# Gastroenteritis: a serious medical and economic burden – a new approach

Fractured NHS laboratory diagnostics are often blamed for a slow turnaround of diarrhoeal stool samples. Dr James Anson of the Royal Liverpool and Broadgreen University Hospitals Trust has spent the last year testing a multiplex molecular diagnostic technology made by **Luminex** as a possible solution, as he tells Jack Wittels.

Accurate and efficient diagnosis of diarrhoeal diseases is a major issue for the NHS. Establishing whether norovirus, the most common cause, is responsible for symptoms is particularly important; infected patients need to be moved to isolated beds as soon as possible to prevent ward closures. Novovirus contagion has caused over 1,000 closures in the last three years in Scotland alone.

The current methodologies used to analyse stool samples are slower than clinicians would like, often taking 24-72 hours to return a result. The underlying cause of the problem is their fractured structure.

"If you sent a stool into this lab, we'd do a bit in bacteriology, maybe some in parasitology, and then we'd send another sample upstairs to virology," comments Dr James Anson, clinical director and consultant microbiologist of the Royal Liverpool and Broadgreen University Hospitals NHS Trust. "It's a very fragmented methodology. Splitting and transporting stools between labs takes time, which delays diagnosis."

The divided approach also means that different members of staff in separate departments can all end up testing the same stool – a highly inefficient process, and one that encourages labs to perform an extremely narrow selection of tests.

"When a clinician sends in a sample, they're only really interested in what's causing their patient's diarrhoea," explains Anson. "So we base a lot of our analysis on clinical details; the type of stool, the age of the patient, and whether it's come from a community or from a traveller. That results in a degree of self selection of tests, potentially leading to mis-or over-diagnosis."

## Faster checking

The NHS is aware of these shortcomings, and is actively looking for solutions. Anson's hospital has spent the best part of a year running multiplex molecular diagnostic technology alongside existing procedures. The xTag Gastrointestinal Pathogen Panel (GPP) from Luminex, manufacturer and developer of biological testing technologies, can check for up to 15 bacterial, viral and parasitic pathogens simultaneously, and produce results within five hours.

"We've been using the GPP alongside our routine procedures and comparing the two," says Anson. "We get a higher pick-up rate of infections with xTag GPP. Importantly, we also see coinfections, rather than the singular ones that our usual methods pick up.

"It also brings a much-needed degree of scalability. If we're doing 80 stools a day, for example, then being able to extract multiple pathogens at once for the PCR run, rather than just one or two at a time, allows us to be a lot more efficient, and that means we can have a much quicker results turnaround."

Faster diagnosis brings a number of important benefits; patients with an infectious diarrhoeal disease can be placed in isolation more quickly, reducing the chance of outbreaks. It also stops impatient clinicians sending multiple specimens from the same patient to labs, which cost the NHS around £20 each to process, as well as hugely cutting repeat tests of the same stool, which Anson estimates will allow for a 50% reduction in the faeces diagnosis workforce. A final boon is that the subsequent quicker patient turnaround could also generate more tariffs for hospitals.

## Skewed epidemiology

Moving on to discuss the broader consequences of implementing multiplex testing, Anson highlights another key benefit.

"I certainly think the NHS is missing organisms at the moment," he says. "Things like ETEC (enterotoxigenic E. coli), for example; there's no national agenda saying you've got to look for these, so some labs might not be. That means public health epidemiology could be skewed. Having a more comprehensive screen like this upfront would allow better information on which to base future public health measures."

The advantages of multiplex molecular diagnostic technology seem clear: it unifies the NHS's fractured laboratory processes, and in doing so, brings a wealth of financial, medical and logistical benefits. As Anson concludes: "We're tantalisingly optimistic about this new technology." ■

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