

# ANMC Gastrointestinal (GI) Pathogen Panel Guidance

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## Background:

Many pathogens, including bacteria, parasites, and viruses can cause infectious diarrhea. Previously, many of the pathogens responsible could only be isolated using traditional techniques such as stool culture or ova and parasite exam that were often time consuming and lacked sensitivity. To improve the detection of intestinal pathogens, the microbiology lab has introduced multiplex PCR testing using the FilmArray Gastrointestinal (GI) panel, which detects 22 common viruses, bacteria, and parasites that may cause infectious diarrhea.

## Testing:

This panel will replace traditional stool culture, *Giardia* and *Cryptosporidium* antigen screen, and Rotavirus antigen. Stool cultures for identification and susceptibility will only be performed by provider request when enteric pathogens are detected by the GI panel. *C. difficile* testing is part of the panel but will not be reported. The microbiology lab and antimicrobial stewardship teams have determined that PCR testing alone is inadequate for accurately identifying those with *C. difficile* infection (CDI) who require treatment.<sup>1,2</sup> If CDI is suspected the *C. difficile* toxin assay is recommended in combination with PCR testing as it is the preferred method to diagnose CDI, please continue to order “C difficile PCR with reflex to EIA toxin” in Cerner. See the ANMC *C. difficile* Testing & Treatment Guidelines.

## Restriction:

The GI panel may only be ordered for patients who have been hospitalized for less than 5 days; otherwise it will require approval from the microbiology director (or their designee) who will consult with the antimicrobial stewardship program or the infectious disease service when needed. The panel may also only be ordered once per admission. These restrictions will be put in place as data show that routine stool cultures from patients with diarrhea that develops after 72 hours of hospitalization are typically low yield for standard bacteria and parasites.<sup>3,4</sup>

## Interpretation:

Results of PCR testing for stool pathogens must be taken into clinical context when making treatment decisions and treatment decisions should be based upon clinical presentation. PCR testing is much more sensitive than traditional techniques and allows for the detection of low numbers of pathogens.<sup>5,6,7</sup> The clinical correlation of PCR results with the need for treatment and clinical outcomes has not been established. Studies evaluating stool PCR testing frequently detect more than one enteric pathogen in patient’s stool and data are not available to determine the causative organism in these situations.<sup>5,7</sup> Additionally low levels of stool pathogens have been detected in healthy persons and all decisions regarding need for treatment must be taken into clinical context of the patient.

## Treatment Recommendations:

Most GI infections due to common bacterial and viral causes are self-limited in nature and do not require antimicrobial therapy. Symptoms typically resolve within 7 days in a normal host and therapy should focus on providing supportive care by replacing fluid and electrolyte losses. The use of antimicrobial therapy must be carefully weighed against unintended and potentially harmful consequences, including antimicrobial-resistant infections, side effects of treatment with antimicrobial agents, super-infections when normal flora are eradicated by antimicrobial agents, the prolongation of a carrier state (particularly in *Salmonella*) and the possibility of induction of disease-producing phages by antibiotics (such as Shiga-toxin phage induced by quinolone antibiotics).

These recommendations apply to generally healthy persons unless otherwise noted. There is a paucity of data regarding the efficacy of antimicrobials in a number of the pathogens detected on the panel and in these cases, antibiotics are generally only recommended in severe or non-resolving cases or those at risk

for severe disease such as immunocompromised patients. In cases where data are lacking, clinical judgment and the assessment of the risk versus benefit must be considered.

