Closing the Gap: A Research Agenda to Drive Human Capital Investment

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Building human capital across the lifecycle
Losing Human Capital
Human Capital Index foci

- Stunting among under-5s
- Under-5 mortality rate
- Years of schooling by age 18
- Learning among school-children
- % 15-year olds surviving to 60
<table>
<thead>
<tr>
<th>Mastering metrics</th>
<th>Health</th>
<th>Education</th>
</tr>
</thead>
<tbody>
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The dollars and cents of childhood stunting
A backward-looking calculation

• What’s the reduction in per capita income today due to some of today’s workers being stunted in childhood?

A forward-looking calculation

• What’s the rate of return to implementing today a program designed to reduce stunting among tomorrow’s workers?

Looking backwards

**Computing income reduction from stunting**

Childhood stunting rate among today’s workers

Multiply by

Labor share in output

Multiply by

Reduced earnings due to being stunted in childhood

Equals

Reduction in per capita income

Calculate average age of today’s workers.
Estimate stunting when they were 2½ years old

Assume = 2/3

It’s (a bit more) complicated…

Computing reduced earnings due to being stunted in childhood

Early childhood
- Impaired cognitive (and socioemotional) development
- Reduced stature

Childhood & youth
- Reduced cognitive (and socioemotional) skills (-0.6 SD)
- Fewer years of schooling (-1.6 yrs)
- Reduced stature (-6cm)

Adulthood
- Lower earnings due to reduced cognitive skills (-3%)
- Reduced earnings due to fewer years of schooling (-16%)
- Reduced earnings due to reduced stature (-10%)

Looking forwards
A 10-intervention nutrition program for under-5s

10 nutrition intervention package for under-5’s

Cost per capita (entire population)

Estimated impact on stunting

Varies by Bank region:
average = $3.85

Salt iodization
Acute Malnutrition Management

Supplementation in pregnancy of multiple micronutrients, iron folate, calcium, energy protein

Breastfeeding promotion. Complementary feeding education and food supplementation

20% reduction

Timing of costs and benefits of the 10-intervention nutrition program

- Only children aged 0 or not yet born will get a full 5 years of exposure to the program.
- Costs are incurred now. Benefits (lower earnings) start accruing only in 2031. Discount!
- Need to factor in that stunting is falling anyway.
- Earnings are rising – the % increase on earnings is on earnings at the time.

Calculations for 140 countries

Looking backwards
What’s the reduction in per capita income today due to some of today’s workers being stunted in childhood?

Calculations for 32 countries with highest stunting burden

Looking forwards
What’s the rate of return to implementing today a program designed to reduce stunting among tomorrow’s workers?

Effective health coverage: Getting at quantity and quality
“If we’re serious about improving health outcomes in the developing world, we desperately need to increase people’s use of health services”.

“Everyone knows the quality of health services is terrible. If we’re serious about improving health outcomes, we need to improve the quality of health services before we start getting people to use them more.”
Getting to effective coverage

Utilization
- % population using a service
- E.g. % children taken to a health provider
- But does everyone need a consultation?

Coverage
- % population in need using a service
- E.g. % children with acute respiratory infection (ARI) taken to a health provider
- But do children get the correct treatment?

Effective coverage
- % population in need using a service and getting the optimal treatment
- E.g. % children with ARI taken to a provider and getting Amoxicillin
Household surveys

- In principle, gets at care actually delivered
- Caregiver may not know, may forget
- Hard to establish exact needs of patient ex post and based on caregiver’s recall

Facility assessments

- Vignettes (hypothetical cases – paper or video)
- Standardized (‘fake’) patients
- Direct observation. NB Hawthorne effect

Effective Coverage \[ e/b \] = \[ \frac{\text{Coverage}}{\text{Quality}} \]

Coverage

% pers. in need of care for condition X who consult
[ b/c ]

Quality

% pers. consulting who get optimal care
[ e/c ]

% children with pneumonia who are taken to provider

% children with pneumonia who are taken to provider and get Amoxicillin

===== Getting at quality =====
Vignette = hypothetical patient
Two video vignettes: non-poor (left) and poor (right)

