The Ebola Virus and Other Pathogen’s Effects on Wastewater Treatment Employees

As a few Americans have contracted the Ebola virus, concern has spread about the virus’ symptoms and ability to be transmitted. As wastewater treatment employees that constantly work near human refuse, this outbreak has raised many questions about the risks of the Ebola virus in wastewater and the potential for staff to contract the pathogen as part of their everyday work tasks.

Background
The Ebola virus causes an acute illness that is often fatal with a death rate of up to 90 percent. Ebola virus disease first appeared in 1976 in two simultaneous outbreaks, one in a remote area of Sudan and the other in a village near the Ebola River in the Democratic Republic of Congo. The current outbreak in West Africa (the first cases reported in March 2014) is the largest and most complex Ebola outbreak since the Ebola virus was first discovered. The current outbreak has spread through both urban and rural areas.

The virus is transmitted to humans from wild animals and spreads in the human population through human-to-human transmission. Ebola is transmitted through direct contact with infected bodily fluids (e.g., blood, vomit, feces). The Ebola virus can only replicate within host cells. Therefore, it cannot survive long in water because it does not have its host — either a human or an animal.

How could the Ebola virus enter the sewage system?
The Ebola virus can enter the wastewater stream via the discharge of bodily fluids from it’s host or disposal from medical facilities. The Centers for Disease Control & Prevention (CDC) has released an FAQ that states that sewers may safely be used for disposal of Ebola patient waste, because “sewage handling processes (e.g., anaerobic digestion, composting, and disinfection) in the United States are designed to inactivate infectious agents.”

How does it affect wastewater employees?
Ebola is not a foodborne, waterborne or airborne illness. Because of Ebola’s fragility when separated from its host, bodily fluids flushed by an infected person would not contaminate water or wastewater systems. Researchers believe Ebola survives in water for only a matter of minutes and is unlikely to be a risk in the collection system or at a wastewater treatment plant, even before disinfection occurs. Once in water, the host cell will take in water in an attempt to equalize the osmotic pressure, causing the cells to swell and burst, thus killing the virus. The Water Research Foundation (WRF) posted a statement, “Ebola: Not a Waterborne Illness,” with information about the inability of the virus to survive in water.

What are the next steps?
On November 20, 2014 CDC published the Interim Guidance for Workers Handling Untreated Sewage from Ebola Cases in the United States, which addresses basic hygiene practices and personal protective equipment (PPE) use and disposal actions that should be taken. As the virus
is fragile once it leaves the body, the guidance is focused on those occupations that come into
direct contact with raw sewage soon after leaving the body; these include:
- Workers who perform sewer maintenance.
- Construction workers who repair or replace live sewers.
- Plumbers.
- Workers who clean portable toilets.

The EPA, CDC and water associations are communicating regularly and the EPA is passing
along questions for the CDC to address, and providing relevant information to the CDC. The
EPA is also discussing the ongoing work related to algal toxins in the wake of the Toledo
microcystin event this summer, as well as a tool that it is developing to provide information to
utilities about potential sources of source water contamination. Both the EPA and the CDC have
stated that they intend to release additional information soon.

Are there water borne diseases that can affect wastewater plant employees?
Although the Ebola virus isn’t a water borne disease, there are other water borne human disease-
causing organisms (pathogens) that present hazards to wastewater workers. Four major types of
pathogens found in sewage include bacteria, viruses, protozoa and helminthes (parasitic worms).

How do I protect myself from water borne pathogens?
The National Institute for Occupational Safety and Health (NIOSH) has made no official
recommendations regarding vaccinations for workers who contact sewage. NIOSH does point
out that wastewater workers, like all adults, should be current on their tetanus-diphtheria
immunization. NIOSH (along with several other agencies and researchers) do acknowledge that
there may be some potential risk for water borne pathogens and they further state that one of the
best defenses against water borne disease for wastewater workers is to practice good hygiene and
housekeeping.

One of the best lines of defense against pathogens is PPE to keep contaminates from your body
and to keep you free from cuts, scrapes, scratches and other damage to your body. L/E WWTP
employees should always wear proper PPE and employ safe handling procedures when working
around untreated wastewater. In particular, staff that are potentially exposed must wear PPE
including, at a minimum, disposable gloves, eye protection (goggles or face shield), and
facemask to protect against direct skin and mucous membrane exposure of splashes or spatters
during operation, maintenance, cleaning and disinfection activities. The following tips can also
be used to prevent illness to workers in hazardous environments:
- Workers should wash their hands frequently with anti-bacterial soap. Be sure to wash
thoroughly and scrub under nails with a brush. Especially be sure to wash up before
eating, smoking or drinking.
- Open cuts or wounds should be protected, be sure to replace contaminated dressings.
- Avoid direct contact with wastewater; always wear rubber gloves and protective clothing
when working with wastewater.
- Do not wear contaminated or soiled clothing, wash work clothes regularly to remove
contaminants. It is suggested that work clothing for wastewater workers be washed on-
site, it IS NOT recommended to bring sewage contaminated clothing home. Let your
work clothing (and work boots) remain at work. Bringing the contaminated clothing

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home may expose other family members to pathogens. It is also recommended that you take a shower at the end of your shift.

- In spite of our best efforts, at times things may go wrong that result in copious amounts of wastewater or wastewater residues spewing forth onto workers. If you get sprayed or soaked down with sewage or sewage residues, change clothes and take a shower.
- Keep your fingernails short and DO NOT bite your nails!
- DO NOT stick your fingers or hands in your mouth, nose, eyes or ears.

**Resources**
World Health Organization (WHO) Global Alert and Response (GAR) website
World Health Organization (WHO) Media Centre website
Center for Disease Control and Prevention (CDC) Ebola (Ebola Virus Disease) website


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