### Etiology and Treatment Recommendations <sup>8,9,10</sup>

Pathogen	Common Presentation	Commonly Implicated Sources and Seasonality	Treatment Recommendations	Treatment (If Indicated)
<b>Bacteria</b>				
<i>Campylobacter</i>	Fever, abdominal cramps, and diarrhea within 6-48 hours, fecal leukocytes often present	Poultry, unpasteurized milk and dairy products Peak season – spring, summer	<b>Most patients recover without antimicrobial therapy.</b> Antibiotics have been shown to reduce symptom duration by 1.3 days and are recommended for severe illness or risk factors for complications (elderly, pregnancy, immunocompromised).	<ul style="list-style-type: none"> <li>• Azithromycin 500 mg daily x3 days</li> <li>• Fluoroquinolone x3 days*</li> </ul> <p>Immunocompromised patients may require prolonged therapy (7-14 days)</p>
<i>Plesiomonas shigelloides</i>	Severe abdominal cramps, and diarrhea within 6-48 hours	Fresh water, shellfish, international travel	<b>Most patients recover without antimicrobial therapy.</b> Unclear if antibiotics shorten the duration of illness. Consider treatment in severe diarrhea, extremes of age, and immunocompromised.	<ul style="list-style-type: none"> <li>• Fluoroquinolone x3 days*</li> <li>• Azithromycin 500 mg daily x3 days</li> <li>• TMP/SMX DS BID x3 days</li> </ul>
<i>Salmonella</i>	Fever, abdominal cramps, and diarrhea within 6-48 hours, fecal leukocytes often present	Poultry, eggs, dairy products, produce, reptile contact Peak season – summer, fall	Antibiotics have no significant effect on the length of illness and may prolong carriage of the organism in the stool. <b>Antibiotics should generally be avoided,</b> but recommended for severe illness (>8 stools/day, high fever, hospitalized) or risk for complications (age <1 or > 50, immunocompromised)	<ul style="list-style-type: none"> <li>• Fluoroquinolone x7 days*</li> <li>• Azithromycin 500 mg daily x7 days</li> <li>• TMP/SMX DS BID x7 days</li> </ul> <p>Immunocompromised patients require 14 days of therapy or longer if relapsing</p>
<i>Yersinia enterocolitica</i>	Fever and abdominal cramps within 1-11 days, with or without diarrhea, fecal leukocytes often present	Unpasteurized milk, undercooked pork, chitterlings Peak season – winter	<b>Most patients recover without antimicrobial therapy.</b> Unclear if antibiotics shorten the duration of illness.	<ul style="list-style-type: none"> <li>• For immunocompromised patients, ceftriaxone 2 g IV daily <b>PLUS</b> gentamicin 5 mg/kg daily</li> </ul>
<i>Vibrio</i> species (if positive and <i>V. cholera</i> negative indicates <i>V. parahaemolyticus</i> or <i>V. vulnificans</i> is present)	Fever, abdominal cramps, and diarrhea within 6-48 hours, fecal leukocytes often present	Shellfish	<b>Most patients recover without antimicrobial therapy.</b> Unclear if antibiotics shorten duration of illness. Consider in severe or prolonged diarrhea.	<ul style="list-style-type: none"> <li>• Azithromycin 1 g x1 dose</li> <li>• Doxycycline 300 mg x1 dose</li> </ul>
<i>Vibrio cholerae</i>	Abdominal cramps and large volume watery diarrhea within 16-72 hours	Shellfish, travel to Haiti or other areas where cholera is endemic	Oral rehydration is the key intervention. <b>Antibiotics shorten the duration of illness and are recommended.</b>	<ul style="list-style-type: none"> <li>• Azithromycin 1 g x1 dose</li> <li>• Doxycycline 300 mg x1 dose</li> <li>• Levofloxacin 500 mg x1 dose</li> <li>• Ciprofloxacin 500 mg x1 dose</li> </ul>

<b>Diarrheagenic <i>E. coli</i>/Shigella</b>				
Enteroaggregative <i>E. coli</i> (EAEC) Enteropathogenic <i>E. coli</i> (EPEC) Enterotoxigenic <i>E. coli</i> (ETEC) <i>lt/st</i>	Abdominal cramps and watery diarrhea within 16-72 hours, can be prolonged	International travel, infantile diarrhea in developing countries	Limited data in EAEC and EPEC, many patients recover without antimicrobial therapy. Antibiotics have been shown to shorten the duration of illness in ETEC and are generally indicated for moderate to severe diarrhea (>4 stools/day, fever, or blood or pus in stool).	<ul style="list-style-type: none"> <li>Fluoroquinolone x3 days*</li> <li>Rifaximin 200 mg TID x3 days</li> <li>Azithromycin 1 g x1 dose or 500 mg daily x3 days</li> </ul>
Shiga-like toxin-producing <i>E. coli</i> (STEC) <i>stx1/stx2</i> (shiga-toxin producing <i>E. coli</i> is present) <i>E. coli</i> O157 (the shiga-toxin producing <i>E. coli</i> is type O157)	Bloody diarrhea with minimal fever within 3-8 days	Unpasteurized milk, fresh produce, ground beef, petting zoos	Antibiotics have no effect on duration or severity of symptoms and certain antibiotics may increase the risk for hemolytic-uremic syndrome.	<b>Antibiotics and antimotility agents should be avoided.</b> Supportive care only
<i>Shigella</i> /Enteroinvasive <i>E. coli</i> (EIEC)				
<i>Shigella</i> /Enteroinvasive <i>E. coli</i> (EIEC)	Fever, abdominal cramps, and diarrhea within 6-48 hours, fecal leukocytes present	Egg salad, lettuce, day care	Treatment is recommended if detected.	<ul style="list-style-type: none"> <li>TMP-SMX 160-800 mg BID x3 days</li> <li>Fluoroquinolone x3 days*</li> </ul> <p>Immunocompromised patients require 7-10 days of therapy</p>