Standardized patient = actor pretending to be sick
A standardized (fake) patient interaction

Do you think he’ll realize I’m a fake patient pretending to have unstable angina?
I can’t quite remember what I’m supposed to ask, do or prescribe when a patient describes these symptoms!
Health providers don’t always know a lot...
Testing knowledge through vignettes

And they don’t always do what they know...
Vignettes vs. the “real” thing (SP)

% of providers correctly treating condition

<table>
<thead>
<tr>
<th></th>
<th>Type II Diabetes</th>
<th>TB</th>
<th>Childhood pneumonia</th>
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<tbody>
<tr>
<td>Nigeria 2013</td>
<td>36%</td>
<td>27%</td>
<td>71%</td>
</tr>
<tr>
<td>Niger 2015</td>
<td>56%</td>
<td>42%</td>
<td>68%</td>
</tr>
<tr>
<td>Tanzania 2016</td>
<td>72%</td>
<td>71%</td>
<td>77%</td>
</tr>
<tr>
<td>Kenya 2012</td>
<td>87%</td>
<td>76%</td>
<td>65%</td>
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% of providers ordering X-Ray or Sputum Test

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<th>Vignettes (knowledge)</th>
<th>Standardized Patients (practice)</th>
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<td>China</td>
<td>90%</td>
<td>30%</td>
</tr>
<tr>
<td>India</td>
<td>80%</td>
<td>10%</td>
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The Know-Do Gap

Factoring in quality makes a (big) difference

Child pneumonia, quality measured via vignettes


Quality (vignette score)
Consultation rate (among children with presumed pneumonia)

Kenya; 51
Togo; 27
Madagascar; 25
Senegal; 26
Mozambique; 35
Tanzania; 51
Niger; 35
Nigeria; 18
Uganda; 42

20%
30%
40%
50%
60%
70%
80%
90%

20%
30%
40%
50%
60%
70%
80%
90%

Kenya, 59%
Mozambique, 55%
Tanzania, 51%
Niger, 48%
Madagascar, 40%
Senegal, 40%
Nigeria, 33%
Togo, 33%
Uganda, 69%

Coverage
Effective Coverage

20%
30%
40%
50%
60%
70%
80%
90%
Are vignettes overoptimistic about what children (taken to a provider) actually get?

Vignette (child with non-severe pneumonia) vs. DHS (child with presumed pneumonia) % getting correct treatment

Vignette (severely dehydrated child with diarrhea) vs. DHS (severely dehydrated child with diarrhea) % getting correct treatment

Demand- and supply-side incentives in health. Do they work?

A Mega Meta-Analysis
Why look at demand- and supply-side financial incentives in health?

• 2/3 of IDA HNP projects try to increase coverage of maternal and child health (MCH) interventions by **using financial incentives to health providers** – performance-based financing (PBF)
• Does PBF work?
• Does it work better than financial incentives targeted at health care users, e.g. CCTs?
• Are there some services where one type works better than the other?

The Study

• A lot of potentially relevant studies – not all actually relevant, and not all high quality
• Some programs have been evaluated by several studies
• Use meta-analysis to synthesize the evidence
Whittling down the evidence base

Three literature searches – 2016, 2017 and 2018. In 2016, 20,255 articles were found.
Countries with credible evidence on supply- and/or demand-side incentives for MCH
The emerging evidence on demand- and supply-side financial incentives in health

Three (tested) nudges to improve adult health
Nudge #1: Using SMS nudges to reduce TB treatment delay and treatment non-initiation

• TB is curable. Yet South Africa has one of the world’s highest TB mortality rates
• TB “journey” has a series of steps. Delays and drop-off occur at each stage, especially at treatment initiation
• Patients who have tested for TB either don’t return to get their results / start treatment, or delay their return
• HIV+ patients esp. vulnerable – TB develops more quickly
• RCT tested 2 SMS nudges in 3 Cape Town clinics
  • **SMS1**: A simple reminder – aimed at getting returning to clinic to “top of mind”. “Don’t forget to collect your results from the clinic tomorrow.”
  • **SMS2**: A scary reminder – aimed at overcoming “optimism bias”. “Don’t forget to collect your results from the clinic tomorrow. 96,000 South Africans die every year from TB. This should not be – TB can be cured”.

