



Water Quality Module of the Ghana Living Standards Survey (GLSS) VI

Monitoring Household Drinking Water Quality through a Country Survey

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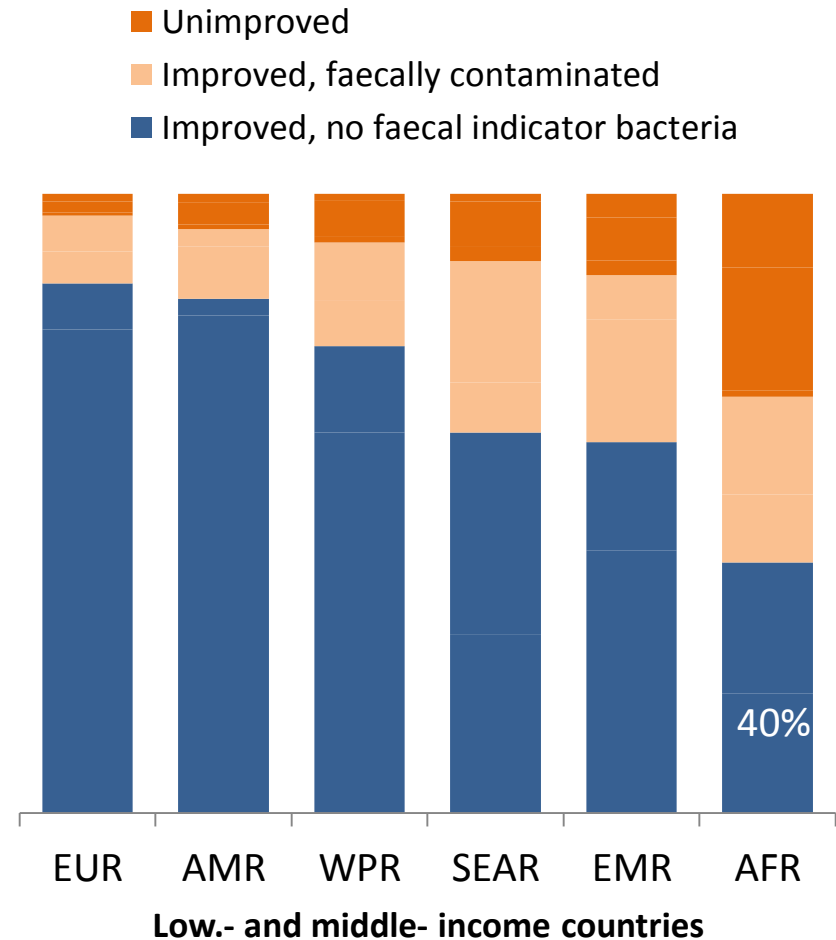
Water and Health Conference, UNC Chapel Hill

October 13, 2014

Introduction: Why water quality testing

Background

- Enhanced focus on Water Safety globally - e.g. post-2015
- No comprehensive national data on drinking water quality
- Proposed development of a national Drinking water Quality management framework (in progress)



