

PUBLIC & OCCUPATIONAL HEALTH RISKS FROM EXPOSURE TO SEWAGE CONTAMINATION

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The general public is at risk for infectious disease and other adverse health effects from exposure to untreated sewage through extensive backflows and sewage-contaminated flood waters. There is also a significant health risk from improper remediation of these situations. Workers who remediate sewage damage losses, as well as sewage treatment workers, and sewage sludge processors, are at risk for chronic respiratory disease, other systemic health effects, and a host of acute and chronic bacterial, fungal, viral, and parasitic diseases.

PUBLIC HEALTH. Risk to the public's health from sewage exposure is demonstrated in a 1988-1989 epidemic of hepatitis A in Ocoee, Florida, that resulted in 39 cases and one fetal death (Vonstille et al, 1993). Of the 18 index cases, each had a history of contact with sewage-contaminated stormwater. Over 120 different viruses are excreted in human feces and urine and find their way into sewage (Straub et al, 1993). These can include rotavirus, causing severe and sometimes life-threatening diarrhea in children, adenoviruses, causing respiratory and eye infections, and Norwalk virus, a significant cause of gastroenteritis. Parasitic agents include the highly infectious *Giardia* and *Cryptosporidium* that can result in chronic and severe intestinal disease in both adults and children.

Bacterial pathogens in sewage can include virulent strains of gram-negative organisms such as *Salmonella*, *Campylobacter*, and *E. coli*. **In addition to the infectious disease risk, gram-negative bacteria contain endotoxins that are released at the time of cell death and destruction, and can be aerosolized into the air during improper remediation, such as attempts to clean and dry sewage contaminated carpets.** Drying of such carpets will liberate airborne endotoxins that induce respiratory inflammation and airway restriction, and can potentiate the allergic and infectious disease responses. **Attempts at salvaging sewage contaminated carpets and other porous materials can liberate extensive amounts of endotoxins, allergens, and infectious agents, and pose a particular risk for susceptible populations such as the elderly, infants, convalescents, and those that are immunocompromised through disease or therapy.** Sewage contaminated porous materials must be confined in plastic bags and transported to appropriate disposal facilities. After removal of contaminated materials, mechanical and natural dehumidification, temperature control, and rapid drying are essential, as are appropriate disinfection and cleaning measures. This will prevent secondary microbial colonization by allergenic and toxigenic fungi. At a minimum, procedures to be followed for effective sewage remediation are those contained in the IICRC S500 *Standard and Reference Guide for Professional Water Damage Restoration*

of the Institute of Inspection, Cleaning and Restoration Certification (IICRC), Vancouver, Washington.

Public health risks can also be incurred through the indiscriminate, inappropriate, and illegal transport and dumping of extracted sewage by unscrupulous companies. It is imperative that all sewage wastes extracted from indoor environments be appropriately and safely disposed of according to all local, state, and federal regulations.

OCCUPATIONAL HEALTH. Those who professionally remediate and restore residential sewage backflows are at significant risk for adverse health effects from infectious agents, potent allergens, noxious gases, vapors, and fumes, and endotoxins and mycotoxins. The latter are toxic metabolites of a variety of environmental fungi that can quickly grow in water damaged environments and liberate airborne toxin-containing spores. **Recent research has shown that workers with routine sewage exposures exhibit respiratory dysfunction (Zuskin et al, 1993; Richardson, 1995), fatigue and headache (Melbostad et al, 1994), infection (Schlosser et al, 1995), and increased incidences of cancers (Friis et al, 1993).** Thus the need for adequate training, immunization, and the use of personal protective equipment that provides dermal, mucus membrane, and respiratory protection.

References

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