BACKGROUND

- Globally, there has been a growing concern about Healthcare-associated Infections (HAIs). Each year, millions of people acquire new infections at healthcare facilities (HCFs) while receiving treatments for other medical conditions. In particular, low-income countries have a higher rate of HAIs due to limited resources, insufficient healthcare services, and little training on Infection Prevention and Control (IPC).
- Cambodia has one of the highest infant mortality rates worldwide. Inadequate water, sanitation and hygiene (WASH) infrastructure and resources, especially in maternal and neonatal wards, may increase mothers and newborns’ risks for HAIs.
- Understanding areas of environmental contamination with common pathogens allows the development of target interventions to interrupt environmental transmission, which is also believed to be the first step in reducing the incidence of HAIs.

OBJECTIVES

- Compare WASH infrastructure and IPC practices in two hospitals using a standardized assessment tool (WASH Conditions Tool) and unstructured observations.
- Identify common places of environmental contamination by assessing the magnitude, frequency, and variability of the detection of target indicator bacteria.
- Characterize the microbiological water quality at point of use in two hospitals.
- Evaluate the feasibility of using microbiological techniques to collect and test environmental samples in hospital in a lower middle-income country.
- Provide evidence-based recommendations for future studies of WASH in HCFs.

METHODOLOGY

- Sampling sites
  - Both hospitals were public hospitals in Phnom Penh. They were selected based on distance to the laboratory and were comparable in terms of facility capacity.
  - Hospital A is a fairly reputable hospital known for its high quality of healthcare services, whereas Hospital B is exactly the opposite.
  - Over an eight-week period of sampling, a total of 211 environmental samples were collected. Each hospital was visited two days a week every other week.
- Sampling methods
  - EnviroTrans with 5mL neutralizing buffer swabs were used to sample the most touched surfaces: bed sheets, bedside rails, door handles, faucet handles, and delivery beds.
  - WhirlPak bags with 500mL sterile water were used to rinse equipment and collect hand samples from healthcare workers.
  - Tap water was sampled at point of use, free and total chlorine residuals were recorded.
- Processing methods
  - Membrane filtration with Compact Dry Plates was used to assess the presence of target indicator bacteria: Escherichia coli, other coliforms, and Staphylococcus aureus.

PRELIMINARY RESULTS

- Frequency of the detection of target bacteria
- Frequency of the detection of target bacteria (N=39)
- Free chlorine residual in tap water
- Total chlorine residual in tap water
- Results from equipment rinses (N=11)

LIMITATIONS

- Both hospitals need further IPC training
- Difference in individual behaviors (i.e. regular handwashing practices, change and frequent use of gloves)
- Lack of enabling environment (i.e. water filters, trash can, clean sink, soap and hand sanitizer)
- Inconsistent surface area
- Lack of context information
- Difficulty in communication

PRELIMINARY RESULTS

- Magnitude of E. coli detected
- Magnitude of other coliforms detected
- Magnitude of S. aureus detected

KEY TAKEWAYS

- Lack of enabling environment (i.e. water filters, trash can, clean sink, soap and hand sanitizer)
- Difference in individual behaviors (i.e. regular handwashing practices, change and frequent use of gloves)
- Both hospitals need further IPC training
- Inappropriate waste (general, medical, and biohazardous) disposal
- Unorganized medical and cleaning equipment
- Lack of clear labels and hygiene promotion (i.e. handwashing posters)
- Insufficient cleaning procedures
- Future environmental samplings and monitoring are needed
- Limitations
- Negative control
- Incubator temperature fluctuations
- Specificity of Compact Dry Plates
- Small sample size
- Insufficient vortex time
- Inconsistent surface area
- Lack of context information
- Difficulty in communication

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LESSONS LEARNED

- Meet with EVERYONE (i.e. stakeholders) at the beginning of the study and learn local language
- Check incubator’s daily temperature using additional thermometer
- Conduct more pilot testing and positive controls
- Use different types of swabs, selective media or microbiological techniques
- Perform more rigorous structured observations and follow-up interviews or focus group discussions with healthcare workers during and after quantitative lab testing
- Next Step: Using the laboratory data, together with the results from WASH Conditions Tool that were collected by CGSW staff, I will develop a thesis project and write reports to the Cambodian Ministry of Health and directors from both hospitals