Mexico's **PROGRESA**: Using a Conditional Cash Transfer Program to Invest in Human Capital

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One of the Tragedies of Poverty is its Intergenerational Transmission

- **Children who grow up in poverty remain poor**
  - Poor invest less in children’s health & education

- **Enter adulthood without “basic capabilities”**
  - Not able to take advantage of labor market opportunities
  - Less capable of pulling themselves out of poverty
  - Lower quality of Life
Health is a Critical “Capability”

- Most Long-Term Poverty Alleviation Policies Focus on Schooling
- But, Health is also important
  - Health & Nutrition in formative years affects growth & cognitive development
  - Healthier kids get more schooling & do better in school
  - Healthier adults have higher wages & higher quality of life
PROGESA Addresses Immediate & Long-Term Problems of Poverty

- **Cash transfer Immediate needs**
  - Hunger
  - Disease and illness
  - Living conditions

- **Break inter-generational transmission**
  - Invest in children’s Education, Health & Nutrition
  - Improve children’s “capabilities”
    - Pull themselves out of poverty
    - Lead a high quality of life
PROGRESA is an Incentive-Based Welfare PROGRAM

- Cash transfer is used as incentive to invest in human capital
  - Education, Health & Nutrition
  - Cash conditional on staying in school, preventive health care, nutrition monitoring

- Primarily focused on children
  - Adults benefit as well (health)
PROGRESA is a Big Program

• Rural Program 1997-2000
  – 2.6 million families from 50,000 villages
  – 40% of rural families

• Urban Expansion 2001-2003
  – Added 2 million families

• Annual Budget
  – US$2.6 Billion budget or 0.5% of GDP
Traditional Approaches to Improving Health

1. Cash transfer Programs

2. Improving Programs
   - E.g. prenatal, family planning, nutrition monitoring & supplement, primary care…
   - Access (travel time & prices)
   - Availability & quality services
   - Patient knowledge about availability and efficacy
Do Cash Transfer Programs Have an Impact on Health?

- Assume problem is lack of income
  - But, families may have other priorities for cash
- Evidence?
  - Currie (2000) finds no effect in US
  - Dulfo (2001) finds some effect in South Africa
- Mixed evidence on income effect on health in developing countries
Expanding Supply Has Less than Desired Effect

- Mixed evidence these programs have impact
  - No big increases in population health indicators

- Problems:
  - Low take-up rates
  - Selected program participation
    - Most needy least likely to choose to participate
    - Non-participants are ones who get no care
    - Participants substitute program for other care
PROGRESA Overcomes Problems of Traditional Approaches

• *Relaxes income constraint through cash transfer*

• *Provides financial incentive to use health services*
  – 97% take-up rate (Mexico’s PROGRESA)
  – No selection effects
  – Those most in need get access to services
In Contrast to Traditional Approaches.....

- **We Find That PROGRESA....**
- *Improved child health*
  - Reduced hospital inpatient stays
  - Reduced morbidity
  - Taller & Less Anemia
- *Improved adult health*
  - Reduced hospital inpatient stays
  - Reduced illness days
  - Improved stamina
• Politicians reluctant to spend on investments that have long-term return
  – e.g. child health & nutrition
  – Politicians come up for election before families fully benefit

• Cash part of CCT attractive as yields short-run political payoff
Use a Randomized Experiment to Evaluate Impact on Child Health

- Randomized 506 rural villages into control and treatment groups
- After 18 Months Find that PROGRESA Improved child health as indicated by
  - Reduced morbidity
  - Taller & Less Anemia
- After 5 years find big effects on growth & physical health but little on cognitive develop.
Presentation Outline

- The Intervention
  - Targeting / Eligibility
  - Benefits

- Experimental Design
- Impact on Health After 18 Months
- Long-Term Impact on Health
- Lessons & Extensions
Eligibility determined in 2 stages

1. Identify poor communities
   - “marginality” index
   - Infrastructure, demographics, etc.

2. Identify poor households in each poor community
   - Proxy Means Test (PMT)
   - Index of easily observed characteristics
     - Housing, education, family structure, Assets, etc
     - Characteristics & weights not common knowledge
   - HH Census to collect characteristics
Enrollment

• *Went house to house to inform those eligible*
• *Achieved 97% take-up rate*
• *Receive benefits for 3 years*
• *Limited enrollment period,*
  – After which, no new enrollment
  – Must wait 3 years for next enrollment period
  – Avoid migration problems
Health Benefits Include…

• **Cash Transfer**
  – About 1/3 of mean “poor” income
  – Given to female head of household
  – Expected to be used to purchase food
  – 70% spent on more/better food (H&S, 2000)

• **To obtain cash, all family members have to get preventive health care**

• **Ensure clinics able to provide preventive care**
Specifically, To Obtain Cash...

