



GI Health Screen

Information Guide

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Gut Health and the Microbiome



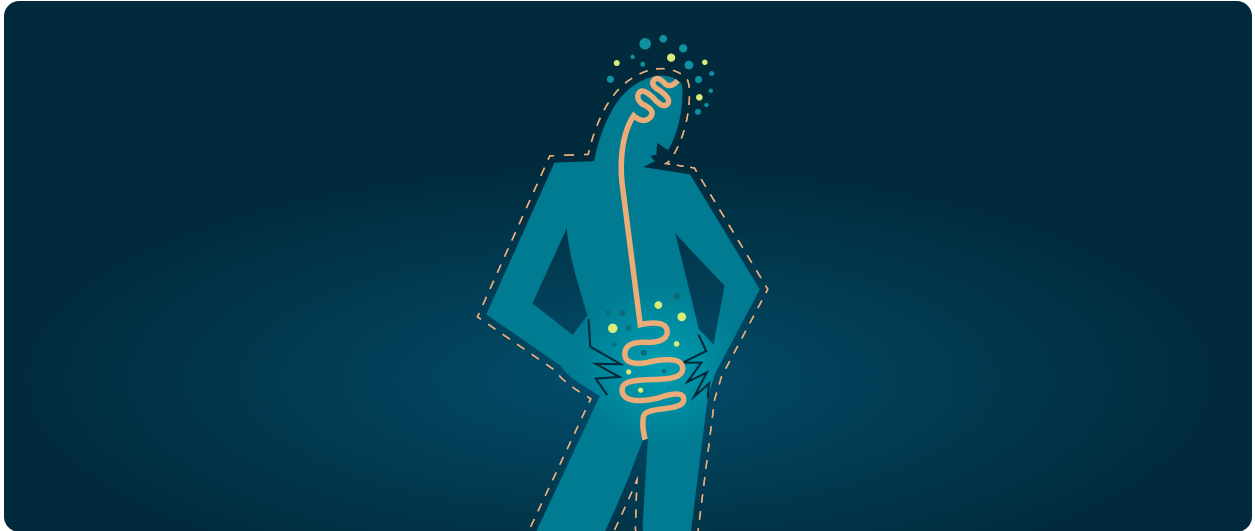
A growing body of evidence indicates that the gut microbiota plays an important role in gastrointestinal (GI) disease including IBS. The fecal microbiota of IBS patients differs significantly from healthy subjects, with potential contribution to altered bowel habits and influencing colonic transit.

Cite: [link](#)



Additionally, clinicians understand that acute GI symptoms are often driven by infectious agents. However, more insidiously, chronic gut symptoms including constipation, loose stool, heartburn, abdominal pain, bloating and gas will also have an infection component as the root cause. This relationship is often overlooked. Ruling in or out parasites, yeast, and bacterial infections in patients presenting with any of these symptoms can be the first step on their road to recovery.

Mental Health and the Microbiome



The gut microbiome as a potential therapeutic target for mental illness is an important consideration for doctors and patients. Trillions of bacteria reside in the human gut and have been shown to play a crucial role in gut-brain communication through an influence on neural, immune, and endocrine pathways.

Patients with various mental health concerns including anxiety, depression, bipolar disorder, schizophrenia, and autism spectrum disorder have been shown to have differences in the composition of their gut microbiome. Looking at factors that are disrupting this healthy balance of bacteria, like diet, stress, environmental factors,

and other pathogenic infections like yeast and parasites, has the potential to improve mood and reduce anxiety in both healthy people and patient groups.

Cite: [link](#)



The following guide may be useful for understanding the nature of each of the microorganisms found on the GI- Health Screen, as well as clinical implications and treatment guidelines.

Treatment Guidelines

In order to successfully treat an infectious organism there are a number of factors that need to be considered and the following roadmap can be useful for the clinician.



STEP 1 Elimination

The purpose of Step 1 is to deliver key nutrients for optimizing mitochondrial health and establishing healthy drainage pathways — both of which are essential before promoting periods of detoxification. This step ensures that the kidney, liver, bowel and lymphatic systems are functioning optimally before the infection is treated.

