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Title: *Strains of Escherichia coli in Water Samples from Costa Rica, Guatemala, Haiti and Illinois*

Abstract

Introduction: Waterborne diseases present a major problem for public health worldwide. Unsafe water and poor hygiene and sanitation account for a majority of deaths worldwide, particularly amongst children and the elderly. The detection and assessment of particular pathogens in water is important to help determine the most effective water purification methods and to prevent the outbreak of waterborne diseases.

Methods: Water samples were collected from international and local sites to be tested for presence of *E. coli*: 1) San Jose, Costa Rica, 2) Jacmel, Haiti, 3) Antigua, Guatemala, and 4) Edwardsville, Illinois. After a sample was found to be contaminated with *E. coli*, it was brought to the SIUE lab for further testing. The selected samples underwent DNA extraction, PCR, and gel electrophoresis to determine which particular strains of *E. coli* were present.

Results: With the exception of the U.S. sample, all samples were consistently contaminated with enteropathogenic (EPEC), enterohemorrhagic (EHEC), enteroinvasive (EIEC), enteroaggregative (EAEC), and shigella (SHIG) bacteria. Interestingly, no samples were contaminated with enterotoxigenic (ETEC) bacteria or were in such low levels that we were unable to detect it using PCR.

Conclusion: *Escherichia coli* will undoubtedly persist as a major contaminant in water sources around the world because of its ubiquitous role in the environment. Because of this, and the high morbidity and mortality associated with diarrheal disease, further studies will need to be conducted as it is important to determine which strains are the most prevalent in order to focus water purification efforts.