Chlorine Dispensers for Safe Water

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The Kenya Rural Water Project (RWP)

- Ongoing series of randomized evaluations of alternative water interventions in rural western Kenya
  - Collaboration between researchers at Harvard, Berkeley and IPA

- Studies on:
  - Source water quality improvements through \textit{spring protection}
  - Point-of-use water treatment with chlorine
  - Increased water quantity
  - Alternative water maintenance policies

- Results
  - Understanding of demand for and impact of interventions
  - New approach to water treatment – \textit{point of collection chlorine dispensers} - that could improve health of millions

Improving Source Water Quality

- Randomized trial of spring protection (Kremer, Leino, Miguel, Zwane; 2009)
  - 184 springs protected; sequence of protection randomized (2004-07)

- Recontamination important: Source water contamination $\downarrow$ 66%; home water contamination $\downarrow$ 24%

- Child diarrhea $\downarrow$ 25%

- Low valuation of water quality

- Convenience important for adoption

Chlorination

- Chlorination is effective, safe, cost effective
  - Most commonly used treatment in piped water
  - Reduces child diarrhea by 20-40 percent
  - Chlorine residual protects against recontamination
  - Extremely cheap

- Distribution via social marketing
  - But limited take-up

- Why?
Determinants of Adoption of Water Treatment

- Price is an important barrier to adoption

- Personal contact, community messages, information, psychological factors have some effect

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Chlorine Dispenser System: New approach to cut costs, increase convenience, salience, social learning

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Potential for Impact

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<th>High Adoption</th>
<th>Low Cost</th>
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- Long run estimated cost as low as
  - $0.30 per person per year
  - 50 percent of current costs

- At scale, cost per DALY saved as low as $20
  - Comparable to vaccines

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Potential for Scale and Sustainability

- Pilot programs:
  - Ministry of Education, Kenya
  - Ministry of Public Health and Sanitation, Kenya
  - Local Governments, Western Kenya
  - Regional water services board, Western Kenya
  - NGOs in Ethiopia, Swaziland and Bangladesh
Ministry of Education, Kenya

- Dispensers at 33 schools
  - Water sources on premises; used by school and community
- Funded and led by MoE
  - Technical assistance from IPA
- Multi-year chlorine supply + dispenser
- Chlorine delivery through retail channel, using coupons
- School teachers lead ongoing management and community education

Results

- Chlorine access for > 30,000 people
- Positive chlorine tests (random) in 85% of schools with water

Next steps:

- Integrate with school feeding, school health programs (e.g. de-worming)?
  - Combined training?
  - Combined distribution of pills and chlorine?
- Leverage school program to reach student homes, communities?

Other potential models

- Long-term government funding with ministry distribution (Ministry of Public Health and Sanitation, Kenya)
- Contracting for Services (Local Governments, Kenya)
- Bundling with water provision (water vendors, water user committees, circuit riders)
- NGO funded and managed

Key Operational Issues

- Promoters
  - Their role?
  - Monetary payments, social recognition for motivation?
- Distributing chlorine
  - Coupon-based retail, drop-offs or public distribution?
- Managing installation, repairs, maintenance
  - Contract structure for installers?
  - Warranty models?
- Financing long-term supply of chlorine
  - Multi-year commitments (public health model)?
  - Endowments model (capitalize recurring costs)?
Using Technology to Improve Transparency

- SMS technology
  - Supply chain management
  - Accountability
  - Financial transfers

- GPS devices
  - Monitoring chlorine delivery, dispenser re-filling

For more information:
Email dispensers@poverty-action.org
Visit www.poverty-action.org/safewater

The Need for Safe Water

- More than 1.6 million children die each year from diarrhea
  - Over 4000 per day
  - 20 percent of all child mortality

- Unsafe water is a leading cause

- Much of this is preventable