STEP 2 Gut and Immune Support

This step involves the use of natural health products to remove the identified infection, like the pathogenic bacteria, the parasite, or the yeast overgrowth. This is done by promoting the body's natural detoxification processes and nurturing the gut microbiome

BACTERIAL PATHOGENS

Aeromonas spp.

Campylobacter spp.

C. difficile - toxin B producing (CdB gene)

Salmonella spp.

Shigella spp./EIEC E. coli

Vibrio spp.

Yersinia enterocolitica

EAEC *E. coli* (*aggR* gene)

EPEC *E. coli* (*eaeA* gene)

E. Coli 0157 (EHEC)

ETEC *E. coli*

Hypervirulent *C. difficile*

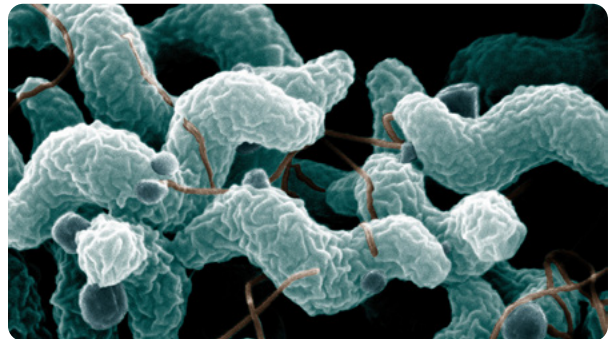
Shiga Toxin producing *E. coli* (*stx1/stx2* genes)

Aeromonas spp.

- Role in gastrointestinal disease is uncertain
- May be recovered from the stool of patients with diarrhea, but recovery is variable
- Is commonly found in asymptomatic individuals; however, it is likely that certain strains cause diarrheal disease
- Spread by fecal contamination of water
- Symptoms: acute watery diarrhea with blood and mucus, vomiting.

Campylobacter

- Common cause of foodborne illness
- Spread by fecal contamination of water



***Clostridium difficile* - Toxin B and Hypervirulent strain**

- Patients may be asymptomatic carriers (2-10% of population)
- Associated with prolonged use of antibiotics and thus is considered a healthcare associated infection (HAI)
- Causes pseudomembranous colitis
- Toxin B producing strains including the Hypervirulent strain are identified. The Hypervirulent strain may be associated with more severe disease.

***Enterohemorrhagic E. coli* (*E. coli* O157)**

- Spread by fecal contamination of food and through ingestion of undercooked beef
- Causes hemorrhagic colitis and may cause Hemolytic Uremic syndrome (HUS) which could lead to Kidney failure

***Enteroinvasive E. coli* (EIEC)**

- Spread by fecal contamination of food
- Symptoms: bloody diarrhea, vomiting, fever, chills, abdominal cramping

***Enteropathogenic E. coli* (EPEC)**

- Spread by fecal contamination of food
- Symptoms: watery bloody diarrhea

***Enterotoxigenic E. coli* (ETEC)**

- Spread by fecal contamination of food and water
- Most common cause of traveler's diarrhea
- Could lead to GI inflammation

***Shiga-like toxin E. coli* (STEC)**

- Spread by fecal contamination of food especially undercooked meat
- Symptoms: diarrhea with or without blood and severe abdominal cramps

Salmonella

- Spread by fecal contamination of food – especially poultry and poultry products, eggs, dairy, raw fruits and vegetables
- Symptoms: fever, vomiting, and severe diarrhea

Vibrio cholerae

- Spread by fecal contamination of food, especially raw shellfish.
- Severe infections is characterized by profuse watery diarrhea (“rice water stools”) vomiting and other systemic symptomatology)

Yersinia enterocolitica

- Spread by fecal contamination of food and water, undercooked pork, meat and dairy products
- Symptoms: watery or bloody diarrhea, fever, vomiting and abdominal pain