Source: Bain et al. 2014

Introduction: Why water quality testing

Opportunities offered by GLSS

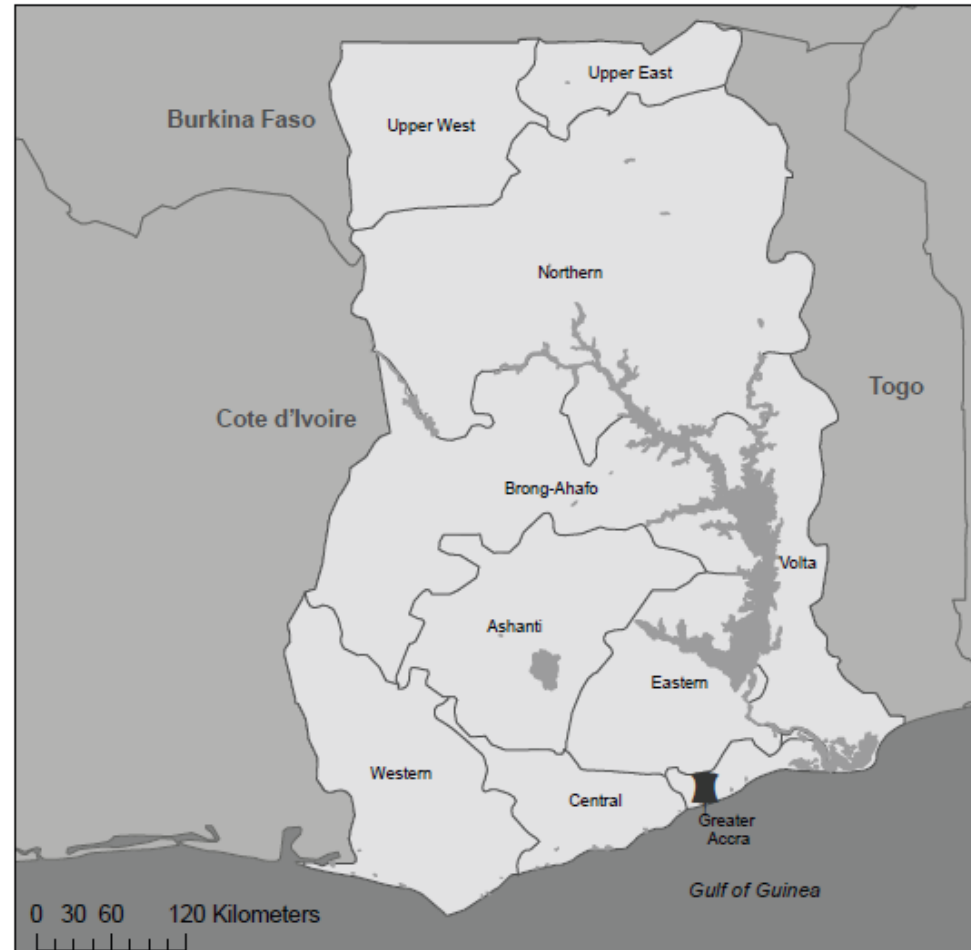
- Country Survey focused on poverty
- Cost effective
- Measurement at household and at source (collection points)
- Cross-tabulation / correlation with WASH practices and poverty or equity-based indices – health, economic etc.
- Opportunity for periodic review (WQ situation)

Enabling Factors

- Advancement in field measurement technology
- Country level technical support – Technical Committee
- International Support – technical design including instrumentation, training of field staff and follow-up process support
- Overall Survey Management - Ghana Statistical Service (GSS) - responsible for national surveys


Design of the GLSS-VI

- Sample size = 18,000
- 1,200 Enumeration Areas (EAs) each 15 households
- Disaggregation
 - Urban and rural
 - 3 ecological zones and Accra
 - 10 administrative Regions
 - 4 quarters, each having 300 EAs (1 October 2012 – 30 September 2013)
- WASH Component of Questionnaire is fairly standardized - i.e. with MICS, DHS etc.



Design of the Water Quality Module

STATISTICAL SERVICE



REPUBLIC OF GHANA

GHANA LIVING STANDARDS SURVEY 6
(WITH LABOUR FORCE MODULE)
2012/2013

HOUSEHOLD QUESTIONNAIRE
PART A

REGION: DISTRICT: E.A. NUMBER: HOUSEHOLD:

- 30 Data collection teams – 10 data collection cycles
- Measurement of *E. coli* and arsenic
 - Team Supervisor and senior interviewer/ Editor (Assistant)
- 3,600 households sampled
- 1,200 sources sampled

Field Kits



E. coli, Other Coliforms

Portable filtration

Pre-poured testing plates

Incubate 24 hours



Arsenic

Portable kit

Three chemicals

Results in 10 minutes

Quality Control

- Field blanks
 - 1 blank (sterile water) per 20 regular tests = 5%
- Laboratory duplicates
 - Samples tested in regional laboratories of Ghana Water Company + Central Lab of Water Research Institute
 - 1 duplicate household test per 15 households
 - 1 duplicate source test per 5 sources
 - Total 2 duplicates per 20 tests = 10%







Data Interpretation

Arsenic: Four risk classes (parts per billion)