Effects of SMS on returning to clinic on requested day
Per protocol = effect on treated, i.e. people with phone getting intended SMS

Nudge #2: Using a commitment device to encourage people to quit smoking

- Time preference is the idea that people are impatient
- **Time-inconsistent preferences** (TIP) mean people are more impatient in near-term trade-offs than in longer-term trade-offs
- TIP helps explain why people find it hard to quit smoking
- TIP imply a preference for a commitment device – a way to voluntarily constrain one’s future consumption choices
- Could the offer of a commitment device help people quit smoking?

- Smokers selected randomly were offered the opportunity to voluntarily sign a commitment contract to stop smoking
  - Smoker commits to paying own money into a fund each week and to passing a urine test after 6 months. If does so, gets his money back. If not, fund is donated to charity
- 2nd treatment group received “cue cards” about the health risks from smoking

Commitment device and cue card (ITT) effects on passing (nonsmoking) urine test 12 months later.

Nudge #3: Incentivizing Safe Sex – Lotteries and HIV in Lesotho

• In 2016, 1.2m new HIV infections in Africa, adding 26m new people living with HIV
• Could financial incentives to stay free from sexually transmitted infections via a lottery help reduce HIV?
• RCT with low expected payments (but high payments to lottery winners) conditional on testing negative for 2 curable sexually transmitted infections (syphilis and trichomoniasis)

Results of incentives on HIV incidence and prevalence

Three (tested) ideas to improve children’s learning
Idea #1: Storybooks, language development and getting ready for school

• 250 million under-five children at risk of failing to meet their developmental potential – partly because of inadequate cognitive stimulation in early childhood

• Parent support programs yield significant benefits... but they’re expensive

• Could giving (culturally- and linguistically-appropriate) storybooks to families help? Would training, feedback and home visits also help?

Study population

Controls: Nothing
T1 Storybooks dropped off
T2: T1 + Group Dialogic Reading Training + Feedback Session
T3: T2 + Booster Training
T4: T3 + Home Visit
Storybooks increase reading and comprehension

Extra support adds little

Idea #2: Incentivizing learning through scholarships
Does how a scholarship is labeled make a difference?

• Cambodia piloted a scholarship program for upper primary schoolers – grades 4-6 – in 3 provinces
• Free schooling plus $20 p.a. per pupil
• Schools randomly assigned to Phases 1 and 2
• Within each phase, schools randomly assigned to be poverty scholarship schools or merit scholarship schools
• Did the scholarships work?
• Did the 2 types work equally well? Did the label make a difference?

Scholarships worked equally well for enrollment. Only merit scholarships increased learning.

Idea #3: After-school programs in El Salvador’s violent schools

- El Salvador’s gang violence is having negative effects on education – a 13% decrease in enrollment
- Could an after-school program (ASP) – aimed at students in the age range targeted by gangs, and living in the most violent communities – help?
- RCT in 5 schools in El Salvador’s most violent communities
- Two 90-minute ASP sessions per week – enrolled children selected at random were invited to participate; the rest became the control group
- Two components to each ASP session:
  - Club activities – e.g. scientific experiments, artistic performances, etc.
  - Cognitive behavioral therapy (CBT) – concrete methods for regulating participants’ violent behavior
- Data from school, self-reports, psychometric tests and electronic brain monitoring used to measure impacts on absenteeism, behavioral reports, grades, etc.

Randomization process in each school

After-school program (ITT) effects

Anticipating changes in the HCI – globally
A barometer to help us anticipate HCl changes?

- Human Capital Barometer
- Lots of frequently collected indicators that either mimic or “lead” the HCl
- 5 slow-moving indicators

Human Capital Index
Use Gallup World Poll (GWP) to collect data for the barometer?

