Quality education for all children? What works in education in developing countries

Howard White, 3ie
Deworming

School-based deworming is one of the most cost-effective methods of improving school participation. The evidence … has contributed to the scale up of school-based deworming to over 59 million children (J-PAL website)
A 2008 systematic review reports impact on schooling from seven trials:

• India: no impact
• Vietnam: no impact
• South Africa: no impact
• Jamaica: 1 study impact in 3/10 tests, 1 study: no impact
• Zanzibar: no impact
• Guatemala: no impact
Lessons

• Perhaps shouldn’t base global policy on single studies

• Systematic reviews sound rather important, let’s talk about them
A systematic review

• Systematic search
• Systematic inclusion / exclusion against explicit criteria
• Systematic synthesis of findings (including meta-analysis)
• Systematic presentation of methods, analysis and findings
Search: education review

Database searches (n=10,648)

Screening of database results (n=469)

Full-text reports retrieved (n=585)

Studies included in review (n=73)
Meta-analysis

Corticosteroid for women about to deliver prematurely

30-50% reduction in mortality
## Why meta-analysis matters

### Errors in hypothesis testing

<table>
<thead>
<tr>
<th></th>
<th>$H_0$ correct</th>
<th>$H_0$ false</th>
</tr>
</thead>
<tbody>
<tr>
<td>Don’t reject $H_0$</td>
<td>No error</td>
<td>Type II error</td>
</tr>
<tr>
<td></td>
<td></td>
<td>‘false negative’</td>
</tr>
<tr>
<td>Reject $H_0$</td>
<td>Type I error</td>
<td>No error</td>
</tr>
<tr>
<td></td>
<td>‘false positive’</td>
<td></td>
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</tbody>
</table>
Errors in hypothesis testing

Type II error is often higher than we think

Because we

- Underestimate attrition
- Over-estimate compliance
- Over-estimate minimum effect size (i.e. we think the programme will make a bigger difference than it actually does)
Implications

• An RCT is no better than tossing a coin at determining if a successful programme is working so:
  – Power, power, power
  – A theory-based approach can lead us to think correct or false negative
  – We also need replicate ‘unsuccessful’ programmes
  – And we really REALLY need to do SRs (we will see why shortly)
Pooling evidence

Intervention is harmful

Intervention works

So pooling data allows us to overcome the high risk of Type II error

Goal scoring is wrong

1 = no effect
So, finally......

