

Analysis of the Public Health Risks of the Urban Water System in Accra by Microbial Risk Assessment

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Outline of Presentation

1. Introduction
2. Objectives
3. Description of Accra Urban Water System
4. Methodology
5. Results and Discussions
6. Management Options and use of standards
7. Conclusions

Introduction

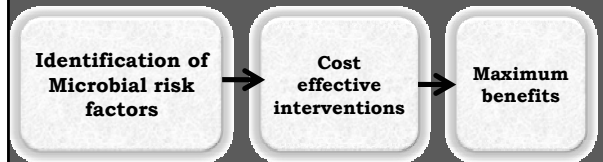
- ❖ Urban Water Systems and Human Health
 - ❖ Diarrhoeal diseases
 - ❖ 2 million deaths worldwide
 - ❖ 59 million disability adjusted life years
 - ❖ 21% of under five mortality

Background

- ❖ Millennium Development Goal (MDG)
 - ❖ number 4: Reduce child mortality
- ❖ SWITCH (sustainable urban water management improves tomorrow's cities health)
 - ❖ theme 1: Urban water paradigm shift

Problem Statement and Justification

- ❖ Accra : Inadequate potable water supply
Uns sanitary conditions
Poor wastewater disposal



Objectives

Overall

To assess the microbial health risks of the Accra urban water system

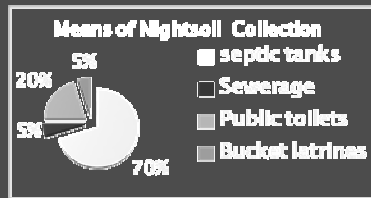
Specific Objectives

1. To identify the potential exposure pathways originating from the urban water system that could lead to the infection of citizens of Accra with water-borne diseases
2. To predict the burden of waterborne diseases in Accra and compare it with the established disease incidence
3. To make recommendations on interventions needed to reduce the microbial health risks

Description of Accra Urban Water System Water Supply

- ❖ Characteristics
 - ❖ 80 % of population
 - ❖ Intermittent supply
 - ❖ Leakage
- ❖ Other Sources of Water
 - ❖ Water vendors (tankers)
 - ❖ Boreholes, wells, ponds, springs

Wastewater System



Methodology

Study Area

✓ Accra

✓ Population: 1.7 million

Study Population

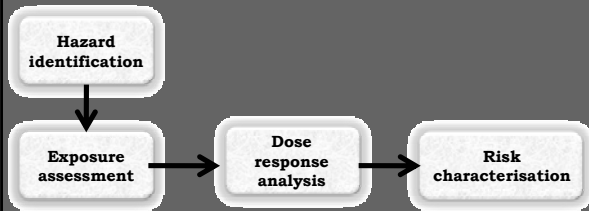
✓ Odaw River catchment

✓ Population: 1 million

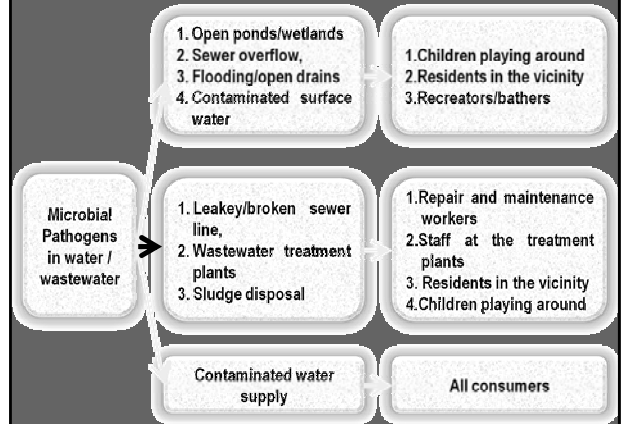
Methodology

- ✓ Desk study, secondary data
- ✓ Field work (Interviews, observations)

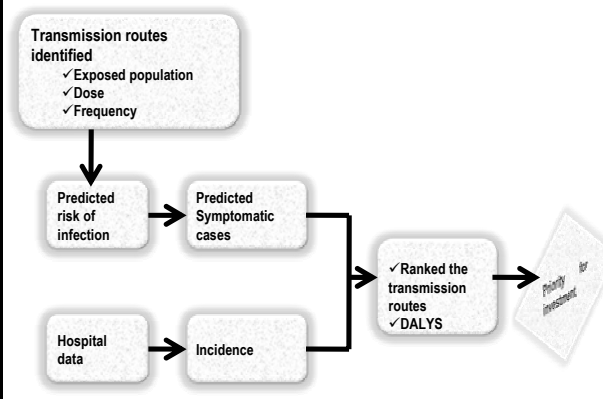
Microbial Risk Assessment



Conceptual Model- Exposure to Pathogens in Water



Methodology



Results and Discussions

Exposure Pathways Identified (Sanitation)

Type of exposure	Volume ingested (ml)	Frequency (per year)	Exposed population
Recreational swimming	100	7	29,878
Children playing in flood water	1	1	23,699