\*Levofloxacin 500mg PO daily or ciprofloxacin 500mg PO BID (should be avoided in pregnancy)

<b>Parasites</b>				
<i>Cryptosporidium</i>	Prolonged watery diarrhea	Contaminated water (recreational and drinking), unpasteurized apple cider	Most patients recover without antimicrobial therapy but antibiotics may decrease the duration of illness. Immunocompromised patients often develop prolonged symptoms and respond poorly to therapy.	May use antimotility agents and/or nitazoxanide 500mg BID x3 days for prolonged or severe illness. ID consult recommended for immunocompromised patients
<i>Cyclospora cayetanensis</i>		Imported fresh produce	Treatment indicated if symptomatic.	TMP/SMX DS BID x 7-10 days ID consult recommended for immunocompromised patients
<i>Entamoeba histolytica</i>		Returning travelers	Treatment recommended if detected.	<ul style="list-style-type: none"> <li>Metronidazole 500 mg TID x 7-10 days</li> <li>Tinidazole 2 g daily x3 days</li> <li>Nitazoxanide 500 mg PO BID x3 days followed by paromomycin 25 mg/kg/day in 3 divided doses x7 days</li> </ul>

<i>Giardia lamblia</i>		Contaminated recreational water, daycare, international travelers	Treatment indicated if symptomatic.	<ul style="list-style-type: none"> <li>• Tinidazole 2 g x1 dose</li> <li>• Nitazoxanide 500 mg PO BID x3 days</li> <li>• Metronidazole 500 mg TID x 5-7 days</li> </ul>
<b>Viruses</b>				
Adenovirus F 40/41	Vomiting and non-bloody diarrhea within 10-51 hours	Children <2 yrs, day care	No therapy available. Treat symptomatically.	Antibiotics not indicated
Astrovirus		Children <1 yr, day care		
Norovirus GI/GII		Salads, shellfish, cruise ships, epidemic foodborne disease Peak season – winter		
Rotavirus A		Infants Peak season – winter		
Sapovirus		Children		

**Pediatric Dosing Chart:**

	<b>Recommended Dosing</b>
Azithromycin	10 mg/kg PO/IV daily
Ciprofloxacin*	10-15 mg/kg/dose PO BID (max 1.5 g/day)
Doxycycline*	≥ 8years: 2 mg/kg/dose PO BID (max 100 mg/dose)
Levofloxacin*	<5 years: 8-10 mg/kg/dose PO/IV twice daily ≥ 5years: 10 mg/kg/dose PO/IV daily (max 750mg/day)
Metronidazole	Giardiasis: 5 mg/kg/dose PO/IV TID (max 250mg/dose)
Nitazoxanide	1-3 years: 100 mg PO BID 4-11 years: 200 mg PO BID ≥ 12 years: 500mg PO BID
Paromomycin	10 mg/kg/dose PO TID (max 1500 mg/day)
Rifaximin	3-11 years: 100 mg PO four times daily (limited data) ≥ 12 years: 200mg PO three times daily
Tinidazole	50 mg/kg PO single dose (max 2000 mg/day)
TMP/SMX	≥ 2months: 4-5 mg/kg/dose (TMP component) PO BID

\*Fluoroquinolones and doxycycline are not routinely used as first line therapy in pediatrics

Adapted from Nebraska Medical Center Gastrointestinal Pathogen Panel Guidance. [https://www.nebraskamed.com/sites/default/files/documents/providers/asp/GI\\_Panel\\_Guidance\\_10-18.pdf](https://www.nebraskamed.com/sites/default/files/documents/providers/asp/GI_Panel_Guidance_10-18.pdf). Accessed May 22, 2024.

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