Low risk	0 – 10
Medium risk	11 – 50
High risk	51 – 200
Very high risk	> 200

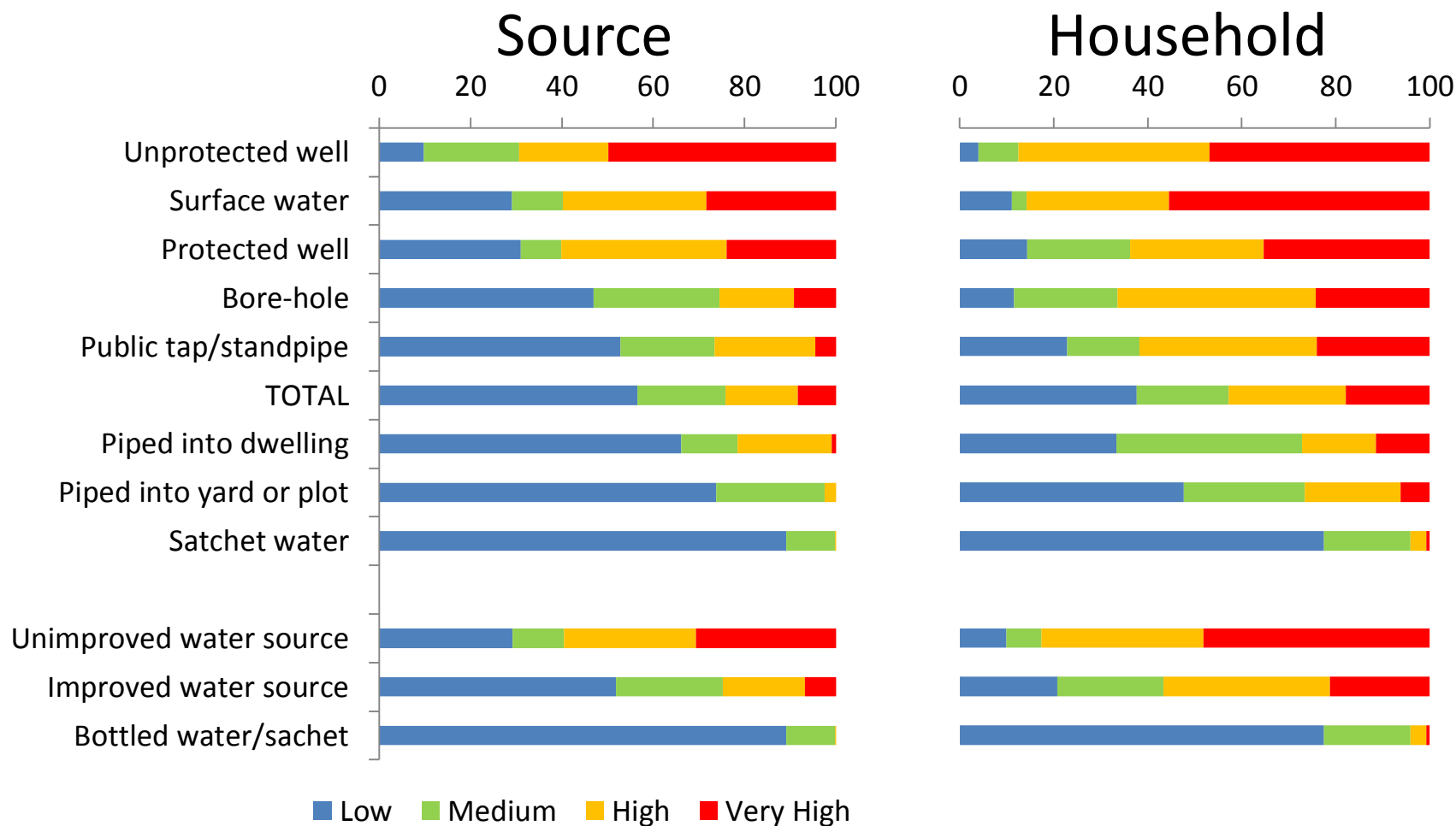
E. coli: Four risk classes (CFU per 100 mL)