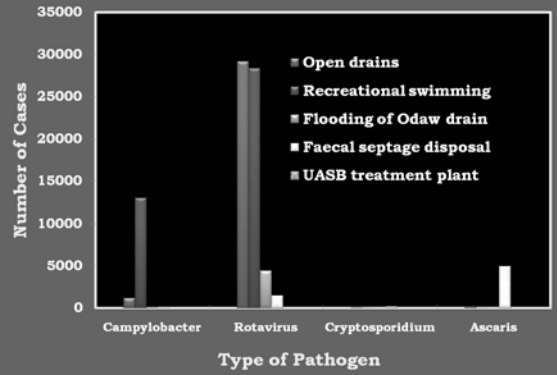
1. Recreational swimming
2. Flooding of Odaw drain
3. Faecal septage disposal
4. Open drains
5. UASB treatment plant

Exposure Pathways Identified (Water Supply)

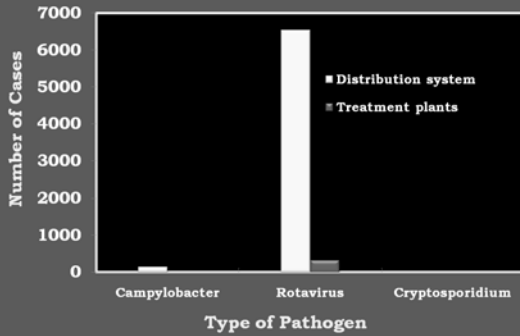
Type of exposure	Volume ingested (Litres)	Frequency (per year)	Exposed population
Power outage at Weija treatment plant	2.9	3.6	646,986
Pollution entering part of distribution system without pressure (108 hours per week)	2.9	234	298,609

1. Water treatment plants
2. Water distribution system

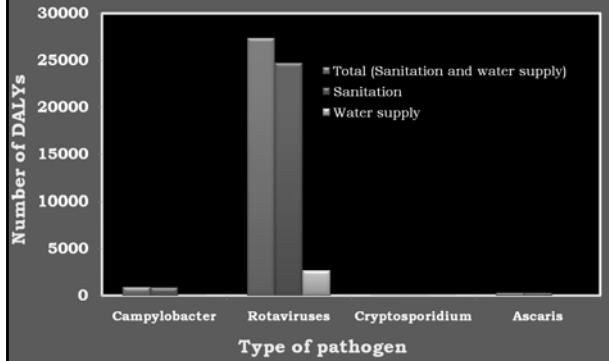
Predicted Annual Disease Cases from the Sanitation Pathway



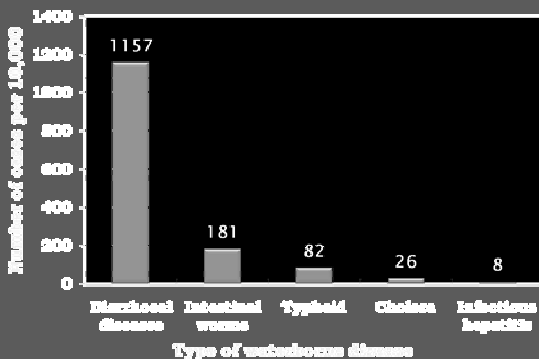
Predicted Annual Disease Cases from the Water Supply Pathway



Predicted Annual Disease Burden from the Accra Urban Water System



Background endemic waterborne disease incidence



Severity of consequences to the community

Exposure	Campylobacter	Rotavirus
1. Open drainage channels	Moderate	Catastrophic
2. Flooding of the Odaw drain	Minor	Major
3. Faecal septage disposal	Minor	Moderate
4. Water distribution system	Minor	Major
5. Recreational swimming	Catastrophic	Catastrophic

Will we meet the Millennium Development Goals by 2015?

About 5,000 children under 5 years DIED TODAY of diarrhoeal diseases (worldwide)

Management Options

Sanitation

- ❖ Repair and upgrade of existing wastewater treatment systems
- ❖ Proper operation and maintenance
- ❖ Provision of more pit latrines in low income areas
- ❖ Proper disposal of solid waste
- ❖ Health education and public awareness
- ❖ Improvement in enforcement of environmental law
- ❖ Small bore sewerage

Water supply

- ❖ Upgrade of the existing system
- ❖ Water safety plan

How standards help

- ❖ ISO/TC 224- on water services
- ❖ ISO 9001:2000 Quality Management Systems
- ❖ IWA 6- guidelines for the management of drinking water utilities under crisis conditions
- ❖ Management of water utilities will contribute to the economic, social and environmental benefits- sustainable development
- ❖ ISO 14000 series on environmental management
- ❖ ISO 22000 series on food safety management
- ❖ ISO/TC 147 on water quality

Conclusions

1. Accra urban water system is not safe for its citizens
2. Sanitation system more hazardous than the water supply system
3. Use of standards will go along way in reducing the environmental/health impacts
4. Standards would make the management of water resources more sustainable

THANK YOU