
<td>13,539</td>
<td>5.03%</td>
<td>14,742</td>
</tr>
<tr>
<td>Colombia</td>
<td>2005, 2010</td>
<td>26,023</td>
<td>1.84%</td>
<td>26,607</td>
</tr>
<tr>
<td>Egypt</td>
<td>2005, 2008</td>
<td>18,376</td>
<td>2.81%</td>
<td>19,595</td>
</tr>
<tr>
<td>Ghana</td>
<td>2003, 2008</td>
<td>5,008</td>
<td>5.26%</td>
<td>5,460</td>
</tr>
<tr>
<td>Honduras</td>
<td>2005, 2011</td>
<td>17,319</td>
<td>2.51%</td>
<td>19,341</td>
</tr>
<tr>
<td>Cambodia</td>
<td>2005, 2010</td>
<td>13,352</td>
<td>6.38%</td>
<td>14,710</td>
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<tr>
<td>Madagascar</td>
<td>2003, 2008</td>
<td>15,452</td>
<td>5.22%</td>
<td>15,715</td>
</tr>
<tr>
<td>Malawi</td>
<td>2004, 2010</td>
<td>25,165</td>
<td>6.89%</td>
<td>28,857</td>
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<tr>
<td>Nigeria</td>
<td>2003, 2008</td>
<td>32,683</td>
<td>7.98%</td>
<td>35,137</td>
</tr>
<tr>
<td>Nepal</td>
<td>2006, 2011</td>
<td>9,342</td>
<td>4.59%</td>
<td>9,506</td>
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<tr>
<td>Philippines</td>
<td>2003, 2008</td>
<td>10,622</td>
<td>2.86%</td>
<td>11,064</td>
</tr>
<tr>
<td>Rwanda</td>
<td>2005, 2010</td>
<td>14,329</td>
<td>7.06%</td>
<td>15,130</td>
</tr>
<tr>
<td>Senegal</td>
<td>2005, 2010</td>
<td>17,958</td>
<td>5.69%</td>
<td>18,845</td>
</tr>
<tr>
<td>Tanzania</td>
<td>2004, 2010</td>
<td>13,184</td>
<td>5.96%</td>
<td>13,103</td>
</tr>
<tr>
<td>All control countries</td>
<td></td>
<td>234,563</td>
<td>5.16%</td>
<td>250,262</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td>282,751</td>
<td>5.52%</td>
<td>304,201</td>
</tr>
</tbody>
</table>
Increased leave lowered infant mortality

*results were robust to adjustment for individual, household, and country-level characteristics, including the wage replacement rate, GDP per capita, female labor force participation, government health expenditure per capita, and total health expenditure per capita.*
Applying empirical methods

- **Difference-in-differences (DD)** can be used to compare the change over time in an outcome for a treatment group that experienced a reform vs. a control group that did not when a policy is adopted or modified in some areas but not others.

- **Regression discontinuity (RD)** methods can be used when eligibility for a particular program is determined by whether individuals are below or above a threshold value on a continuously measured variable, such as age or income.
RD measures the difference in post-intervention outcomes between units near the cutoff—e.g., those units that were just above the threshold and did not receive cash payments serve as the counterfactual comparison group.

*Source:* Gertler (2011)
Future research directions

- Continuing to examine social policies that might influence health over the life-course, including early-life interventions

- Expanding to other public policy areas, including policies that can influence healthcare services, public health, social welfare, economic opportunity, gender equality, and the environment

- Assessing heterogeneous effects and impacts on social and gender inequalities in health

- Examining/monitoring implementation of policies and coverage of social determinants of health
Thanks!

Key collaborators:
Efe Atabay, John Frank, Mohammad Hajizadeh, Sam Harper, Jody Heymann, Jay Kaufman, Lauren Maxwell, José Mendoza Rodriguez, Erin Strumpf, Ilona Vincent, and all of the research team

Partner institutions:

Funding:

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