Providing Health Checkups Through Schools: An Evaluation of Coverage in Bihar’s School Health Program

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Introduction

• High levels of child malnutrition and poor health frequently attributed to low quality of local health resource institutions (AWCs, HSCs), and consequent failure of households to utilize programs delivered through these institutions

• Solution advocated by many: deliver basic health services, such as checkups, to children through schools (Jamison et al 2006, FRDSH – inter-agency framework of UNESCO, UNICEF, WHO and World Bank).
Schools as delivery point for basic health services

• Advocated, because of near universal enrollments and ready supply of skilled personnel (teachers)

• Difficulties:
  
  – High student absenteeism

  – Resource constraints, identical to those that affect local health institutions – large population to be covered relative to availability of health personnel
This paper

- Assesses role of absenteeism and resource constraints in the context of Bihar’s NPSGY, a program to deliver health checkups to 34 million children ages 0-14 (girls 14-18).

- Program coverage in its first year was very low (44% of target), and as low as 6% in Kishanganj, 9% in E Champaran and 12% in Araria (below 30% in 6 additional districts, including Lakhisarai and Bhagalpur).

- Coverage lower than attendance, as well as low coverage even in districts of relatively better off South Bihar, suggest that absenteeism is not the only explanation
  - Suggests importance of resource constraints
This paper establishes

• Effect of individual attendance on coverage

• Effect of resource constraints on coverage
  – Aggregate attendance, and hence an analysis of the effects of both individual & aggregate attendance
  – VHSND

• Reverse causation: Effect of coverage on individual attendance probabilities
Empirical challenges: reverse causation, omitted variables bias

- Use knowledge of exact visit date, combined with monthly data on attendance.

- Construct a pseudo-panel data set using monthly observations
  - Far more observations per student
  - No problem of attrition bias, etc.

- To identify individual attendance: Use multiple out-of-period observations (exploit properties of error structure)

- To identify aggregate attendance: month-specific variation in school days, with variation in this variable across schools due to school-wise variation in month of visit

- VHSND: date relative to NPSGY date
Results

- Individual attendance enhances coverage

- But effect is not due to a resource constraint: aggregate high attendance reduces coverage
  - Paradoxical result: Need to improve attendance to achieve coverage goals, but, doing so, without increasing health resources, will reduce coverage

- Also a negative effect from simultaneous VHSND

- No effect of program on coverage, except in smallest schools
Rest of the talk

- NPSGY
- Resource constraints in health centers and schools
- Survey region, data and summary statistics
- Empirical Methodology
- Results
- Conclusion
2. NPSGY

• Teams organized from PHC, including doctors, specialists, but also people from lower health institutions, ANM, AWW

• Work through all schools in the PHC, so variation in month of visit, even within the block

• To ensure attendance, information on health camp was to be disseminated through AWW, ANM

• Evidence of resource constraint even in planning, in that each school was allotted one day (rather than varying with school enrollment)
<table>
<thead>
<tr>
<th>HSC</th>
<th>Number of schools</th>
<th>Camp date (2011)</th>
<th>Number of beneficiaries</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Primary</td>
<td>Middle</td>
<td>AWCs</td>
</tr>
<tr>
<td>Rupni APHC</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Nisandra</td>
<td>5</td>
<td>3</td>
<td>8</td>
</tr>
<tr>
<td>Loucha &amp; Bisa Gopalganj</td>
<td>8</td>
<td>6</td>
<td>19</td>
</tr>
<tr>
<td>Mahadev Deghi</td>
<td>7</td>
<td>5</td>
<td>10</td>
</tr>
<tr>
<td>Dohar Malani</td>
<td>6</td>
<td>2</td>
<td>9</td>
</tr>
<tr>
<td>Palasmani Birpur</td>
<td>6</td>
<td>3</td>
<td>9</td>
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<tr>
<td>Bansbari</td>
<td>7</td>
<td>4</td>
<td>8</td>
</tr>
<tr>
<td>Murmala</td>
<td>7</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Khodaganj</td>
<td>10</td>
<td>6</td>
<td>10</td>
</tr>
<tr>
<td>Natuapara</td>
<td>3</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Lohagara</td>
<td>17</td>
<td>5</td>
<td>17</td>
</tr>
<tr>
<td>Dohamani</td>
<td>6</td>
<td>2</td>
<td>8</td>
</tr>
<tr>
<td>Sameshwar</td>
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<td>5</td>
</tr>
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<td>Bilasi</td>
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<td>2</td>
<td>5</td>
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<tr>
<td>Jhingakata</td>
<td>9</td>
<td>3</td>
<td>10</td>
</tr>
<tr>
<td>Gangi</td>
<td>4</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Altabari</td>
<td>3</td>
<td>1</td>
<td>8</td>
</tr>
<tr>
<td>Gopalpur</td>
<td>6</td>
<td>1</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>123</td>
<td>57</td>
<td>206</td>
</tr>
</tbody>
</table>

