
Abstract

Reliable measures of the incidence of waterborne disease and the disease burden associated with them and the frequency of occurrence of frank pathogens in water distribution systems, among the major unanswered questions limiting efforts to address and measure the efficacy of interventions to improve potable water quality. An EPA workshop in 2005 estimating the risks of waterborne illness in the US identified what participants called “data gaps” for future research. Following suggestions by others, including some of the authors of this paper, those identified at the workshop were (in no particular order): 1) sensitive subpopulation risks; 2) distribution system risks; 3) groundwater risks; 4) individual water system risks; 5) secondary transmission risks; 6) identification of etiologic organisms causing endemic gastrointestinal illness and 7) a plan to categorize water systems and waterborne exposures for US populations. This work addresses at least part of each of these gaps. The work described herein is intended to overcome the current limitations of epidemiological studies correlating gastrointestinal disease caused by microorganisms with the consumption of contaminated drinking water and the efficacy of general interventions on the measures in the title. This work was conducted in small, rural systems in Puerto Rico. Collaborators developed and tested a protocol for detecting Salmonella spp in densities of 0.1/L and correlated these findings with water quality indicators and the incidence of diarrheal disease in the systems sampled. Operators were trained and system managers and administrators engaged and the efficacy of these interventions was tested in a pilot intervention study. Significant differences in bacteriological and health measures were found, suggesting the efficacy of the intervention. In addition, during the following year a cohort study was contrasting systems with and without some of the interventions described in this report and the incidence of diarrheal disease correlated with a number of confounding factors and some of these results are presented, as well.