Improving Diagnostics
for Detecting GI Pathogens

ARUP Laboratories' Medical Director Marc Roger Couturier, PhD, D(ABMM), is an assistant professor of pathology at the University Of Utah School of Medicine. His expertise involves diagnostic testing that identifies the many viral, bacterial, and parasitic pathogens that cause gastroenteritis. In the United States, acute gastroenteritis impacts some 179 million people, resulting in approximately 600,000 hospitalizations and thousands of deaths each year according to the CDC.

Dr. Couturier developed his passion for enteric disease through research on *Helicobacter pylori* in his doctoral training and through post-doctoral training in public health microbiology, during which he developed molecular tests for detecting Shiga-toxin producing *E. coli* (STEC). His research at ARUP focuses on *H. pylori* diagnostics and epidemiology, and the development of improved methods for the detection of gastrointestinal pathogens.

In this Q & A, Dr. Couturier discusses ARUP Laboratories' new gastrointestinal bacterial panel by PCR for improving diagnostics and its role in a more general context.

Expert Edge

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Q: Are there advantages in using a PCR method to detect the causative agent of bacterial gastroenteritis?

A: Molecular test methods, which are very specific and sensitive, detect pathogens (e.g., *Campylobacter*, STEC) that a culture may not. STEC pathogens are not easily cultured, but by detecting the toxin gene, we can improve the detection of this important pathogen. *Campylobacter upsaliensis* is another example that cannot be readily cultured in most laboratories using recommended culture conditions for *Campylobacter jejuni.* ARUP's molecular test detects this important GI pathogen if it is present.

Q: What organisms are detected by the molecular GI pathogen panels?

A: The most common organisms detectable using molecular assays are *Salmonella*, *Shigella*, *Campylobacter*, and STEC. These are also the most common GI bacterial pathogens.

Q: How does specimen collection and transport compare to conventional methods?

A: Most molecular tests for GI pathogens are performed using stool specimens, which patients and physicians are already accustomed to collecting. The most common specimens are preserved stool in enteric transport media and raw stool submitted fresh or frozen. Each has advantages and disadvantages: a preserved stool has a dilution of the pathogen but less chance for PCR inhibitors to interfere with testing as a result of the dilution; a raw stool has more concentrated pathogen but also more concentrated inhibitors that may interfere with testing.

Q: Which patient populations are likely to benefit most from this testing?

A: Three specific populations can benefit most from molecular GI testing: returned travelers, pediatric patients, and immunocompromised patients. Parasitic infections are not uncommon in children and returned travelers, and viruses are likely to be a major cause of illness in immunocompromised patients.

Testing for viral causes of GI infections has been historically underutilized due to suboptimal testing methods. Molecular testing provides diagnoses that can prevent secondary transmission to other patients. Having a diagnosis also limits additional testing, which typically would be ordered when a diagnosis is not available.

Q: What is the impact to public health?

A: Public health departments are accustomed to receiving isolates from diagnostic laboratories to conduct outbreak investigations. However, unlike classic cultures, molecular GI tests do not yield a bacterial isolate, so only a report is sent to public health laboratories.

Before adopting multiplex molecular GI tests, we must determine where cultures to obtain isolates will be performed, and who will pay for this extra effort.

Q: How important is it to know the infection's cause?

A: Because these pathogens are highly infectious, knowing the cause of an infection can prevent its transmission to other patients. While few, if any, GI infections require treatment in a healthy host, a diagnoses allows for proper patient management when a GI pathogen requires treatment.

Finally, some pathogens, like STEC, should not be treated with antibiotics, as evidence indicates that this increases the production of toxin and results in greater risk for fatal complications.