Executive Summary

Ebola and collection workers: Is there a risk?
Risks from Ebola Discharge from Hospitals to Sewer Workers (WERF4C15)

The Central Issue
There are concerns over the potential for Ebola virus (EBOV) and other pathogen transmission to sewer workers. The concerns exist because the safety of non-disinfected disposal of EBOV-contaminated liquid wastes and the efficacy of disinfection approaches are unknown.

Context and Background
Current government guidance does not require pre-treatment for the disposal of liquid waste from hospital patients undergoing treatment for EBOV disease in the U.S. Consequently, researchers studied the risk of EBOV transmission to sewer workers performing standard occupational activities downstream from a hospital treating Ebola patients. Researchers also examined the effectiveness of various disinfectants on inactivation of EBOV and other highly infectious agents. Further investigations examined risks from inhalation exposure.

The study assessed the potential risks to sewer workers in the sewer line serving a hospital receiving Ebola patients by performing a quantitative microbial risk assessment (QMRA), including an exposure assessment, dose-response assessment, and probabilistic analysis to determine the magnitude and uncertainty of resultant risks.

Findings and Conclusions
Current guidance for EBOV liquid waste disposal may be insufficiently protective of sewer worker safety. The issue warrants further attention because of the potential risk sewer workers face when operating in a wastewater collection system downstream from a hospital receiving Ebola patients. Further, the effectiveness of various disinfectants on inactivation of highly infectious agents is variable and requires further evaluation for disposal and disinfection recommendations.

The results of this study suggest that full compliance with CDC guidance to wear a properly fitted, NIOSH-approved N-95 respirator during handling of untreated sewage leads to reduced aerosol exposure and a lower risk profile for EVD illness. Additionally, studies are in progress to assess the benefits of pre-treating EBOV liquid waste with disinfectant prior to discharge to the sewer, which, if effective, would accelerate the inactivation of viral particles and reduce inhalation exposure downstream.

Management and Policy Implications
Establishing standardized job safety analyses for routine wastewater tasks warrants further attention, especially for workers operating in a wastewater collection system downstream from a hospital. Such analyses would reduce risks of exposure from many other pathogens of concern such as the Zika virus.
## Related WERF Research

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<th>Project Title</th>
<th>Research Focus</th>
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<td><strong>Potential for Exposure to Ebola Virus Surrogates Aerosolized from Wastewater Systems (WERF2C15)</strong></td>
<td>Research seeks to produce new technical data on the amount of EBOV surrogates aerosolized by wastewater systems, the carrier size of the resulting aerosols, and the viability of the surrogates in aerosols – information critical for predicting the risk of inhalation exposure to workers.</td>
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<td><strong>Protecting Wastewater Treatment Plant Operators from Emerging Pathogens: A Preparedness Protocol and Online Decision Support Tool (WERF3C15)</strong></td>
<td>Research will develop an integrated preparedness protocol and decision support tool to guide water resource recovery facility operators and public health policymakers as they prepare for potential risks from emerging pathogens conveyed in wastewater.</td>
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<td><strong>The Survival of Surrogates for Ebola in Sewage and Wastewater Treatment (WERF5C15)</strong></td>
<td>Research will use a viral surrogate(s) for Ebola to evaluate its survival in sewage and during wastewater treatment. Results will feature key information on potential routes of exposure via sewage and sewage treatment.</td>
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<td><strong>Collaborative Workshop on Handling, Management, and Treatment of Bio-Contaminated Wastewater by Water Resource Recovery Facilities (WERF7W15)</strong></td>
<td>Summarizes discussions from a workshop which engaged subject matter experts and wastewater utility stakeholders on topics surrounding high-consequence pathogens such as Bacillus anthracis (anthrax) in wastewater collection and treatment systems.</td>
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<td><strong>Design and Implementation of Peracetic Acid for Municipal Water and Wastewater Related Processes (LIFT14T16)</strong></td>
<td>Research will examine the effects of peracetic acid (PAA) on aquatic life, on water/wastewater-related processes, and will provide guidance on the use of PAA as a disinfection method.</td>
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