A National Assessment of Point-of-Consumption Drinking Waters in Rural Cambodia

Preliminary Findings and Implications for WSPs and HWTS
Cambodia

- 14 million people
- 81% rural
- GDP per capita = $805 USD (2010)
- Under 5 mortality rate = 54 per 1,000 live births
- 25% of rural population completed primary school

Source: Demographic Health Survey 2010
Drinking Water in Cambodia

**Dry Season**
- Improved: 53.1%
- Unimproved: 45.6%

**Wet Season**
- Improved: 76.0%
- Unimproved: 23.2%

Source: Demographic Health Survey 2010
Drinking Water in Cambodia

Source: Demographic Health Survey 2010
National Assessment of Rural Drinking Water

• **Aims:**
  – To improve the knowledge and understanding of drinking water at the point-of-consumption (PoC)
  – To inform policy and programmatic decision-making

• **Objectives:**
  – To measure E. coli of water in drinking glasses (PoC)
  – To examine associations between PoC E. coli and conditions from source to consumption.
Methodology

• Random selection of rural communes throughout Cambodia
  – 50 communes
  – 10 random GPS locations in each selected commune
• 2 nearest households at each GPS location
• ≈ 1000 households (50*10*2)
• Household questionnaire
• Water sample from drinking vessel (glass or cup)
• Mobile laboratory setup at guesthouse
  – E. coli testing using Micrology Coliscan © Membrane Filtration
    (www.micrologylabs.com)
  – Ambient temperature incubation
National Assessment of Rural Drinking Water

• Field work completed in September 2013
• Currently conducting data analysis

• Preliminary findings:
  – 985 households
  – 4,543 people
  – 5.5% people with diarrhea in past 2 weeks
  – 944 valid PoC E.coli water testing results
Source to Consumption

Improved: 81.2%  Unimproved: 18.8%

National Assessment vs. CDHS
Wet Season Drinking Water Source

- National Assessment
- CDHS
Source to Consumption

Bar chart showing the percentage of people using different water treatment methods:

- **No treatment**: 50%
- **Boil**: 30%
- **Ceramic filter**: 10%
- **Mineral pot filter**: 5%
- **Bio-Sand filter**: 5%
- **Chlorine**: 2%
- **Alum**: 2%
Source to Consumption

- No treatment
- Stored in same container used to treat
- Different unsealed container
- Different sealed container

Protected drinking glass
- Yes
- No
E. Coli in the Drinking Glass

- **E. coli (cfu/100mL)**
  - 0 (Minimal Risk)
  - 1-9 (Low Risk)
  - 10-99 (Medium Risk)
  - >100 (High Risk)

- **N = 944**
Limitations

• Field work conducted in wet season
  – Situation in dry season is different

• E. coli is only an indicator of pathogens and health risk
  – Not a perfect indicator
Next steps...

• Analyze associations with E. coli in the glass
  – Points along the water pathway
    • Source (improved vs. unimproved)
    • Transport
    • Storage
    • Treatment
    • Post-treatment storage

– Household socio-economics
– Diarrhea and water-borne illnesses
– Water-related behaviors and knowledge
Implications for WSPs and HWTS

• WSPs
  – Risk management from catchment to consumer
  – What variables are associated with E. coli in the drinking glass water (PoC)?
    • How do we address those issues in WSPs?
  – What is the difference in E. coli in the glass between improved and unimproved water sources?

• HWTS
  – What is the difference in E. coli in the glass between treated and untreated water?
    • This is the potential impact of future HWTS promotion
    • Baseline data for future monitoring
Questions?

Acknowledgements:

Project Supervisor: Mr. Steven Iddings - WHO
Project Manager: Andrew Shantz – WHO Consultant
Research Advisor: Dr. Joe Brown – London School of Hygiene and Tropical Medicine
Discounted laboratory consumables provided by Micrology Laboratories