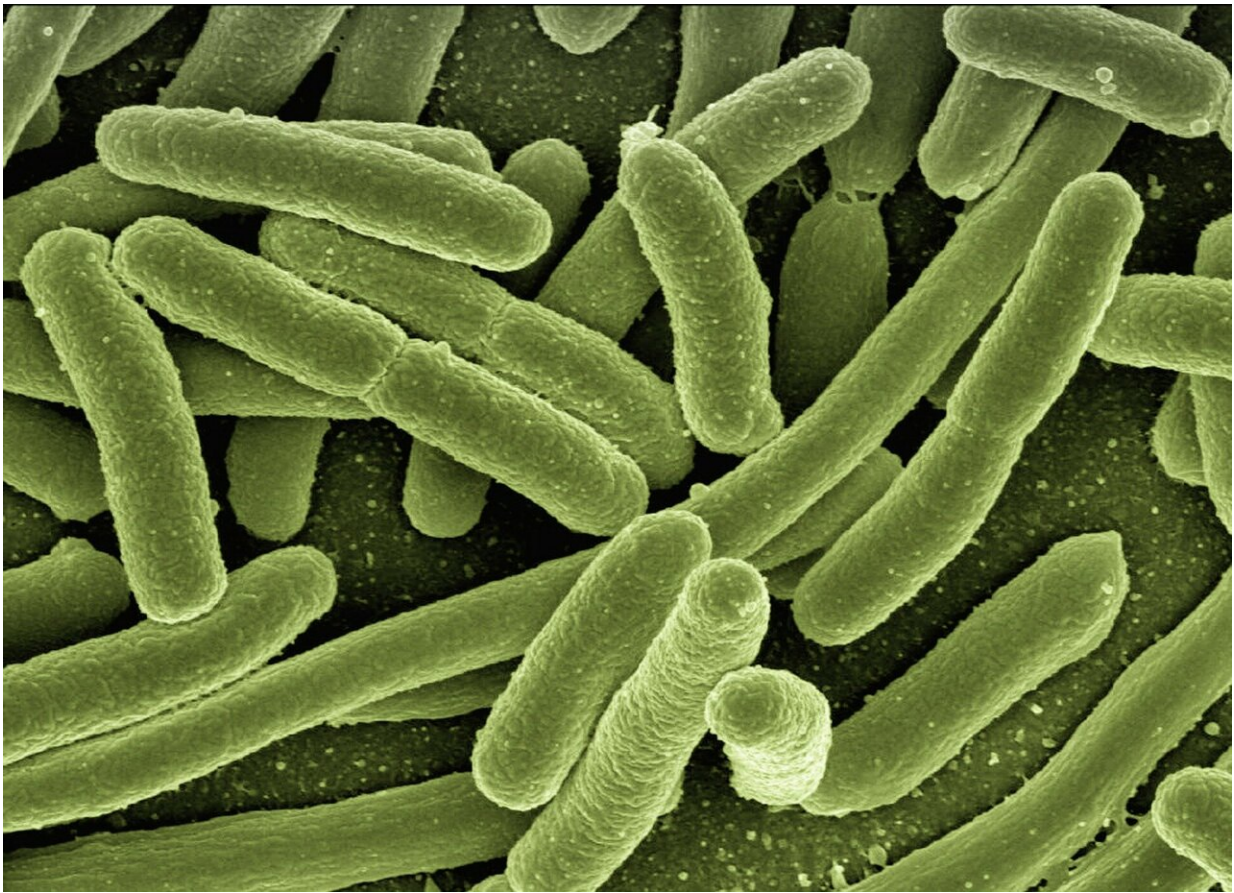


New weapon in the fight against gastrointestinal disease in informal settlements

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Monash University researchers have validated a way to successfully detect a diverse range of bacteria (pathogens) that cause diarrhoeal disease in informal settlements.

Better protection from disease for people living in communities facing water, sanitation and hygiene challenges is essential, as microbes that cause gastrointestinal disease (enteropathogens) are responsible for 1.4 million deaths per year, predominantly in children under five, and cause impaired nutrition and development.

However, it is highly challenging to effectively monitor their spread due to the sheer number of pathogens and sources involved. Numerous enteropathogens cause diarrhoea and other gastrointestinal diseases, spanning viruses, bacteria, amoeba, and worms, each with distinct characteristics. Moreover, they are spread through complex pathways via human, animal, environmental, and food sources. Traditionally, microbiologists only monitor select pathogens and each source is usually tested separately.

The study, published in *The Lancet Planetary Health*, evaluated for the first time the laboratory method called the TaqMan Array Card (TAC) against the gold standard method, standard quantitative polymerase chain reaction (qPCR). They found that the TAC is faster and cheaper than qPCR, while delivering comparably precise results and simultaneously detecting over 30 different enteropathogens.

Monash University's Biomedicine Discovery Institute microbiologist Dr. Rachael Lappan co-led the comparative study using wastewater samples from Melbourne and human stool, animal scat, soil, and [water samples](#) from informal settlements in Suva, Fiji. She says that validating the TAC method is a big step forward in combating the complex and neglected problem of childhood diarrhoea.

'Enteropathogens can be picked up through so many different ways in informal settlements, and it can be a real challenge to monitor them because there's such a variety of enteropathogens that contribute to disease,' Dr. Lappan explains. 'TAC offers a relatively simple and affordable way to do this, and it can be done on any kind of sample.'

'It's incredibly important because it will help us better understand and monitor the pathways through which people become sick, and help target those pathways with effective water management interventions that could ultimately lead to better health, like the one we are trialling in the Revitalising Informal Settlements and their Environments (RISE) program,' Dr. Lappan said.

Co-senior author of the paper, Associate Professor Chris Greening from Monash University's Biomedicine Discovery Institute, adds 'by comparing these methods, we wanted to know whether the ability to efficiently detect a broad range of enteropathogens would come with a substantial disadvantage in sensitivity. However, we showed that TAC performs comparably to qPCR and is ideally suited for broad pathogen screening that is impractical to carry out via standard qPCR.'

The study was conducted as part of the Revitalising Informal Settlements and their Environments (RISE) program, an interdisciplinary research program and trial that aims to improve the management of water and sanitation in urban [informal settlements](#) with nature-based infrastructure. RISE, and other transformational water, sanitation and hygiene programs, need techniques that allow comprehensive but efficient monitoring of enteropathogens to understand environmental contamination and disease burden before and after interventions.

More information: Rachael Lappan et al, Monitoring of diverse enteric pathogens across environmental and host reservoirs with TaqMan array cards and standard qPCR: a methodological comparison study, *The*

Lancet Planetary Health (2021). [DOI: 10.1016/S2542-5196\(21\)00051-6](https://doi.org/10.1016/S2542-5196(21)00051-6)

Provided by Monash University

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