Public Health Risks Associated with Unsafe Fecal Sludge Management in Accra, Ghana

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Center for Global Safe WASH, Emory University

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Background

- SaniPath Tool assesses public health risks (exposure to fecal contamination) from unsafe fecal sludge management (FSM)
- Advocacy and decision-support tool for local governments and development partners
- Deployed only in low-income neighborhoods in Ghana, India, and Mozambique

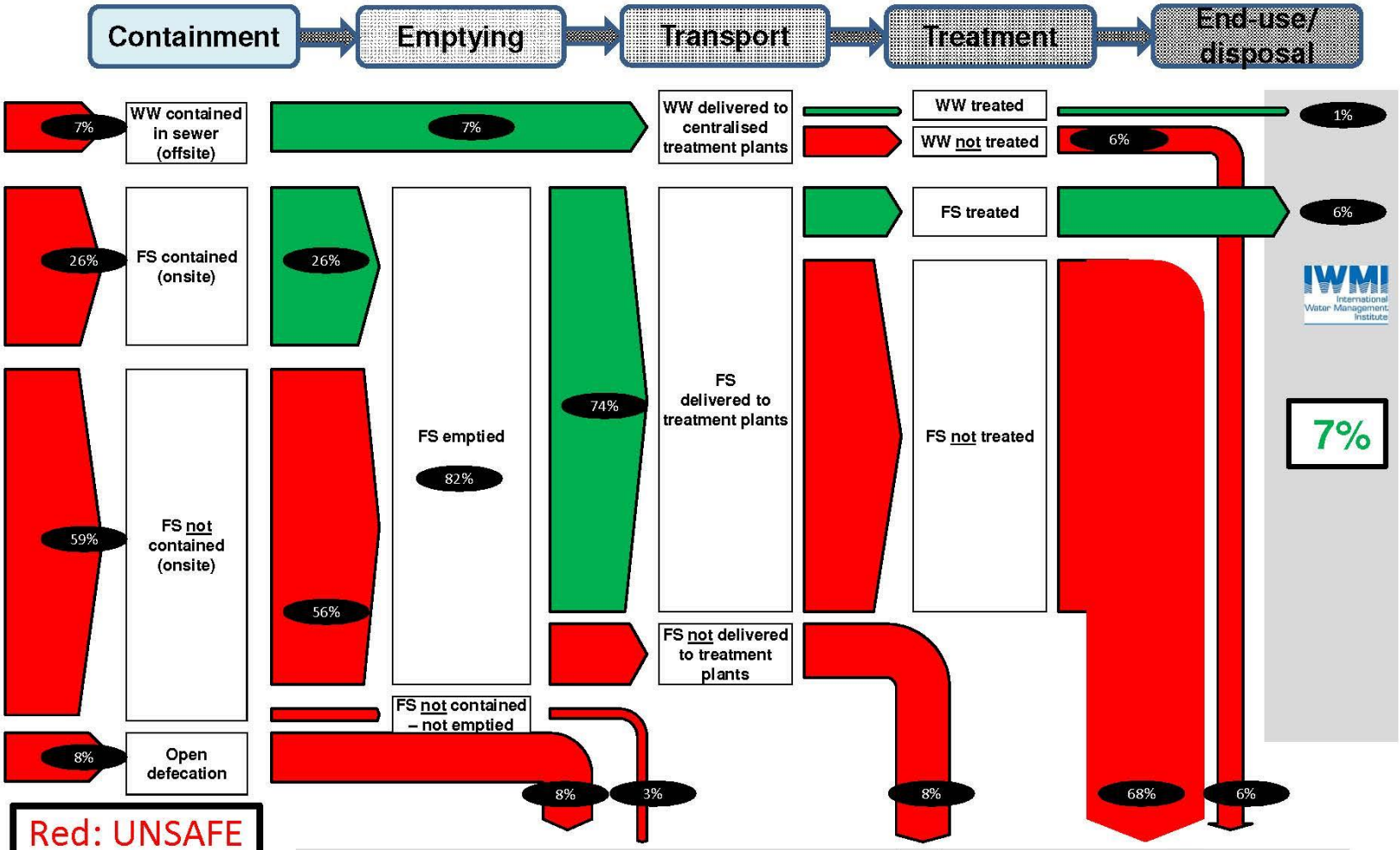
Introduction

- Demand for city-wide assessments by decision makers

Research Question

- Can you characterize city-level fecal exposure pathways using representative neighborhoods?
- Before we get to that…
  - Do we observe differences in exposure to fecal contamination with changes in SES, population density, and sanitation at the neighborhood-level?

