Risk Communiqué

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Wastewater Pathogen Risks: Are You Protected?

A study by the Washington On-Site Sewage Association looked at risks for those who service household septic tanks. "Whatever illnesses or infections [residents] have are in the sewage," said WOSSA Executive Director John Thomas. "The infective dose threshold for many pathogens is quite low." The study, which included field sampling, task observation, and laboratory analysis, found risks can be minimized with the proper use of personal protective equipment (PPE). However, the study also concluded much of the PPE in use does not adequately provide protection from pathogens.

Common Risks

Sewage contains hundreds of known viruses, bacteria, protozoa, and parasites. But some of WOSSA's finding were a bit surprising such as viable MRSA bacteria — a staph infection resistant to antibiotics — in liquid sampling. One worker was hospitalized for a week with a MRSA infection of his face and sinuses.

"We also had positive tests for a family of bacteria that includes chlamydia, a sexually transmitted disease, from aerosolized wastewater being dumped at a septage handling facility."

Other documented illnesses involved such things as pinkeye, intestinal infection from the Giardia parasite, hepatitis, and illness from E. coli.

"Public beaches are closed in Washington when E. coli reaches 126 colony forming units per 100 mL," Thomas explained. "In our field samples, raw sewage commonly contained 160,000/100 mL."

Direct contact with wastewater is an obvious source of exposure. Thomas said the most surprising finding was the scope of inhalation exposure, which occurred in tasks common to working with on-site systems and treatment plants such as jetting, backflushing, and pumping residual water after washing down tanks. Positive samples were found as far as 60 feet away.

"Our testing showed the aerosol cloud was much bigger than we thought," says Thomas.

PPE findings

Thomas said many workers in the on-site field wear nitrile (rubber) gloves, but they are probably wearing the wrong kind. Those rated for industrial use or food handling are not appropriate for working with wastewater. Thomas said exam grade gloves, also called medical grade, are the only type of nitrile gloves that will protect from pathogens. Typical work gloves, of course, provide no pathogen protection.

"A lot of employers provide dust masks or other kinds of face masks," says Thomas. "Upgrade them to an N95 surgical mask, sometimes called a procedure mask, and that will give appropriate protection for airborne pathogens. One field test of an N95 mask showed it had more than 10,000 colonies of bacteria on it. A simple dust mask is not designed to protect a worker from that kind of exposure."

As for eye protection, Thomas recommends that workers protect against splashes, sprays, and airborne aerosols from multiple angles: Goggles are sometimes needed rather than just a pair of safety glasses.

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Spreading the word

Thomas is now presenting the findings to on-site professionals in Washington using a lesson plan developed with assistance from the state's Safety and Health Investment Project. The material is available to others to educate those who work with sewage.

Among the recommendations being taught are basic hygiene rules for workers such as:

» Wash hands after working with waste, especially before eating or drinking.

» Avoid touching the face, mouth, eyes, nose or open sores and cuts.

» Wash hands with soap and water before and after using the toilet.

» Before eating, remove soiled work clothes and eat away from sewage-handling activities.

» Do not smoke or chew tobacco or gum while handling sewage.

» Keep open sores, cuts and wounds covered with clean, dry bandages.

» Gently flush eyes with safe water if sewage contacts the eyes.

» Wear rubber boots at the work site and during transport of sewage.

» Remove rubber boots and work clothes before leaving the work site.

» Wash contaminated work clothing daily with 0.05 percent chlorine solution (one part household bleach to 100 parts water).

Thomas's message to employers is simple: "Reducing exposure to pathogens is a responsibility under OSHA's General Duty Clause to provide a safe workplace. There are simple steps they can do that — without costing a lot more money than they're spending now — will make sure their employees are adequately protected."

References

1. Day, Doug. "Wastewater Pathogen Risks: Are You Protected?" Municipal Sewer & Water Magazine, 3 Mar. 2015, www.mswmag.com/online_exclusives/2015/03/wastewater_pathogen_risks_are_you_protected?utm_source=newsletter&utm_medium=email&utm_content=More%C2%A0%C2%BB&utm_campaign=150303_MSW.