Public Health Data in Sanitation Planning

USE OF DATA IN SANITATION INTERVENTION PLANNING AND DECISION MAKING

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Pathways of Exposure to Fecal Contamination

- Floodwater
- Public latrines
- Open drains
- Ocean water
- Well
- Drinking water
- Bathing water
- Raw Produce
- Soil
- Street Food
The SaniPath Process

1. Conduct Preliminary Assessment (key informant interviews & transect walks)
2. Determine target neighborhoods, pathways, & sampling sites
3. Preliminary Assessment Report
4 & 5. Behavioral & Environmental Data Collection
6. Risk Profiles & Summary Statistics
7. Final Report

Sarah Abraham, Martha Ormiston, Gilad Fried, and Juan Pablo Bravo from The Noun Project created the icons interview, neighborhood, water, and computer. Schematic created by Suraja Raj
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
Estimating Exposure to Fecal Contamination

Tool uses Bayesian analysis to estimate the distribution of environmental contamination and frequency of exposure.

Other parameters: intake volumes, duration of exposure, etc.

The mean dose and proportion of the population exposed are summarized from simulated distributions and displayed in risk profiles.

Results are presented in a normalized and comparable unit – Dose as MPN E. coli ingested per month.
Dominant Pathway(s): Pathway(s) that make great contribution to total exposure.

Total exposure changes substantially when a dominant pathway is removed.
**Interpreting the People Plots**

**Drain Water**
Kanyama
Adults
44.9% exposed
3.66 MPN/Month *E. coli*

**Drinking Water, Shallow Well**
Kanyama
Adults
12.3% exposed
5.661 MPN/Month *E. coli*

- Higher percent exposed indicated by more red people
- Higher dose indicated by higher intensity red color
SANIPATH Study: Kumasi Study Sites

- MOSHIE ZONGO
- FANTE NEW TOWN
- DAKODWOM
- AHODWO
# Ghana Study: Kumasi Study Sites

## Summary of Behavioural Surveys

<table>
<thead>
<tr>
<th>Neighbourhood</th>
<th>Household</th>
<th>Community</th>
<th>School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fante New Town</td>
<td>100</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Moshie Zongo</td>
<td>100</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Ahodwo</td>
<td>100</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>Dakodwom</td>
<td>100</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>400</strong></td>
<td><strong>16</strong></td>
<td><strong>16</strong></td>
</tr>
</tbody>
</table>

## Summary of Environmental Surveys

<table>
<thead>
<tr>
<th>Pathways</th>
<th>Fante New Town</th>
<th>Moshie Zongo</th>
<th>Ahodwo</th>
<th>Dakodwom</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Open Drain</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>Produce</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>Surface Water</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Latrine Swabs</td>
<td>10</td>
<td>10</td>
<td>4</td>
<td>4</td>
<td>28</td>
</tr>
<tr>
<td>Flood Water</td>
<td>6</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>36</td>
</tr>
<tr>
<td>Soil</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>40</td>
</tr>
<tr>
<td>Bathing Water</td>
<td>3</td>
<td>10</td>
<td>0</td>
<td>8</td>
<td>21</td>
</tr>
<tr>
<td>Drinking Water</td>
<td>10</td>
<td>10</td>
<td>6</td>
<td>10</td>
<td>36</td>
</tr>
<tr>
<td>Street Food</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>10</td>
<td>40</td>
</tr>
</tbody>
</table>
Deployment Activities - 2018
Results Of Exposure Assessment

Kumasi Study
Total Exposure in Kumasi, Ghana

Adults

- **Ahodwo:**
  - Drain: 62%
  - Produce: 36%

- **Dakodwom:**
  - Drain: 69%
  - Produce: 29%

- **Fante New Town:**
  - Bathing: 81%
  - Drain: 12%

- **Moshie Zongo:**
  - Produce: 78%
  - Drain: 18%

Children

- **Ahodwo:**
  - Drain: 98%

- **Dakodwom:**
  - Drain: 95%

- **Fante New Town:**
  - Drain: 85%

- **Moshie Zongo:**
  - Drain: 91%
Results to action
Results to Action – Planning of Interventions