Low risk	< 1
Medium risk	1 – 10
High risk	11 – 100
Very high risk	> 100

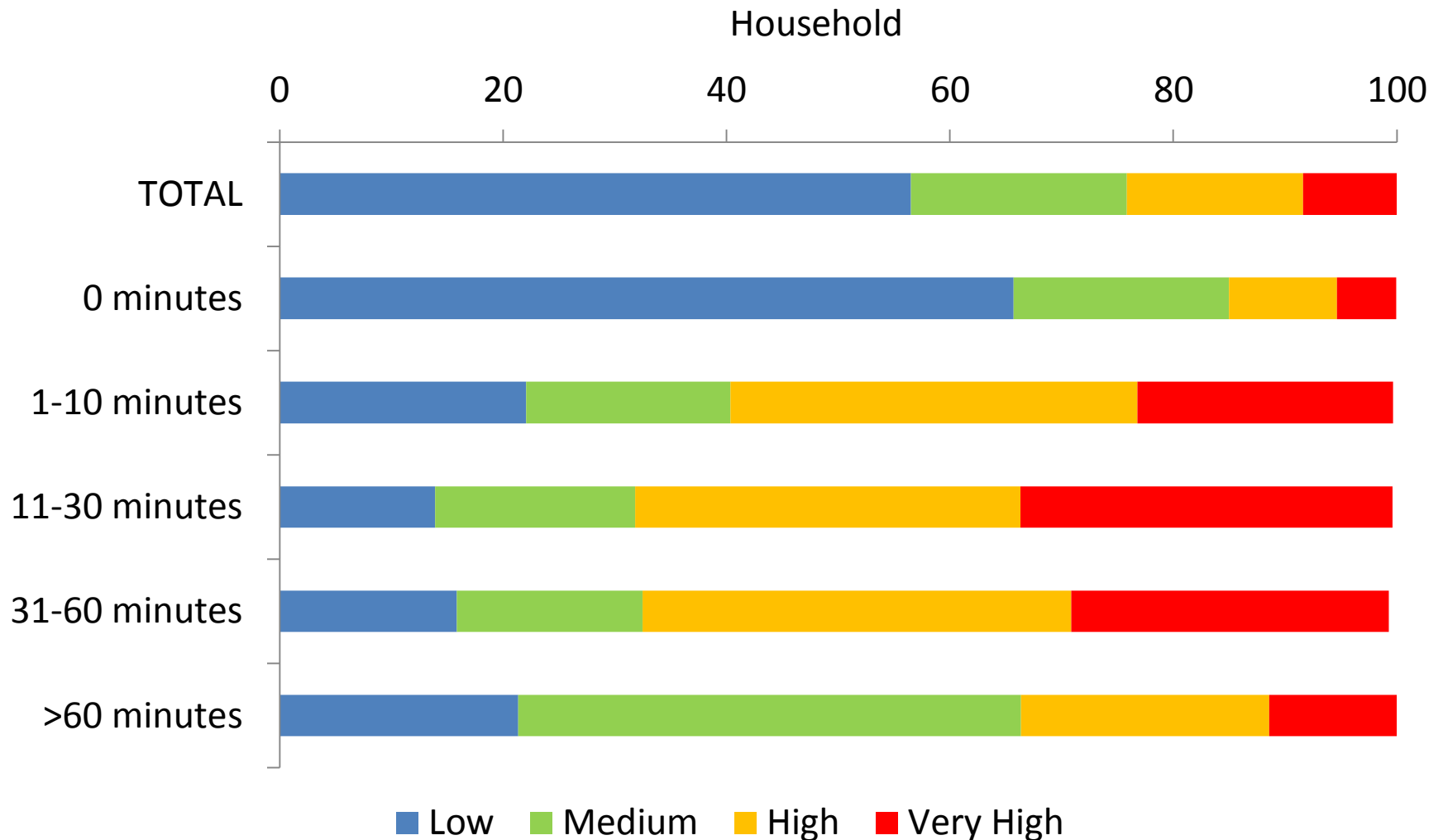
Results

- 57% free from *E. coli* at source
 - 38% at household level
- 8% high risk (> 100 CFU/100 mL) at source
 - 22% at household level
- 7% above 10 ppb arsenic
 - Mostly 11-50 range
 - Little difference between source and household