- **Pregnant women must go to public health clinic for**
  - prenatal care beginning in 1\textsuperscript{st} trimester
  - nutrition monitoring & supplements
    - 100\% of daily required micronutrients & 20\% of protein

- **Lactating women must go to public health clinic for**
  - nutrition monitoring & supplements

- **Children 0-5 must go to public health clinic for**
  - Well baby & nutrition monitoring visits
  - Given nutritional supplements
    - For age 0-24 months
    - For 24-60 months if poor nutrition detected
Presentation Outline

- The Intervention

- Experimental Design
  - Random Assignment
  - Data Sources

- Impact on Health After 18 months

- Long-Term Impact on Health

- Lessons
Another Unique Feature is the Rigorous Scientific Evaluation

- *Independent external evaluation gave credibility*
- **Complemented Operations**
  - Due to budget constraint & logistics problems
    - *Not able to give benefits to all who are eligible in 1st year*
    - *Had to phase in program over 3 years*
  - To be fair & equitable,
    - *gave all eligible families equal chance of being 1st*
  - Controlled Randomized Experiment
    - *Treatment those who got program benefits first*
    - *Controls those who got program benefits 2 years later*
Evaluation Design...

- **506 localities**
  - All have marginality index below poverty line
  - 2/3rds randomly assigned to receive program 1\textsuperscript{ST} yr.
  - 1/3 randomly assigned to receive program 2 yr.s later

- **Data**
  - Household panel surveys
  - Nutrition sub-sample
Household Survey

- **Sample of households**
  - PROGESÁ eligible (i.e. PMT below cutoff)
  - In both Treatment and Control localities
  - 14,500 households / 81,000 individuals

- **Surveyed**
  - At baseline before intervention
  - 4 times after at 6 month intervals

- **Nutrition sub-sample**
  - Kids 12-48 months in about ½ of the villages
  - Measured 12-18 month later after intervention began
Sample Attrition Rates From Baseline

No evidence of selective differential migration

<table>
<thead>
<tr>
<th></th>
<th>Oct 98</th>
<th>May 99</th>
<th>Nov 99</th>
<th>May 00</th>
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<tbody>
<tr>
<td>Control</td>
<td>-0.012</td>
<td>-0.013</td>
<td>-0.012</td>
<td>-0.050</td>
</tr>
<tr>
<td>Treatment</td>
<td>-0.007</td>
<td>-0.010</td>
<td>-0.016</td>
<td>-0.051</td>
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</table>
### Baseline Means for Children < Age 4

<table>
<thead>
<tr>
<th>Variable</th>
<th>Treatment</th>
<th>Control</th>
<th>Diff</th>
<th>t-stat</th>
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<tbody>
<tr>
<td>Ill last month (=1)</td>
<td>0.33</td>
<td>0.32</td>
<td>0.01</td>
<td>(0.43)</td>
</tr>
<tr>
<td>Age</td>
<td>1.63</td>
<td>1.61</td>
<td>0.02</td>
<td>(0.57)</td>
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<tr>
<td>Male (=1)</td>
<td>0.51</td>
<td>0.49</td>
<td>0.02</td>
<td>(1.61)</td>
</tr>
<tr>
<td>Father’s Years of Education</td>
<td>3.80</td>
<td>3.84</td>
<td>-0.04</td>
<td>(-0.24)</td>
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<tr>
<td>Mother’s Years of Education</td>
<td>3.50</td>
<td>3.83</td>
<td>-0.33</td>
<td>(-2.05)</td>
</tr>
<tr>
<td>Father Speaks Spanish (=1)</td>
<td>0.94</td>
<td>0.930</td>
<td>0.01</td>
<td>(1.61)</td>
</tr>
<tr>
<td>Mother Speaks Spanish (=1)</td>
<td>0.94</td>
<td>0.92</td>
<td>0.02</td>
<td>(0.95)</td>
</tr>
<tr>
<td>Own House (=1)</td>
<td>0.92</td>
<td>0.92</td>
<td>0.01</td>
<td>(0.59)</td>
</tr>
<tr>
<td>Electricity (=1)</td>
<td>0.64</td>
<td>0.71</td>
<td>-0.07</td>
<td>(-1.74)</td>
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<tr>
<td>Hectares of Land Owned</td>
<td>0.81</td>
<td>0.79</td>
<td>0.02</td>
<td>(0.32)</td>
</tr>
<tr>
<td>Male Agricultural Wage</td>
<td>30.48</td>
<td>31.22</td>
<td>-0.74</td>
<td>(-0.85)</td>
</tr>
<tr>
<td>Female Agricultural Wage</td>
<td>27.26</td>
<td>27.84</td>
<td>-0.59</td>
<td>(-0.65)</td>
</tr>
<tr>
<td>Sample Size</td>
<td>4,519</td>
<td>3,306</td>
<td></td>
<td></td>
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Presentation Outline