• Gallup does GWP (usually) every year
• 160+ countries
• $N \approx 1,000$
• Interviews face-to-face in LICs and MICs; by phone in HICs
• DECRG has already partnered successfully with GWP to collect data on financial inclusion – FINDEX
• Some questions relevant to HCI are in GWP already
• Others could be added à la FINDEX
• Can think of HCI *mimic indicators* and HCI *leading indicators*
What indicators to collect for the barometer?
*Italicized indicators already available in GWP*

<table>
<thead>
<tr>
<th>Human Capital Index</th>
<th>HCI Mimic Indicators</th>
<th>Human Capital Barometer (GWP)</th>
</tr>
</thead>
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<td>Years of schooling -18</td>
<td>School attendance. UNESCO</td>
<td>School tests. PISA, TIMSS, etc.</td>
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<td>Learning among school children</td>
<td>TIMSS-type math problems to 15-18 year-olds (use to proxy learning)</td>
<td>Births &amp; surviving children (use to compute U5MR)</td>
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<td>Under-five mortality</td>
<td>USMR UN smoothed and modeled data</td>
<td>Stunting UN Interagency WG. HH survey data</td>
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<tr>
<td>Stunting</td>
<td>Adult mortality rate</td>
<td>Recent deaths and ages of deceased (use to compute adult mortality)</td>
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- HCI: Human Capital Index
- U5MR: Under-five mortality rate
- Timss: Trends in International Mathematics and Science Study
- Pisa: Programme for International Student Assessment
- WASH: Water, Sanitation, and Hygiene
### Human Capital Index

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<tr>
<th>Category</th>
<th>Indicator</th>
<th>Source/Method</th>
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<td>School attendance. UNESCO</td>
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<td>School attendance and grade (use to estimate years of schooling to 18)</td>
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<tr>
<td>HCI Leading Indicators</td>
<td>Participation in early childhood programs</td>
<td></td>
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<tr>
<td>HCI Correlates</td>
<td>College attendance, employment, use of skills in workplace</td>
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**Italicized indicators already available in GWP**

- TIMSS-type math problems to 15-18 year-olds (use to proxy learning)
- Satisfaction with local schools
- Use of antenatal care, attended deliveries, WASH
- Recent deaths and ages of deceased (use to compute adult mortality)
- Sanitation, cooking fuel, pregnancy outcomes, feeding
- Adult health: self-assessed health, health limitations, BP, etc.
Correlations between GWP indicators and other data (with # datapoints)

- GWP improved sanitation vs. UNICEF 'at least basic' sanitation: N=50; p=0.000
- GWP % completed secondary education 15-19 vs. Barro-Lee % completed secondary education 15-19: N=108; p=0.000
- GWP % completed secondary education 15+ vs. Barro-Lee % completed secondary education 15+: N=108; p=0.000
- GWP satisfaction w/ schools vs. learning-adjusted yrs schooling: N=113; p=0.000
- GWP satisfaction w/ schools vs. harmonized test scores: N=113; p=0.000
- GWP satisfaction w/ schools vs. SDI teacher knowledge (Africa): N=6; p=0.269
- GWP satisfaction w/ hlth facils. vs. SDI provider knowledge (Africa): N=8; p=0.443
In conclusion...

- **Mastering metrics**
  - Health coverage: Getting at quantity and quality

- **Finding (and explaining) facts**
  - The dollars and cents of childhood stunting

- **Probing policies & programs**
  - Demand- and supply-side incentives in health. Do they work?

- **Trialing and testing**
  - Three (tested) nudges to improve adult health
  - Three (tested) ideas to improve children's learning

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**Human Capital Barometer**

- Your HCI will load shortly (Just kidding)

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- Mastering metrics
- Finding (and explaining) facts
- Probing policies & programs
- Trialing and testing

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- Health coverage: Getting at quantity and quality
- Demand- and supply-side incentives in health. Do they work?
- Three (tested) nudges to improve adult health
- Three (tested) ideas to improve children's learning