PARASITIC PATHOGENS

Blastocystis hominis

Cryptosporidium

Cyclospora cayetanensis

Dientamoeba fragilis

Entamoeba histolytica

Giardia lamblia



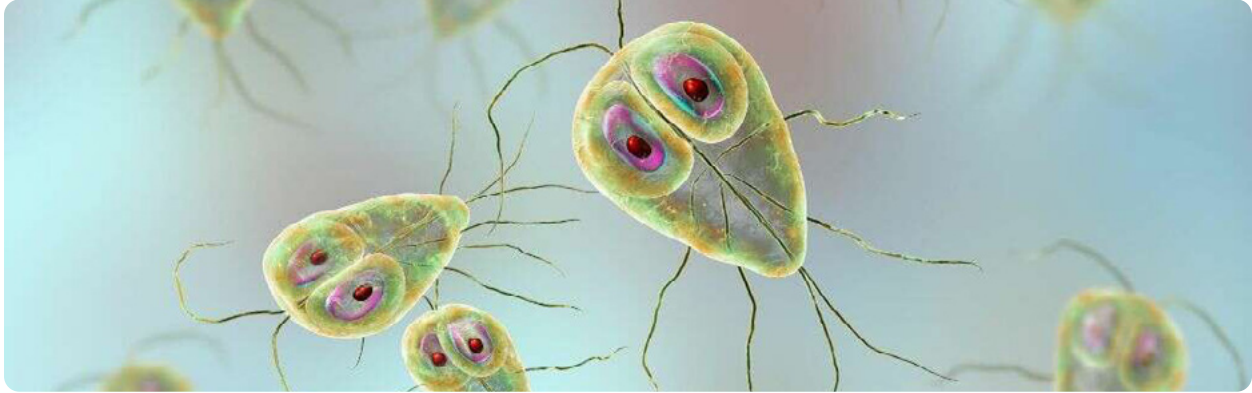
Cryptosporidium

Blastocystis hominis

- Spread by human and animal fecal contamination of food or water
- More common among people who live in or travel to developing countries and among people who work with animals.
- Causes disease in some people and appears not to in others
- Symptoms: abdominal pain, anal itching, diarrhea, nausea, weight loss, may also be associated with skin rashes and hives

Cryptosporidium

- Spread by fecal contamination of ingested foods and liquid (contaminated water and swimming pools, undercooked meat, and raw milk)
- Common cause of traveler's diarrhea
- Can cause reactive arthritis
- Some people will have no symptoms
- Symptoms: Watery diarrhea, abdominal pain, nausea, vomiting, fever. symptoms can come and go for up to 30 days.



Giardia

Cyclospora cayetanensis

- Spread by contaminated food or water. Lettuce, fresh basil and imported raspberries have been implicated in cyclospora outbreaks in the United States and Canada.
- Some people do not have any symptoms.
- Symptoms: watery diarrhea (frequent and sometimes explosive), loss of appetite, weight loss, stomach cramps/pain, bloating, increased gas, nausea, and fatigue. People may also experience vomiting, body aches, headache, low-grade fever, and other flu-like symptoms.
- If not treated, the illness may last from a few days to a month or longer. Symptoms may seem to go away and then return one or more times

Dientamoeba fragilis

- Spread by Fecal-oral transmission.
- Many do not have any symptoms.
- Symptoms: diarrhea and abdominal pain. but may include loss of appetite, weight loss, nausea, and fatigue.
- The infection does not spread from the intestine to other parts of the body.

Entamoeba histolytica

- Spread by fecal contamination of food or water
- Pets may be a source of exposure
- Sexual contact may be a source of exposure
- May spread to other parts of the body
- Symptoms: diarrhea and abdominal pain, in severe cases bloody stool and fever

Giardia

- Most commonly isolated protozoan worldwide
- Found in outside water sources (lakes, streams, ponds) and not always eliminated with filtration systems
- Carried by animals
- Common in daycare workers
- May cause malnutrition and vitamin B12 deficiency
- Can cause reactive arthritis
- Symptoms: stomach cramps, bloating, nausea and bouts of watery diarrhea and may alternate with soft, greasy stools.

