Mortenson Center in Engineering for Developing Communities
UNIVERSITY OF COLORADO **BOULDER**

Research Seminar

Contaminated food, soil, and objects contribute most to children's ingestion of fecal matter: Evidence from rural Bangladesh

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Date: Monday, February 19, 2018
Time: Noon to 1:00pm
Location: SEEL 303 (lab building at SEEC)

Abstract:
Quantifying the contribution of individual fecal transmission pathways (e.g., drinking water, food, hands, fomites) to a child's total ingestion of fecal matter may help explain why sanitation interventions have been less successful than expected and inform the design of novel interventions to reduce fecal-oral disease. In this study, we conducted a Monte Carlo simulation using our measurements of fecal contamination of drinking water, food, soil, hands, and objects and structured and video observations of children's contacts with these environmental reservoirs in rural Bangladesh to assess which pathway contributes most to children's ingestion of fecal matter in different age groups. Among children 3-5 months old, placing objects in the mouth accounted for 32% of total fecal matter ingested, followed by direct ingestion of soil (24%), drinking water (22%) and mouthing hands (21%). Direct ingestion of soil was the predominant pathway among children 6-24 months old, accounting for 61% of total ingestion among children 6-11 months old and 58% among children 12-23 months old. Consumption of contaminated food was a major pathway for older children, accounting for 28% of fecal ingestion among children 24-35 months old and 30% of ingestion among children 36-47 months old, while placing objects in the mouth and directly ingesting soil each accounted for 15-25% of fecal ingestion in these age groups. A sensitivity analysis revealed that variation in the concentration of fecal contamination in food and soil, the frequency with which children directly ingest soil, and the concentration of E. coli per unit mass of feces strongly affect the estimates of total ingestion. These results suggest the child age-specific transmission patterns should be considered when designing appropriate interventions to reduce fecal-oral disease. Mouthing objects, directly ingesting soil, and consuming contaminated food are highlighted as pathways of fecal transmission that have been understudied to date and merit further research.

Biography:
Laura Kwong will complete her PhD in Civil & Environmental Engineering at Stanford University in spring 2018. She has her master's degree from Stanford in the same field and bachelor's degrees in chemistry, biology, and physiology from the University of Minnesota. Combining her background in engineering with a dedication to improving children's health, Laura's research investigates children's exposure to the environmental contamination and develops and tests interventions to interrupt harmful exposures. Her primary research has focused on quantifying children's exposure to fecal contamination in the domestic environment, specifically in rural Bangladesh. She also evaluates how changes to children's homes – adding windows and improving floors – can improve child health. Laura has extensive experience in the field, as well experience in modeling and the laboratory.

For seminar information, please contact Mustafa Naseem at Mustafa.Naseem@colorado.edu