

Preventing Waterborne Non-Tuberculosis Mycobacteria Infections in Hospitals

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DESCRIPTION

Non-Tuberculous Mycobacteria (NTM) are opportunistic pathogens found ubiquitously in the environment, including water sources. In healthcare facilities, where vulnerable populations are prevalent, waterborne NTM infections pose a significant risk. This article examines the sources, transmission pathways, and control measures for waterborne NTM infections in healthcare settings, highlighting the importance of stringent water management practices to safeguard patient health. NTM include over 170 species, with *Mycobacterium avium* Complex (MAC), *Mycobacterium kansasii*, and *Mycobacterium abscessus* being the most clinically significant. These organisms can cause a range of infections, particularly in immunocompromised individuals or those with underlying lung diseases.

Sources of NTM in healthcare facilities

NTM can thrive in various water systems within healthcare facilities, including, Hospital plumbing systems, particularly those with complex piping and areas of stagnation, provide an ideal environment for NTM to form biofilms. These biofilms protect NTM from disinfection efforts and facilitate their persistence. NTM prefer warm water temperatures (30-50°C). Hot water systems, including heaters and distribution networks, can harbor these bacteria, especially if maintenance is inadequate. Devices that use or come into contact with water, such as endoscopes, dialysis machines, and respiratory therapy equipment, can become contaminated with NTM if not properly sterilized. Equipment used in hydrotherapy, such as whirlpools and therapeutic baths, can be a source of NTM exposure if not regularly cleaned and disinfected. NTM infections in healthcare settings are primarily acquired through environmental exposure. The main transmission pathways include, Aerosolization of NTM from water sources during activities such as showering, using sinks, or undergoing respiratory treatments can lead to pulmonary infections. Patients with chronic lung conditions or weakened immune systems are particularly at risk. Contact with contaminated water or surfaces can result in skin and soft tissue infections. This is a concern in wound care, surgical procedures,

and the use of medical devices. Although less common, ingestion of contaminated water or ice can cause gastrointestinal infections, particularly in immunocompromised patients.

Risk factors and control measures

Several factors contribute to the risk of waterborne NTM infections in healthcare facilities, such as, patients with weakened immune systems, such as those undergoing chemotherapy, organ transplant recipients, or individuals with HIV/AIDS, are more susceptible to NTM infections. Conditions like cystic fibrosis, Chronic Obstructive Pulmonary Disease (COPD), and bronchiectasis increase the risk of pulmonary NTM infections. Surgical procedures, catheterizations, and the use of medical devices that bypass normal protective barriers can introduce NTM into the body. Complex plumbing systems, areas of water stagnation, and inadequate disinfection practices facilitate NTM colonization and persistence. Effective control measures are important to mitigate the risk of waterborne NTM infections in healthcare facilities.

Key strategies which include, Implementing comprehensive water management plans that include regular monitoring, maintenance, and disinfection of plumbing systems can reduce NTM colonization. Measures such as maintaining appropriate hot water temperatures and using point-of-use filters can further minimize risk. Strict adherence to sterilization protocols for medical devices, including endoscopes and dialysis machines, is essential. Regular monitoring for NTM contamination and ensuring compliance with manufacturer guidelines are critical steps. Educating healthcare staff about the risks of NTM and implementing robust infection control practices can help prevent transmission. This includes proper hand hygiene, use of personal protective equipment, and appropriate wound care procedures. Informing patients, particularly those at higher risk, about the potential sources of NTM and preventive measures can help reduce exposure. Patients should be advised on safe water practices and the importance of adhering to treatment regimens.

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CONCLUSION

Waterborne infections from nontuberculous mycobacteria in healthcare facilities represent a significant threat to patient safety, particularly for those with compromised immune systems or chronic lung conditions. Understanding the sources and

transmission pathways of NTM is important for developing effective control measures. By implementing rigorous water management practices, ensuring proper sterilization of medical devices, and promoting infection control protocols, healthcare facilities can mitigate the risk of NTM infections and protect vulnerable patients from these opportunistic pathogens.