VIRAL PATHOGENS

Adenovirus (40/41)

Astrovirus

Norovirus I and II

Rotavirus A

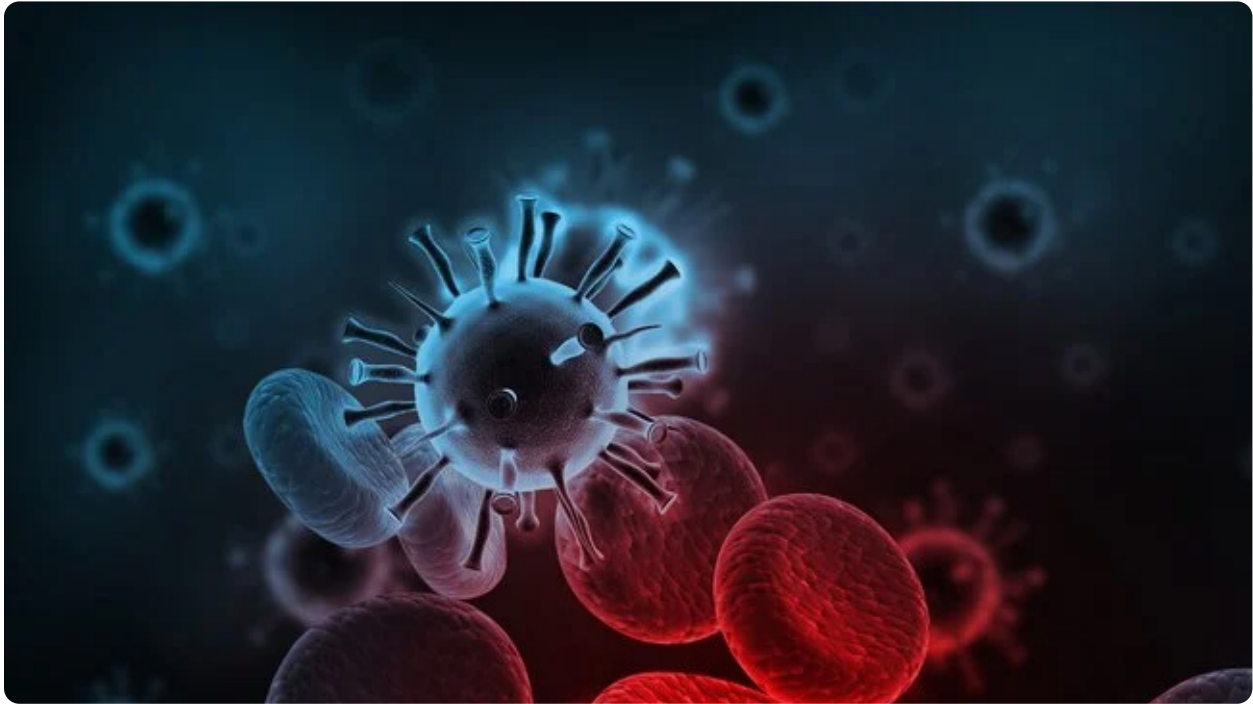
Sapovirus

Adenovirus (serotype 40,41)

- Spread via Fecal-oral route
- Identified in 9% of children with diarrhea
- Third most common cause of infantile gastroenteritis after rotavirus and norovirus.
- Symptoms: fever, diarrhea, vomiting, and abdominal pain, and last for approximately 10 days.