• The Intervention
• Experimental Design

• Impact on Health after 18 months
  • Child morbidity
  • Child height
  • anemia

• Long-Term Impact on health

• Lessons
Child Morbidity Analyses

• Whether child was ill in last 4 wk.s reported by mom
  – Maternal reported
    • Measurement error from reporting bias?
    • Orthogonal to treatment effect (Random Assign.)
  – Hawthorne bias
    • Change views on what is an illness after program exposure
    • So treatments report more illness than controls
    • Implies lower bound estimated impact

• Random effects logistic regression
  – Same controls as above
## Impact on Probability Report Child is Ill in Last Month (Log Odds)

<table>
<thead>
<tr>
<th>Months on PROGRESA</th>
<th>Newborns</th>
<th>Age 0</th>
<th>Age 1</th>
<th>Age 2-3</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-9 m Pre + 3-6 m Postnatal</td>
<td>0.747**</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6 months Postnatal</td>
<td></td>
<td>1.057</td>
<td>0.829*</td>
<td>0.943</td>
</tr>
<tr>
<td>12 months Postnatal</td>
<td></td>
<td>0.768***</td>
<td>0.807*</td>
<td>0.766**</td>
</tr>
<tr>
<td>18 months Postnatal</td>
<td></td>
<td>0.825*</td>
<td>0.808*</td>
<td>0.850*</td>
</tr>
<tr>
<td>24 months Postnatal</td>
<td></td>
<td>0.710***</td>
<td>0.657***</td>
<td>0.712***</td>
</tr>
</tbody>
</table>

Each row is the treatment effect from a separate random effects logistic regression that also controls for

- Demographics: age, sex, education, family structure
- Baseline economic status: ownership of land & housing, electricity, male & female village wage rates
Impact on Morbidity is Cumulative

Change in Morbidity Due to PROGRESA

Months Receiving PROGRESA Benefits

- Newborn
- Age 0 at Baseline
- Age 1 at Baseline
- Age 2-3 at Baseline

Impact on Morbidity

-35.0%
-30.0%
-25.0%
-20.0%
-15.0%
-10.0%
-5.0%
0.0%
5.0%
10.0%

6 Months 12 Months 18 Months 24 Months

28
Armenia & Height From Nutrition Sub-Sample

- Half the enumeration areas about 12 months after the intervention
- Collected Hemoglobin in sample of kids age 12-48 months old
- Collected Anthropometric Measurements on sample of kids 12-36 months
Anemia Analyses

• Anemia
  – Measured by low hemoglobin adjusted for altitude
  – RE logistic regression with same controls

• Find PROGESNA reduced incidence of Anemia by 12.7% after 12-18 months
Height Model

- Usually standardize height
  - relative to a healthy reference population (US)
  - Z-score within narrow age/sex categories
  - Problematic if measurement error in age or if true reference population not US standard

- Instead
  - Use Height as dependent variable
  - Include age-sex dummies on right hand side
  - RE regression with same controls
Impact on Height

• *Height is a measure of long term health*
  – Potential height is genetic
  – Realized height is potential reduced by
    • Insufficient nutrition
    • Illness, reduces ability to absorb nutrition
  – Cumulative effect of illness/nutrition

• *Find PROGRESA increased height by about 1 cm, but no effect on stunting*
Presentation Outline

- **The Intervention**
- **Experimental Design**
- **Impact on Health After 18 months**
- **Long-term Impact on Child Health**
  - Physical Development
  - Motor Skills
  - Cognitive Development
- **Lessons**
Resurveyed Rural Cohort in Fall of 2003

- Interested in medium to long-term effects
- Added new matched control group
- Interested in return to early childhood investments in poor families
  - Compare children who received benefits from birth to those who received them starting at age 3.
  - Can children “catchup” or is early investment critical
### Program Improved Physical Health & Nutrition

<table>
<thead>
<tr>
<th></th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Heart Rate</td>
<td>-0.84%</td>
<td>-1.21%***</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>0.98%***</td>
<td>1.28%***</td>
</tr>
<tr>
<td>Stunted (=1)</td>
<td>-22.22%***</td>
<td>-35.48%***</td>
</tr>
<tr>
<td>Hemoglobin</td>
<td>1.29%</td>
<td>2.38%***</td>
</tr>
<tr>
<td>Anemic (=1)</td>
<td>-4.17%</td>
<td>-21.74%***</td>
</tr>
<tr>
<td>Sick Days Last Month</td>
<td>-40.25%***</td>
<td>-21.15%***</td>
</tr>
</tbody>
</table>
Program Also Improved Motor Development