Table 2: Microplan for Nayi Pidhi Swasthya Guarantee Program, district Kishanganj, block: Bahadurganj (PHC: Bahadurganj)
VHSND

• Central Govt program introduced under NRHM

• In Bihar, also introduced in 2011-12

• Run by AWC, but planned at the level of the HSC

• Fixed dates set aside at HSC for VHSND – generally Mondays and Fridays, but additional days, depending on number

• Have exact days, for each HSC, set aside for VHSND, from micro-plans
3. Resource constraints – Health institutions

- Population per HSC (Bihar): 24,600 (national norm: 5000/3000)

- Population per PHC: 158,275 (national norm: 30,000/20,000)
  - APHCs 61,000 (norm: 30,000)

- Norm for PHC staff strength: 13 (1 dr., 1LHW, 1MHW, 3 ANMs,...)
  - Bihar falls short, eg., only 28% of PHCs have a LHW
Resource constraints - schools

• Even with contract teachers, state PTR is 52 in primary schools, 65 in upper primary
  - India (Primary): 33
  - Karnataka: 16
  - Maharashtra: 23
  - UP: 41

• Reflects variation in school size
  - Bihar (183 (primary) – 452 (HPS))
  - India (95 – 166)
  - UP (154/117); Karnataka (39/171); Maharashtra (58/186)
4. Survey Region, Data

- 4 PHCs, 6 HSCs, 32 schools
- Attendance data on all students in grade 2 (2011-12), as well as data on their attendance in the previous year
- HSC data, school data
- Districts: Vaishali and Buxar
- Summary statistics in paper
Attendance

- Very low: 57%; monthly variation; by school size
6. Empirical Methodology

- Theoretical framework: resource constraints, so individual coverage varies with individual attendance, health and school resource personnel; aggregate attendance (rather than enrollment)

- With resource personnel being determined annually, coverage reflects school (S), PHC (P) and student (X) fixed factors (over school year), and monthly variation in aggregate attendance

- Attendance includes month-specific (X) hhold variables as well as factors common to all households but varying by month (Z)
Estimating equations

- $C_{ijp} = \alpha_0 + \alpha_1 \Pr(\text{attend})_{ijv_j} + \alpha_2 \bar{A}_{jpv_j} + P_p^0' \alpha_3 + X_i^0' \alpha_4 + S_j^0' \alpha_5 + u_{ispv_j}$

- $\Pr(\text{attend})_{ijv_j} = \beta_0 + \beta_1 E(C_{ijp}) + \beta_2 X_{iv_j} + \beta_3 Z_{v_j} + X_i^0' \beta_4 + S_j^0' \beta_5 + \varepsilon_{ispv_j}$
Identification of individual attendance

- \[ A_{v_{j-1}} - A_{v_{j-2}} = \beta_2 (X_{iv_{j-1}} - X_{iv_{j-2}}) + \beta_3 (Z_{v_{j-1}} - Z_{v_{j-2}}) + (\varepsilon_{iv_{j-1}} - \varepsilon_{iv_{j-2}}) \]

- Reverse causation bias: removed, because attendance in other months not affected by coverage

