Gastrointestinal Parasite Panels

**Indications for Ordering**

Aid in the diagnosis of gastrointestinal (GI) infections caused by common protozoal pathogens

**Test Description**

Test methodology
Qualitative polymerase chain reaction

Clinical validation
Validated with specimens identified by conventional stool parasite tests including
- Ova and parasite examination
- Modified acid-fast stain
- Giardia, Cryptosporidium, and Entamoeba histolytica antigen detection assays

**Tests to Consider**

Typical testing strategy
- Stool antigen testing for
  - Giardia spp
  - Cryptosporidium spp
  - E. histolytica
- At least three separate stool specimens, collected on separate days, should be submitted for
  - Ova and parasite examination
  - Modified acid-fast stain for coccidian parasites
- Often, only ova and parasite examination is ordered on a single specimen
  - May be inadequate frequency of testing with inappropriate method to detect pathogen(s)
- Gastrointestinal parasite with or without microsporidia by PCR
  - Order if GI infection due to protozoal pathogens is suspected
  - Do not order for patients with diarrhea developed during prolonged hospitalization

Primary tests

Gastrointestinal Parasite Panel by PCR 2011150
- Sensitive alternative to traditional, insensitive ova and parasite examinations of stool specimens for the evaluation of GI infections
- Detects
  - Cryptosporidium hominis, C. parvum
  - Cyclospora cayetanensis
  - Dientamoeba fragilis
  - Entamoeba histolytica
  - Giardia lambia/intestinalis/duodenalis

Related tests

Cryptosporidium Antigen by EIA 0060045
Entamoeba histolytica Antigen, EIA 0058001
Giardia Antigen by EIA 0060048
Microsporidia by PCR 2011626
- Detects DNA of Encephalitozoon spp (E. intestinalis/E. hellem/E. cuniculi) and Enterocytozoon bieneusi

Parasitology Stain by Modified Acid-Fast 0060046
- Detects Cryptosporidium, Cyclospora, and Cystoisospora

Ova and Parasite Exam, Fecal (Immunocompromised or Travel History) 3001662
- Detects G. duodenalis, E. histolytica, Dientamoeba fragilis, helminth eggs, protozoa, larval worms, and segments of tapeworms
- Does not specifically detect Cryptosporidium, Cyclospora, Cystoisospora, or Microsporidia

Disease Overview

Incidence

- **C. cayetanensis**
  - Clustered outbreaks associated with contaminated food products
  - Outbreaks have been occurring recently in higher frequency
    - Not associated with foreign travel, but rather, foreign food products sold domestically
- **C. hominis, C. parvum**
  - Found in large outbreaks associated with contaminated water sources
  - Can occur year-round when artificial water storage systems are involved
## Diagnostic issues

- **D. fragilis**
  - Has been described as the second most common parasitic pathogen after *Giardia* spp
  - Difficult to identify using ova and parasite examinations
  - May lead to an underestimate of true prevalence
- **E. histolytica**
  - Typically limited to individual cases, with possible spread to sex partners or close contacts
- **G. lamblia/intestinalis/duodenalis**
  - Typically limited to individual exposures to contaminated water sources in warm-weather months
- **Microsporidia**
  - Enteric microsporidiosis in patients with HIV infection
  - ~15% prior to combination antiretroviral therapy (cART)
  - Rates are lower for patients on cART
  - Undetermined incidence in non-HIV populations

## Symptoms

- **Cryptosporidium**
  - Watery diarrhea, stomach cramps, nausea, vomiting, fever, dehydration
- **Cyclospora**
  - Watery diarrhea, loss of appetite, weight loss, cramping, bloating, gas, nausea, fatigue
- **D. fragilis**
  - Asymptomatic or
  - Diarrhea, abdominal pain, loss of appetite, weight loss, nausea, fatigue
- **E. histolytica**
  - Asymptomatic or
  - Mildly symptomatic
  - Diarrhea, stomach pain/cramping or
  - Dysentery
  - Stomach pain, bloody diarrhea, fever
- **Giardia**
  - Diarrhea, gas, abdominal cramps, nausea, vomiting, dehydration
- **Microsporidia**
  - Persistent diarrhea
  - Abdominal pain, nausea, vomiting

## Test Interpretation

### Analytical sensitivity

- **C. cayetanensis**: 80 copies/reaction
- **Cryptosporidium parvum/hominis**: 216 copies/reaction
- **D. fragilis**: 200 copies/reaction
- **E. bieneusi**: 1,600 copies/100 µL stool
- **E. histolytica**: 100 copies/reaction
- **Encephalitozoon spp (E. intestinalis)**: 440 copies/100 µL stool
- **Giardia**: 960 copies/reaction

### Analytical specificity

- No cross-reactivity observed for 48 organisms tested

### Results

- Detected: detection of protozoal parasites in stool is considered diagnostic for infection
- Not detected: no protozoal parasites identified
- Inhibited: stool specimens may contain inhibitors of molecular tests
  - These specimens cannot be resolved

### Limitations

- Due to the periodic shedding of some parasites, a result of “not detected” cannot completely rule out infection with these parasites
- If clinical signs and symptoms persist, additional specimen for testing may be indicated
- Viral and bacterial gastroenteritis are more common than parasitic gastroenteritis and should be considered as alternative diagnoses
- Asymptomatic infections are known to occur, and therefore correlation of test results with clinical signs and symptoms is imperative
- Panel does not detect
  - Helminths (flatworms, roundworms, and flukes)
  - Nonpathogenic protozoa
  - *Cystoisospora*
  - *Microsporidia*
    - Detected in Gastrointestinal Parasite and Microsporidia by PCR
- Negative result does not rule out
  - Presence of PCR inhibitors in specimen
  - Assay-specific nucleic acid in concentrations below the level of detection