<table>
<thead>
<tr>
<th>Activity</th>
<th>Boys</th>
<th>Girls</th>
</tr>
</thead>
<tbody>
<tr>
<td>Walking Backwards</td>
<td>20.39%***</td>
<td>11.21%***</td>
</tr>
<tr>
<td>Standing on right foot</td>
<td>9.00%***</td>
<td>10.78%***</td>
</tr>
<tr>
<td>Walking on Tiptoes</td>
<td>20.45%***</td>
<td>11.46%***</td>
</tr>
<tr>
<td>Standing on left foot</td>
<td>8.16%</td>
<td>10.78%***</td>
</tr>
<tr>
<td>Walking Straight Line</td>
<td>18.37%***</td>
<td>13.86%***</td>
</tr>
<tr>
<td>Skipping</td>
<td>24.71%***</td>
<td>5.43%***</td>
</tr>
<tr>
<td>Seconds Standing on Right Foot</td>
<td>8.26%***</td>
<td>11.15%***</td>
</tr>
<tr>
<td>Seconds Standing on Left Foot</td>
<td>10.88%***</td>
<td>8.61%</td>
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</table>
Little Effect on Cognitive Development

<table>
<thead>
<tr>
<th>Test</th>
<th>Boys</th>
<th>Girls</th>
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</thead>
<tbody>
<tr>
<td>Log (Long Term Memory Test)</td>
<td>0.00%</td>
<td>-.5.04%</td>
</tr>
<tr>
<td>Log (Short Term Memory Test)</td>
<td>1.01%</td>
<td>6.33%</td>
</tr>
<tr>
<td>Log (Visual Integration Test)</td>
<td>-2.70%</td>
<td>-5.58%</td>
</tr>
<tr>
<td>Log (Peabody Picture Vocabulary Test)</td>
<td>10.03%*</td>
<td>0.00%</td>
</tr>
<tr>
<td>Communication Dev. Inventory</td>
<td>6.29%</td>
<td>6.22%</td>
</tr>
<tr>
<td>Words &amp; Sentences Test</td>
<td>16.13%*</td>
<td>8.82%</td>
</tr>
</tbody>
</table>
Big Gains in Physical but Not Cognitive Development

- Brain nutritionally ready but not stimulated in rural environment
- Gains in physical development because of exercise
- Need to add intervention that stimulates brain e.g. early childhood development
<table>
<thead>
<tr>
<th>Cognitive Development Percentiles</th>
<th>Boys (%</th>
<th>Girls (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Long-Term Memory</td>
<td>16.08%</td>
<td>14.85%</td>
</tr>
<tr>
<td>Short-Term Memory</td>
<td>21.54%</td>
<td>23.12%</td>
</tr>
<tr>
<td>Visual Integration</td>
<td>7.15%</td>
<td>7.12%</td>
</tr>
<tr>
<td>Vocabulary</td>
<td>18.86%</td>
<td>17.68%</td>
</tr>
</tbody>
</table>
Presentation Outline

• The Intervention
• Experimental Design
• Short-Term Impact
• Long-term Impact

• Lessons
• PROGRESA experiment
• Limitations
• Policy Influence
• Future Work
PROGRESA Experiment
a Success

• PROGRESA
  – improved child & health
  – Alleviated immediate needs of poverty
  – Improved “capabilities”
  – Need to add ECD

• Marginal cost over a cash transfer program
  – Information system to verify compliance
  – Total admin costs 2.3%
  – Information systems .1%
Major Limitation of the Evaluation

• **Unable to evaluate PROGRESA relative to**
  – Pure cash transfer program
  – Pure program supply intervention
  – Therefore, don’t really know effects of combined program

• **Possible Identification strategy & Preliminary Results**
  – Families get extra cash transfers if school age kids are enrolled in school
  – Instrument is treatment interaction with sib structure
  – Find no effect of additional cash transfers on child health
Rigorous Evaluation Feasible, Cheap, and Influenced Policy Makers!

- **Random assignment**
  - Equitable when budget constraint prevents immediate national rollout
  - Easy for Policy Makers to understand
  - Hard for political opponents to criticize

- *Fox Government is expanding PROGRESA*
  - New urban PROGRESA evaluation

- *Others are adopting PROGRESA-like programs*
  - e.g. Argentina, Brazil, Columbia, Honduras, Jamaica, Nicaragua, Peru, Turkey
  - Article in Today’s San Diego Union Tribune