- Omitted variable bias removed by differencing, which removes effect of all fixed factors determining coverage

- Include month-specific determinants by vector of month-visit dummy variables

- Lagged and forward difference terms
Including aggregate attendance

• Problem in strategy for identification of individual attendance, if month-specific factors determining attendance also varies across schools (e.g., effect of school days depends on school size)

• This effect most likely to exist because of its effect on aggregate attendance (staff availability doesn’t reflect month-specific factors)

• Bias reduced by including aggregate attendance

• Need to do this in any case, to evaluate role of resource constraints through aggregate attendance
Instruments for aggregate attendance

• Monthly variation in school days, in month of visit

• Variation in month of school visit implies variation in this variable, even within a block (include block dummy variables)

• Exogenous choice of date of visit (regression evidence in paper, though only 36 schools)

• Interaction with school size, grade 2 size (aggregate attendance measured by grade 2 attendance)
Effect of coverage on attendance

• Difference-in-difference estimator

• Observations: student–month attendance

• Indicator variable for whether health camp in that month (varies across schools)

• Month-level dummy variables included, enabled by data on students in two years

• So, difference by month of visit, comparing those with visits in that month versus those without
Table 13: Effect of individual and aggregate attendance on program coverage

<table>
<thead>
<tr>
<th></th>
<th>First Stage Regressions – probability of attendance, visit month</th>
<th>IV Probit, Dep variable: Coverage</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Individual</td>
<td>School avge</td>
</tr>
<tr>
<td>School days, visit month</td>
<td>-0.005 (0.01)</td>
<td>-0.015 (0.002)</td>
</tr>
<tr>
<td></td>
<td>0.002 (0.001)</td>
<td>0.004* (0.0004)</td>
</tr>
<tr>
<td>School days * school size</td>
<td>0.005 (0.001)</td>
<td>0.004* (0.0004)</td>
</tr>
<tr>
<td>School days * grade 2 enrollment</td>
<td>0.002 (0.002)</td>
<td>0.003* (0.001)</td>
</tr>
<tr>
<td>(A_{i,t-1} - A_{i,t-2})</td>
<td>0.09* (0.02)</td>
<td>-0.01 (0.01)</td>
</tr>
<tr>
<td>(A_{i,t+2} - A_{i,t+1})</td>
<td>-0.19* (0.03)</td>
<td>0.01 (0.01)</td>
</tr>
<tr>
<td>(A_{t+3} - A_{t+2})</td>
<td>-0.13* (0.03)</td>
<td>-0.04* (0.01)</td>
</tr>
<tr>
<td>Individual Proportion attendance, visit month</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>School proportion attendance, visit month</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>VHSND on same day</td>
<td>0.04* (0.02)</td>
<td>0.05* (0.01)</td>
</tr>
</tbody>
</table>
Table 14: Regression estimates of the effect of the program on attendance

<table>
<thead>
<tr>
<th>Variable</th>
<th>2011-2012 sample only</th>
<th>2010-11 and 2011-12 sample</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Regression 1</td>
<td>Regression 2</td>
</tr>
<tr>
<td>Year 2 (2011-12)</td>
<td>-0.01* (0.005)</td>
<td>-0.06* (0.01)</td>
</tr>
<tr>
<td>Visit month * year 2</td>
<td>--</td>
<td>0.91* (0.23)</td>
</tr>
<tr>
<td>Visit month * school size * year 2</td>
<td>--</td>
<td>-0.01 (0.01)</td>
</tr>
<tr>
<td>Visit month * SC/ST * year 2</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Visit month * year 1</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Visit month * school size (in hundreds)</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Visit month * SC/ST</td>
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</tr>
</tbody>
</table>
Conclusions

• Fundamental constraint on effective delivery of services, health personnel, cannot be reduced by shifting delivery from local health institutions to schools

• A general finding, that also applies to schools:
  
  – Unless improvements in enrollment are matched by increased investment in teachers, any increase in enrollment can only mean a reduction in learning

  – Inequality: In poor quality schools and large schools, students who attend benefit from aggregate absenteeism – higher inequality in poorer quality schools