

# Pathogenic, drug-resistant bacteria found in wastewater treatment plants

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Wastewater settlement tank. Credit: Theo Gouliouris

Infections caused by drug-resistant bacteria are a global public health threat causing serious illness and even death. Strains of the bacterium

*Enterococcus faecium* (*E. faecium*) are generally harmless in healthy people, but can be pathogenic in immunocompromised or severely ill patients. *E. faecium* strains from hospital environments have acquired resistance to commonly used antibiotics, including those used to treat serious infections, making these infections especially challenging to treat.

In a study published today in *Genome Research*, researchers conducted a survey of 20 municipal wastewater plants in England, and isolated drug-resistant *E. faecium* from all sites in both untreated and treated wastewater plants except three, which use ultraviolet light disinfection. Importantly, drug-resistant *E. faecium* counts were significantly higher in untreated wastewater from plants that were direct recipients of hospital sewage. A genomic comparison of *E. faecium* isolates from wastewater and bloodstream isolates of infected patients revealed two major lineages, with ampicillin-resistant bacteria in clade A1 and A2 and vancomycin-resistant bacteria exclusive to clade A1. Further [genetic analysis](#) revealed the presence of shared antibiotic, metal, and biocide resistance genes in clade A1 isolates from bloodstream, hospital sewage, and municipal wastewater.

This study demonstrates close genetic relatedness of drug-resistant *E. faecium* isolates released into the environment with those that cause serious human disease. Further research is needed to determine the public health implications of exposure to healthcare- and waste-associated pathogens. Terminal ultraviolet light disinfection of [wastewater](#) is one solution that would reduce environmental contamination with [drug-resistant bacteria](#).

**More information:** Gouliouris T, Raven K, Moradigaravand D, Ludden C, Coll F, Blane B, Naydenova P, Horner C, Brown N, Corander J, Limmathurotsakul D, Parkhill J, and Peacock S. 2019. Detection of vancomycin-resistant *Enterococcus faecium* hospital-adapted lineages in

municipal wastewater treatment plants indicates widespread distribution and release into the environment. *Genome Research* [DOI: 10.1101/gr.232629.119](https://doi.org/10.1101/gr.232629.119)

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