The World Health Organization (WHO) and UNICEF have estimated that 663 million people lack access to improved drinking water sources, with 42% of the world lacking access to piped connections. A further 2.4 billion individuals are without improved sanitation, and 13% of the world practices open defecation. Therefore, point-of-use (POU) drinking water treatment and onsite sanitation services provide a crucial intervention from exposure to enteric pathogens. Microbial treatment performance targets ensure that a technology can sustain a pathogen reduction goal capable of limiting exposure risk to an acceptable level without the need for microbial monitoring in low resource settings. Treatment technologies must be easy to use and generally require single or two-step treatment processes. Testing of technologies for disinfection and removal of microorganisms must match conservative conditions in which a POU device will be used as waters can range from high-quality groundwater to sources resembling dilute sewage. This seminar explores how the choice of test microorganism, varying antecedent and ideal growth conditions, and choice of chemically synthesized test waters vs. natural surface waters impact POU treatment. Utilizing the knowledge gained, we attempted to improve an existing ceramic filter technology to meet WHO standards and test an onsite chemical disinfection technology in an extreme environment of hospital sewage.