What works in education: where and why?
<table>
<thead>
<tr>
<th>Study ID</th>
<th>ES (95% CI)</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kremer, et al. (2008b)</td>
<td>-0.14 (-0.20, -0.08)</td>
<td>3.57</td>
</tr>
<tr>
<td>Banerjee, et al. (2008)</td>
<td>-0.09 (-0.15, -0.03)</td>
<td>3.57</td>
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<tr>
<td>Banerjee, et al. (2009)</td>
<td>-0.02 (-0.08, 0.04)</td>
<td>3.57</td>
</tr>
<tr>
<td>Sinha, et al. (2009)</td>
<td>-0.01 (-0.07, 0.05)</td>
<td>3.57</td>
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<tr>
<td>Loshkina &amp; Yemtsov (2004)</td>
<td>0.00 (-0.48, 0.48)</td>
<td>1.05</td>
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<tr>
<td>Gertler &amp; Rubio-Codina (2007)</td>
<td>0.00 (-0.03, 0.04)</td>
<td>3.65</td>
</tr>
<tr>
<td>Borkum (2009)</td>
<td>0.02 (-0.02, 0.06)</td>
<td>3.65</td>
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<tr>
<td>Angrist et al. (2002)</td>
<td>0.03 (-0.12, 0.18)</td>
<td>2.96</td>
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<tr>
<td>Attanasio, et al. (2004)</td>
<td>0.04 (0.00, 0.08)</td>
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<tr>
<td>Kazemba, et al. (2008)</td>
<td>0.05 (-0.01, 0.09)</td>
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<tr>
<td>Ahmed, et al. (2004)</td>
<td>0.05 (-0.01, 0.11)</td>
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<tr>
<td>Martinez, S., et al. (2012)</td>
<td>0.09 (0.05, 0.14)</td>
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<tr>
<td>Barrera-Osorio, et al. (2008)</td>
<td>0.10 (-0.01, 0.21)</td>
<td>3.30</td>
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<tr>
<td>Schady &amp; Araujo (2008)</td>
<td>0.12 (-0.05, 0.28)</td>
<td>2.87</td>
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<tr>
<td>Flinto &amp; Soares (2004)</td>
<td>0.13 (-1.43, 1.69)</td>
<td>0.13</td>
</tr>
<tr>
<td>Chandhury &amp; Parasnis (2008)</td>
<td>0.13 (0.09, 0.17)</td>
<td>3.65</td>
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<tr>
<td>Kim, et al. (1999a)</td>
<td>0.14 (0.08, 0.20)</td>
<td>3.57</td>
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<tr>
<td>Glewwe &amp; Olinto (2004)</td>
<td>0.17 (0.08, 0.26)</td>
<td>3.43</td>
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<tr>
<td>Andrabi, et al. (2009)</td>
<td>0.17 (0.02, 0.32)</td>
<td>2.96</td>
</tr>
<tr>
<td>Kremer, et al. (2008a)</td>
<td>0.18 (0.02, 0.35)</td>
<td>2.86</td>
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<tr>
<td>Macours &amp; Vakis (2007)</td>
<td>0.19 (0.08, 0.29)</td>
<td>3.30</td>
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<tr>
<td>Vermersch &amp; Kremer (2004)</td>
<td>0.21 (0.15, 0.27)</td>
<td>3.57</td>
</tr>
<tr>
<td>Meng &amp; Ryan (2007)</td>
<td>0.25 (0.07, 0.44)</td>
<td>2.69</td>
</tr>
<tr>
<td>Miguel &amp; Kremer (2003)</td>
<td>0.29 (-0.42, 1.00)</td>
<td>0.57</td>
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<tr>
<td>Barrera-Osorio, et al. (2007)</td>
<td>0.30 (0.06, 0.53)</td>
<td>2.33</td>
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<tr>
<td>Filmer &amp; Schady (2008)</td>
<td>0.32 (0.23, 0.40)</td>
<td>3.43</td>
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<tr>
<td>Kim, et al. (1999a)</td>
<td>0.35 (0.27, 0.40)</td>
<td>3.57</td>
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<tr>
<td>Duflo, et al. (2007a)</td>
<td>0.34 (0.21, 0.48)</td>
<td>3.18</td>
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<tr>
<td>Khanoker (2006b)</td>
<td>0.43 (-0.27, 1.14)</td>
<td>0.58</td>
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<tr>
<td>Levy, et al. (2008)</td>
<td>0.44 (0.38, 0.51)</td>
<td>3.57</td>
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<tr>
<td>Burde &amp; Linden (2009)</td>
<td>0.47 (0.41, 0.53)</td>
<td>3.57</td>
</tr>
<tr>
<td>Khanoker (2009a)</td>
<td>0.58 (-0.21, 1.37)</td>
<td>0.47</td>
</tr>
<tr>
<td>Kagodjio, et al. (2001)</td>
<td>0.61 (0.24, 0.98)</td>
<td>1.47</td>
</tr>
<tr>
<td>Melucco &amp; Flores (2004)</td>
<td>0.81 (0.61, 1.00)</td>
<td>2.81</td>
</tr>
<tr>
<td>Baird, et al. (2009)</td>
<td>0.81 (0.56, 1.07)</td>
<td>2.16</td>
</tr>
<tr>
<td>Overall (I-squared = 94.7%, p = 0.000)</td>
<td>0.18 (0.12, 0.24)</td>
<td>100.00</td>
</tr>
</tbody>
</table>

NOTE: Weights are from random effects analysis.
Everything works: attendance
It looks pretty good for learning outcomes too. This is an important finding. But with such heterogeneity in interventions we should be wary of a single average treatment effect.
Typology of education interventions

Demand
- Reducing costs
  - CCTs, scholarships and non-fee subsidies
  - Vouchers
  - Abolishing school fees and capitation grants
- Providing information
- Increasing preparedness
  - Early child development
  - Health/nutrition
  - School feeding

Supply
- Buildings
- Teachers
- Materials
- Management
Enrolments and attendance

But these interventions are mostly not the ones which affect learning outcomes.

Enrolments and attendance

Providing Information
School Fees
Vouchers
School Feeding
SBM
Materials
ECD
CCT
Health
Buildings
Teacher Resources

Average effect size
Learning outcomes (maths test scores)
Conditional cash transfers

Cash payment on conditions:
- Education with 80% attendance and maintaining certain grade
- Health: Ante-natal care, child immunization

Targeted both geographically and by means test

- Mexico: Progressa launched 1996 (renamed Oportunidades)
- Brazil: 12 million families by 2010

Design questions:
- Do conditions matter?
- Timing, nature and size of payment
- Who to give it to
CCTs: impact of conditions

Children 60% more likely to be in school with conditionality which is monitored and enforced compared to no conditions.

Transferable lesson?
Vouchers

• Surprisingly little evidence
• Increase private school enrolment
• But not learning outcomes

Philippines theory of change

Howard White  www.3ieimpact.org
The frontiers of SR research

- Causal chain analysis, requiring better quality qualitative synthesis
- Answering design questions
- Cost-effectiveness analysis (allowing for ‘redundant payments’)
- Network meta-analysis
- Seeing the wood for the trees
- Policy-friendly SR presentations
Insights for study designs

• Understand context
  – Supply or demand ‘constrained’

• How to answer policy-relevant questions
  – CAL: (a) children/computer, (b) required training and technical support, (c) appropriate software, (d) who supervises classes

• Looking at unintended effects
  – Interventions disrupt classrooms, or
  – Distract teachers

• Collect process data (design failure or implementation failure?) and cost data
Please visit: www.3ieimpact.org/

Education report
http://www.3ieimpact.org/en/evaluation/working-papers/working-paper-20/