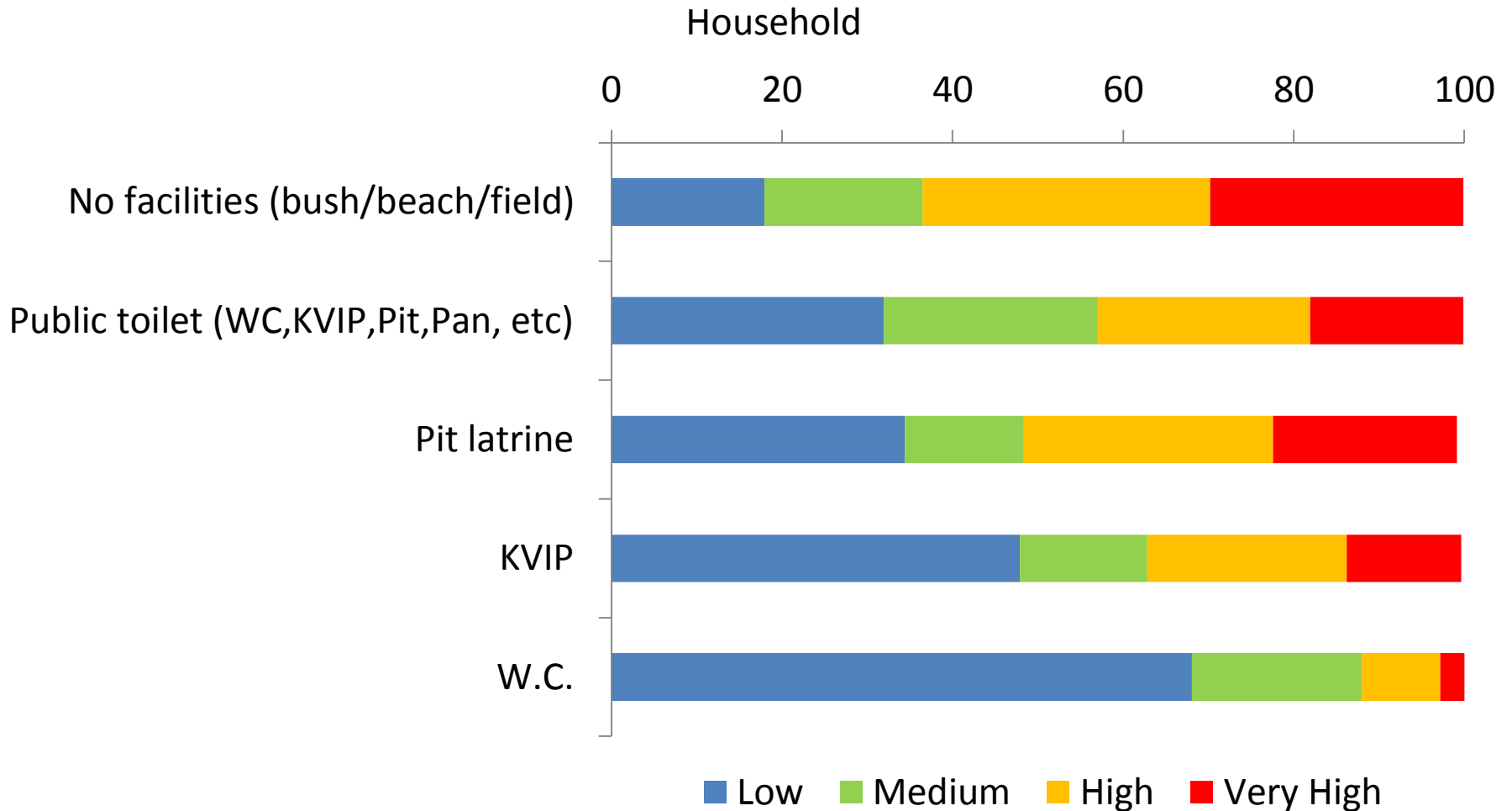
Water source



Travel time



Sanitation



Wealth

Source

	Low	Medium	High	Very High
Poorest	48	22	19	11
Poor	43	21	25	11
Middle	58	18	13	11
Rich	62	19	11	8
Richest	63	19	14	4

Household

	Low	Medium	High	Very High
Poorest	17	13	39	30
Poor	19	18	36	27
Middle	37	15	26	22
Rich	41	22	25	13
Richest	51	22	16	11

Points to note

- Correlation is not causality
- Simple cross-tabulations can miss important underlying causes
 - e.g. sanitation may not be significant if source and wealth are controlled
- Small sample sizes for some less common classes
 - e.g. source samples, unprotected wells

Challenges

- Quality control not consistently applied
 - Blanks not systematically recorded
 - Poor correlation with laboratory results
 - Logistic challenges of sample transport
 - Limited capacity at laboratories
- Consistent application of field protocol
 - Importance of technical supervision

Lessons Learnt

- Preparation – Lead Time (≥ 9 months – normal for other components of survey)
 - data collectors, supportive structures and institutions
- Importance of active Technical Committee
 - process audit, field level technical support, removal institutional bottlenecks and effective coordination - significant process management and coordination (technical and institutional) required
- Refresher training for field teams
- Cost effective
 - relative to size of country and survey, support received from country systems

Programme Implications

- Development of National Drinking Water Management Framework
 - Snapshot of drinking water quality countrywide (thematic report)
 - Strengthening advocacy for Water Safety Initiatives
 - Strengthening HWTS programming – advocacy and basis for targeting of specific interventions
 - Advocacy for capacity enhancement for key water quality management functions – surveillance, reporting, hygiene promotion (incl. HWWS & HWTS) etc.
- Baseline for periodic update/ tracking of drinking water quality - strengthen water safety initiatives
- Methodology for targeted studies
- Baseline for targeted studies

Acknowledgements

- Technical Working Group, led by Water Directorate – Coordination and Monitoring
- Management of GLSS – Survey Management
- GSS Field Data Collection Teams
- GWCL laboratories – QA testing
- Technical Assistance for Design, training and Data Analysis
 - Rick Johnston & Kathryn Kazior
 - UNICEF HQ, NY
 - WHO HQ, Geneva



Thank
You