- KMAs to adopt and expand the use of the SaniPath Tool

- Plan for interventions and Implement Interventions
  - Review and understanding of the Assessment report
  - Planning of intervention necessary to improve situation (both infrastructure and software solutions)
  - Developing of plans and prioritization of interventions based on evidence from the SaniPath
  - Using existing institutional arrangements to roll out interventions
  - Packaging and developing proposals for funding to implement interventions
<table>
<thead>
<tr>
<th>PATHWAYS</th>
<th>PLAUSIBLE CAUSES OF CONTAMINATION</th>
<th>INTERVENTIONS</th>
<th>STAKEHOLDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>Street Food</td>
<td>• Unhygienic:</td>
<td>• Develop standard protocols to guide street foods safety</td>
<td>• KMA (EHO/ Legal/ Planning/ Sub metros)</td>
</tr>
<tr>
<td></td>
<td>o cooking environment</td>
<td>• Public education and awareness creation on the standard protocols</td>
<td>• FDA</td>
</tr>
<tr>
<td></td>
<td>o mode of transporting the food</td>
<td>• Create a database on street food vendors</td>
<td>• KNUST (Food Technology)</td>
</tr>
<tr>
<td></td>
<td>o selling and packaging of street food</td>
<td>• Organise periodic training for the vendors on the standard protocols</td>
<td>• TREND</td>
</tr>
<tr>
<td></td>
<td>• Develop standard protocols to guide the practice of urban agriculture</td>
<td>• Annual certification and rating of vending points</td>
<td>• Traditional Caterers Association</td>
</tr>
<tr>
<td></td>
<td>• Create a database on all urban agriculture farmers and their farms</td>
<td>• Conduct regular inspection to enforce compliance with standard protocols for street food safety</td>
<td>• M-SHEP</td>
</tr>
<tr>
<td></td>
<td>• Organise training for farmers engaged in urban agriculture</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>• Conduct regular farm visit, sampling of farm produce and lab test to ensure compliance to the standards</td>
<td></td>
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</tr>
<tr>
<td></td>
<td>• Provision of clean water sources for vegetable farms</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>• Public education and awareness creation on the hygienic ways of handling raw produce (mode of transportation and packaging)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Raw Produce</td>
<td>• Planting vegetables at marshy areas and wetlands along polluted streams</td>
<td>• Develop standard protocols to guide the practice of urban agriculture</td>
<td>• KMA (EHO/ Legal/ Planning/ Sub metros)</td>
</tr>
<tr>
<td></td>
<td>• Using polluted water for watering the vegetables</td>
<td>• Create a database on all urban agriculture farmers and their farms</td>
<td>• FDA</td>
</tr>
<tr>
<td></td>
<td>• Unhygienic handling of raw produce from farm gate to the market</td>
<td>• Organise training for farmers engaged in urban agriculture</td>
<td>• KNUST (Food Technology)</td>
</tr>
<tr>
<td></td>
<td>• Lack of thorough cleaning of vegetable for preparing food</td>
<td>• Conduct regular farm visit, sampling of farm produce and lab test to ensure compliance to the standards</td>
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<td>• Consumer Protection Agency</td>
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<tr>
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# List of Possible Interventions for the Sanipath Project

<table>
<thead>
<tr>
<th>Pathways</th>
<th>Plausible Causes of Contamination</th>
<th>Interventions</th>
<th>Stakeholder</th>
</tr>
</thead>
</table>
| Drinking Water & Bathing Water | • Exposed service pipelines in drains  
• Burst service pipelines  
• Unhygienic and unkempt surrounding at public stand pipes | • Develop standard protocols to guide operations of water vendors and vending points  
• Identify and register water vendors  
• Conduct regular inspection of water vending points  
• Collect samples from water vending points and send to lab to test for quality of water sold to the public  
• Relay service pipelines that are in drains and exposed | • KMA (EHO/ Legal/ Planning/ Submetros)  
• FDA  
• GWCL  
• TREND  
• KNUST (Civil Engineering) |
| Drain           | • Discharging grey water  
• Discharging black water  
• Open defecation  
• Indiscriminate dumping and littering | • Redesign and reconstruct public open drains into underground drains  
• Intensify efforts to provide toilets to households without toilets  
• Enforcement of all sanitation bye laws to discourage discharging of effluents into drains and stopping open defecation  
• Development of central/communal sewerage treatment systems | • KMA (EHO/ Legal/ Planning/ Submetros)  
• Clean Team – Ghana  
• WSUP  
• TREND |
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<th>Stakeholder</th>
</tr>
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</table>
| Surface water & Flood water | • Discharging of black water  
• Open defecation  
• Indiscriminate dumping  | • Intensify efforts to provide toilets to households without toilets  
• Enforcement of all sanitation bye laws to discourage discharging of effluents into drains and stopping open defecation  
• Source development assistant to construct central/communal sewerage treatment systems  | • KMA (EHO/ Legal/ Planning/ Submetros)  
• Clean Team – Ghana  
• WSUP  
• TREND |
| Public Toilets            | • Poor operational practices  
• Unhygienic public toilets  | • Organise regular training sessions on the standard protocols for operations of public toilets for public toilets operators  
• Conduct regular inspection of public toilets and enforce compliance with operations and maintenance protocols  
• Sanction and prosecute public toilets operators who flout the operations and maintenance protocols  
• Educate patrons of public toilets to observe effective hand washing practice and other hygienic behaviors  
• Facilitate the provision of adequate sanitation and hygiene facilities and running water to basic schools  | • KMA (EHO/ Legal/ Planning/ Submetros)  
• WSUP  
• TREND  
• Public Toilet Operators Association*  
• M-SHEP |
Example from Lusaka Cholera Outbreak

*Note: Difference in scale of exposure – Max of 60,000 for adults and 30,000 for children
Thank You

For more information visit www.sanipath.org
www.trendgroupgh.org