EXCRETA FLOW DIAGRAM: GREATER ACCRA, YEAR 2010

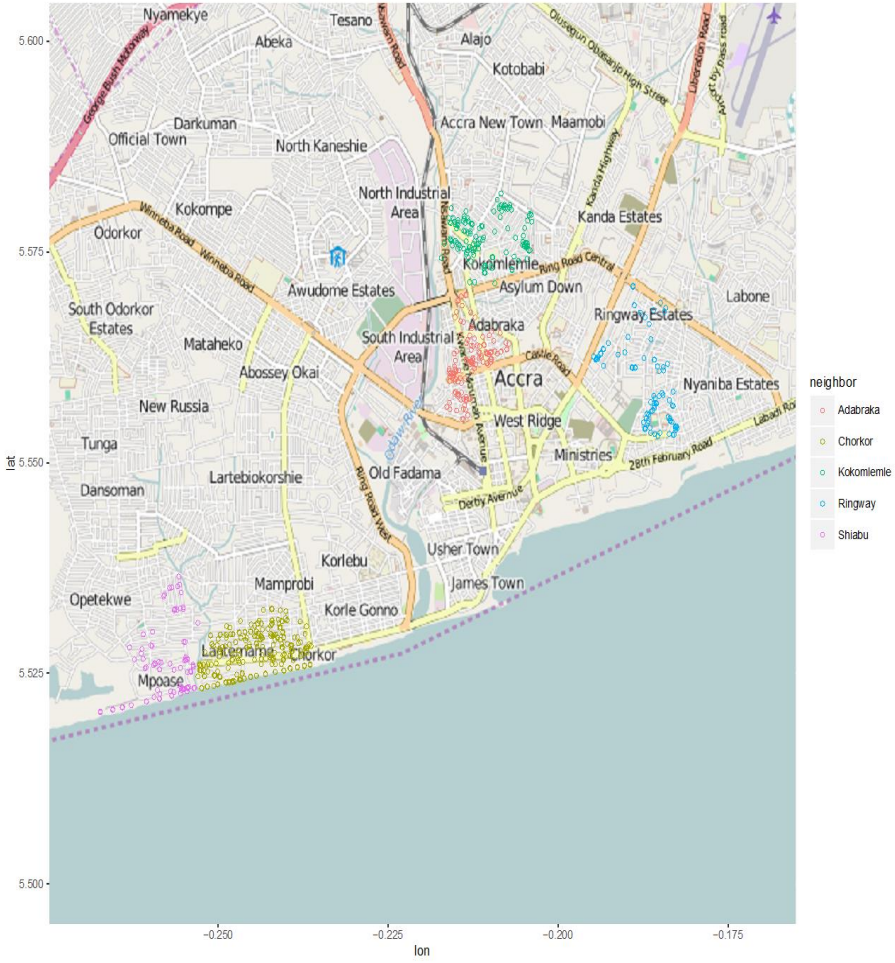


Methods

- Engaged local stakeholders from onset
- Used recommended publicly available data to select neighborhoods
- Data sources were 2010 Census data and 2010 Accra Metropolitan Authority Poverty Map
- Used income levels, population density and sanitation coverage to aggregate and rank neighborhoods
- 4 representative neighborhoods selected out of 87

Neighborhood Classification

Neighb.	Income	Pop. density	Sanitation % Contained/ % Public toilet/ % No facility
Ringway Estates	High	Low	Good 97%/2%/<1%



Neighborhood Conditions

Ringway Estates – High Income

Chorkor – Very Poor

Data Collection Methods

- **Behavioral Exposure Data**
  - Key informant interviews and transect walks, household and community surveys
  - Reported frequency of behavior of adults and children that leads to exposure to fecal contamination

- **Environmental Microbiology Data**
  - Collect environmental samples from relevant exposure pathways (ocean, drains, produce, water, soil, public latrines, floodwater)
  - Analyze for *E. coli* as an indicator of fecal contamination
- Data collection April-August 2016, 2-4 weeks per neighborhood

