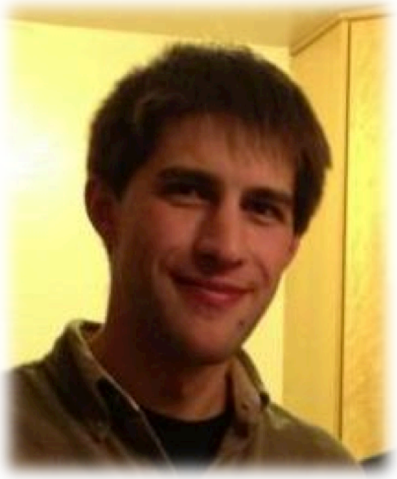
2014 Thomas C. Alber Science & Engineering for Global Health Fellow



John Erickson, UC Berkeley PhD Candidate in Environmental Engineering, Nelson Lab

John Erickson is a PhD candidate in Environmental Engineering advised by Prof. Kara Nelson. He is studying a piped drinking water system in Panama that provides intermittent service. The research is intended to improve understanding of the effects of intermittent supply on water quality and infrastructure condition so that water utilities can prioritize infrastructure investments and operate their distribution systems more effectively.

Fellowship Proposal

Diarrhea resulting from inadequate access to drinking water and sanitation is a major contributor to disease burden globally. A 2002 study estimated the global water, sanitation and hygiene disease burden to be 4.0% of all deaths and 5.7% of total disease burden in DALYs (disability-adjusted life years) (Pruss A, et al. 2002). The portion of the world's population with access to an improved drinking water source increased from 76% to 89% from 1990 to 2010, and the portion with access to piped water on their premises increased from 45% to 54% (WHO & UNICEF, 2012). However, not all improved sources, even piped sources, necessarily provide safe water. Intermittent water supply (IWS), when users do not have water in their taps 24 hours per day 7 days per week, is a common risk to the quality of piped water in low- and middle-income countries. Intermittency is generally considered to be a risk to microbiological water quality.

Despite risks associated with IWS, knowledge of the magnitude and frequency of contamination events in intermittent systems is still quite limited by a lack of water quality data from those systems. Since detection of specific pathogens in drinking water can be time-consuming and expensive, and can only be performed on grab samples collected at one instant in time, it is difficult to detect the short contamination events that might occur under IWS. The research proposed here will take place in Arraiján, Panama, a peri-urban area west of Panama City where portions of the drinking water distribution network operate intermittently. IWS in Arraiján varies in how it is controlled and in its severity, making it an ideal place to compare the effects of different IWS situations. This project aims to develop monitoring methods for contamination events associated with IWS and to apply those methods to different IWS scenarios in the Arraiján drinking water system.