Astrovirus

- Spread by contaminated food and water
- Associated with 5%~9% of cases of gastroenteritis in young children.
- Symptoms: Nausea, vomiting, abdominal pain, Loss of appetite, body aches, fever



Norovirus I & II

Norovirus I & II

- Spread by fecally contaminated food or water, direct contact with infected person
- Symptoms: Diarrhea, forceful vomiting, nausea, Stomach pain, may also include fever, headache, body aches

Rotavirus A

- Spread via Fecal-oral route
- Symptoms: Fever and vomiting followed by 3-7 days of watery diarrhea

Sapovirus

- Spread by Fecal-oral route usually person to person, only occasionally via contaminated food or water
- Commonly infects young children and also found in long-term care facilities
- Symptoms: vomiting and diarrhea. fever is rare

HELMINTHS

*Enterocytozoon spp. /
Encephalitozoon spp. (EN)*

Hymenolepis spp. (HY)

Taenia spp. (TA)

Ancylostoma spp. (AN)

Necator americanus (NA)

Strongyloides spp. (ST)

Ascaris spp. (AS)

Trichuris trichiura (TT)

Enterobius vermicularis (EV)

Enterocytozoon spp. / Encephalitozoon spp. (EN)

- Spread by the release of spores in feces, urine, and other secretions. Spores have been detected in both food and water
- Microsporidia are considered to be an emerging pathogen of increasing importance and a cause of opportunistic infection in immunosuppressed patients, particularly among persons with AIDS
- Of all of the manifestations of microsporidiosis, *Enterocytozoon bieneusi*-associated diarrhea is the most common
- Typical sites of infection: Eyes, Small intestine and biliary tree

Strongyloides spp. (ST)

- Spread by ingestion of fecal contaminated food or skin penetration (depending on species)
- Typical symptoms after ingestion of larvae: diarrhea, constipation, abdominal pain, and anorexia
- Chronic strongyloidiasis is generally asymptomatic

Hymenolepis spp. (HY)

- Spread by contaminated food or water
- Most patients are asymptomatic
- Heavy infections with *H. nana* can cause weakness, headaches, anorexia, abdominal pain, and diarrhea.
- *Hymenolepis* infection may result in poor growth and development in children, particularly in cases of heavy infection or in the presence of other parasitic infections

Necator americanus (NA) *(Hookworm)*

- Spread via Fecal-oral route, or by skin penetration (bare feet)
- An estimated 576-740 million people in the world are infected with hookworm
- Itching and a localized rash are often the first signs of infection. These symptoms occur when the larvae penetrate the skin
- A person with a heavy infection may experience abdominal pain, diarrhea, loss of appetite, weight loss, fatigue and anemia
- The physical and cognitive growth of children can be affected.

Trichuris trichiura (TT) *(whipworm)*

- Spread via Fecal-oral route
- Typical symptoms: rectal bleeding and abdominal pain.
- It is estimated that worldwide there are between 450 million to 1 billion active cases with most diagnosed in children

Ancylostoma spp. (AN) *(Hookworm)*

- Spread via Skin penetration
- Intestinal hookworm infections are commonly asymptomatic. Attachment of the hookworms to the intestinal wall may stimulate abdominal pain, nausea, and anorexia
- Iron deficiency anemia caused by blood loss at the site of intestinal attachment of adult worms may occur especially in heavy infections
- On contact with the human host, typically bare feet, the larvae penetrate the skin and are carried through the blood vessels to the heart and then to the lungs.
- Larvae penetrate into the pulmonary alveoli, ascend the bronchial tree to the pharynx, and are swallowed . The larvae reach the jejunum of the small intestine, where they reside and mature into adults



Gut parasites

Taenia spp.(TA) (Tapeworm)

- Spread by consuming raw or undercooked meat (beef, pork)
- *Taenia saginata* (beef tapeworm) taeniasis produces only mild abdominal symptoms
- The most important feature of *Taenia solium* (pork tapeworm) taeniasis is the risk of development of cysticercosis.
- *Taenia solium* taeniasis is less frequently symptomatic than *Taenia saginata* taeniasis.

Enterobius vermicularis (EV) (Pinworm)

- Spread via Fecal-oral route - ingestion from contaminated hands/ surfaces
- Most common symptom is an itchy anal region
- Pinworm is the most common worm infection in the United States
- Although pinworm infection can affect all people, it most commonly occurs among children, institutionalized persons, and household members of persons with pinworm infection