4 neighborhoods
Accra, Ghana, 2016

Drains

Very Poor

Chorkor
Percent Exposed = 71%
Dose= 10^6.4 CFU/month

Poor

Kokomlemle
Percent Exposed = 50%
Dose= 10^5.51 CFU/month

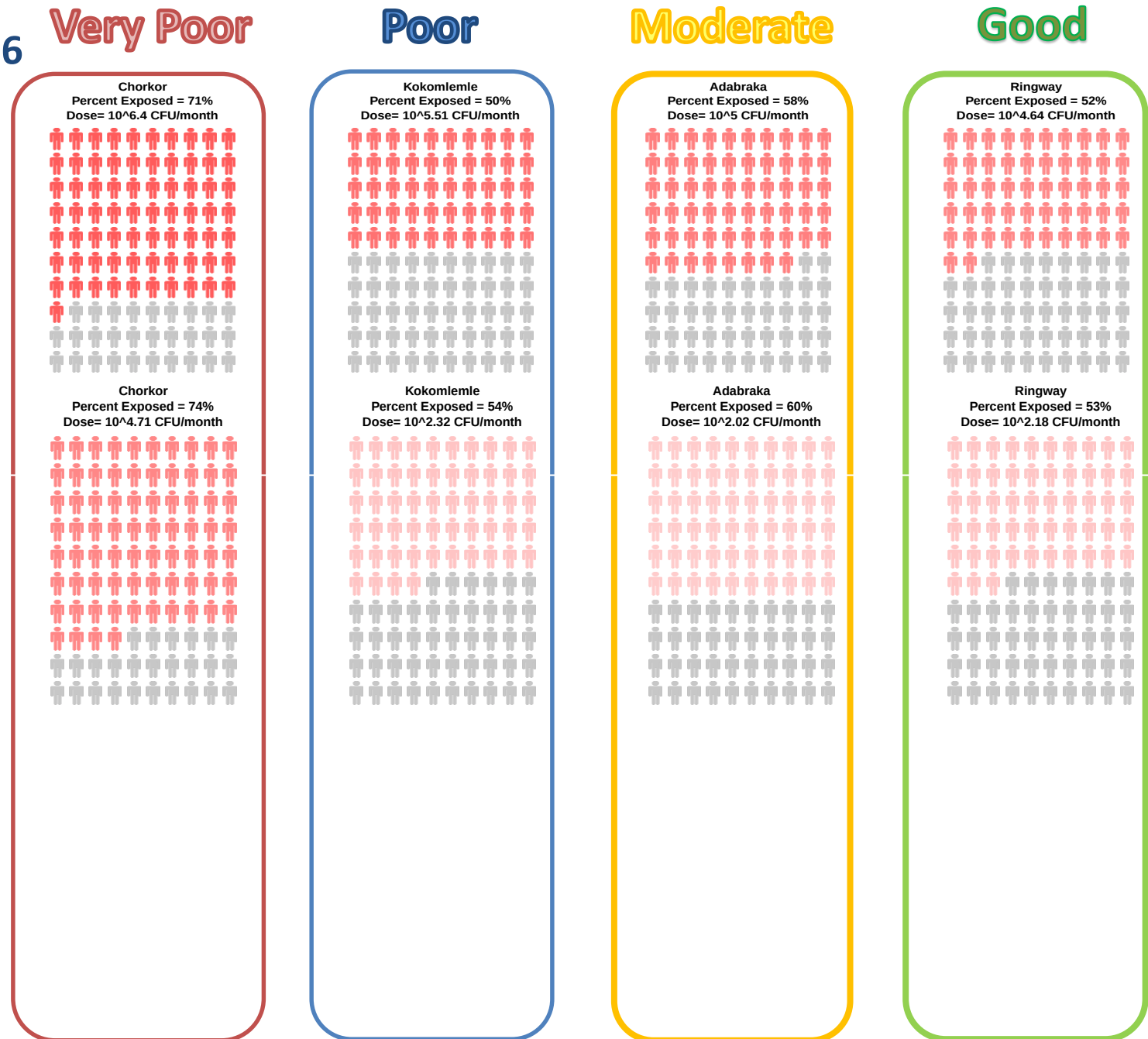
Moderate

Adabraka
Percent Exposed = 58%
Dose= 10^5 CFU/month

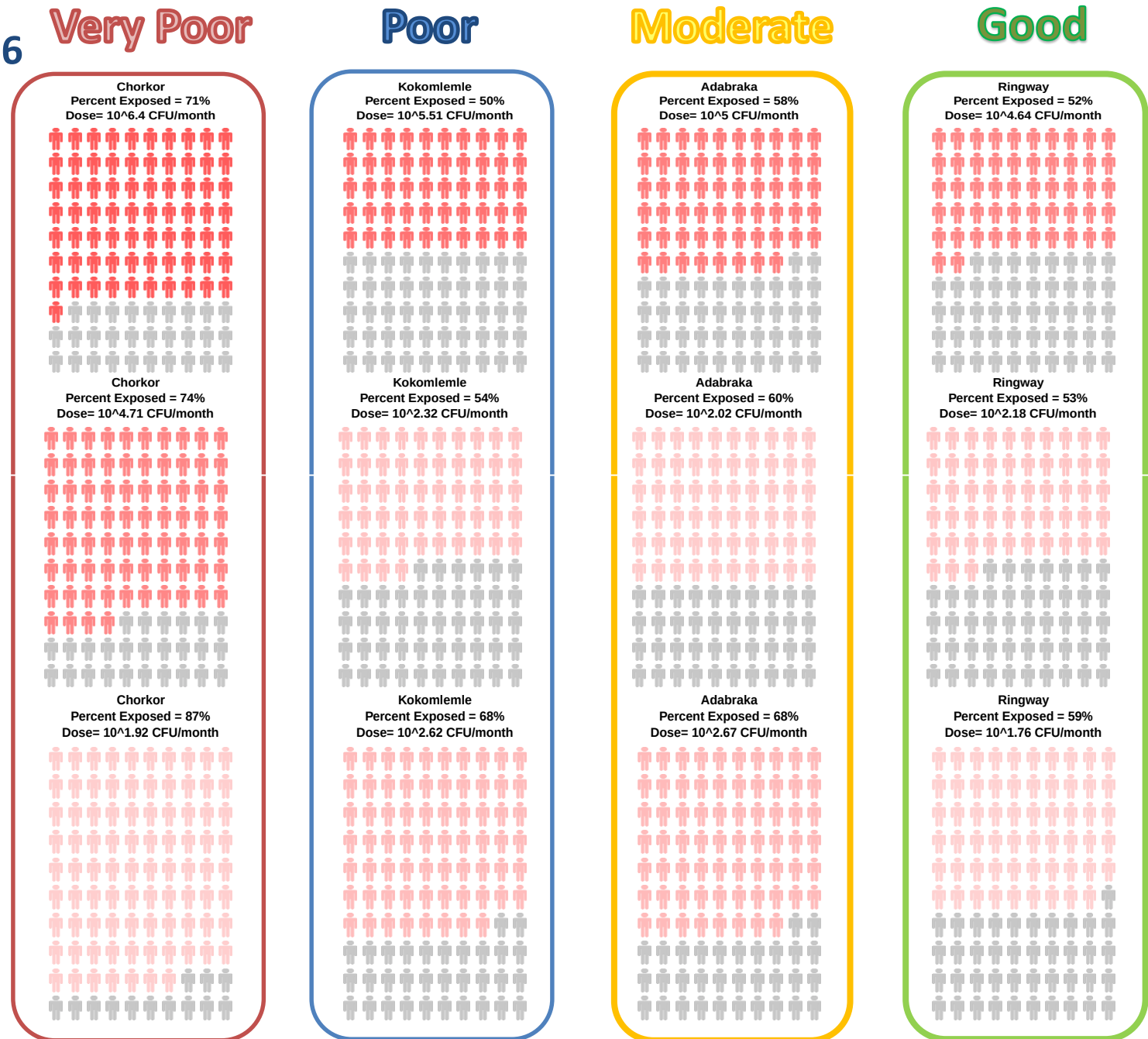
Good

Ringway
Percent Exposed = 52%
Dose= 10^4.64 CFU/month

4 neighborhoods
Accra, Ghana, 2016



4 neighborhoods
Accra, Ghana, 2016



4 neighborhoods
Accra, Ghana, 2016

Summary

- The major risk of exposure to fecal contamination in all 4 neighborhoods was through **produce**.
- Poor FSM in a city may lead to public exposure to fecal contamination irrespective of neighborhood characterization.
- Except for the produce pathway, risk of exposure to fecal contamination in the 4 neighborhoods was generally aligned with publicly available data on neighborhood sanitation coverage, income level, and population density.
- It may be possible to use the fecal exposure data from these 4 typologies of neighborhoods to estimate exposure in all neighborhoods on a city scale. This would allow comparison of fecal exposure between cities.

Limitations & Next Steps

- Neighborhood classification across the city was limited by what information was publicly available. What is available in one city may not be available in another.
- The relative importance of the different factors used for neighborhood classification (income levels, population density, and sanitation coverage) on the risk of exposure to fecal contamination is unknown.
- The SaniPath Tool is designed to be able to detect larger differences in exposure (i.e. >1 $\log_{10}$).
- Further work is needed to compare the representativeness of neighborhood-level risk of fecal exposure to the risk of exposure across the whole city.

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