

Infectious Diarrhea

Infectious Diarrheal Diseases

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Objectives

- Identify the most common causes of infectious diarrhea in adult patients
- Describe how the patient history and clinical presentation of diarrhea may favour viral versus bacterial causes that benefit from antibiotic therapy
- Compare clinical spectrum of disease in resource-rich vs. resource-poor countries

Background

- Diarrheal disease is one of the top ten leading causes of death worldwide
- Diarrheal disease is a particular concern for children younger than five years old in resource-limited settings
- Among adults in resource-rich settings, diarrhea is often a “nuisance disease” in the healthy individual

- Most cases of acute diarrhea in adults are of infectious etiology, and most cases resolve with symptomatic treatment alone
- When clinicians care for adults with diarrhea, two important decision points are:
 - When to perform stool testing
 - Whether to initiate empiric antimicrobial therapy

(Fang and Patel, 2017; GBD 2016 Diarrhoeal Disease Collaborators, 2018)

Definitions

- Diarrhea is defined as the passage of loose or watery stools, typically at least three times in a 24-hour period
- Reflects increased water content of the stool, whether due to impaired water absorption and/or active water secretion by the bowel
 - Acute – 14 days or fewer in duration
 - Persistent diarrhea – more than 14 but fewer than 30 days in duration
 - Chronic – more than 30 days in duration
- Invasive diarrhea, *dysentery*- diarrhea with visible blood or mucus
 - Dysentery is commonly associated with fever and abdominal pain

Etiology

- Most cases of acute diarrhea are due to infections and are self-limited.
- Most cases of acute infectious diarrhea are likely viral, as indicated by the observation that stool cultures are positive in only 1.5 to 5.6 percent of cases
- The major causes of acute infectious diarrhea include:
 - **Viruses** (norovirus, rotavirus, adenoviruses, astrovirus, and others)

- **Bacteria** (Salmonella, Campylobacter, Shigella, enterotoxigenic Escherichia coli, Clostridioides difficile, and others)
- **Protozoa** (Cryptosporidium, Giardia, Cyclospora, Entamoeba, and others)
- Non-infectious etiologies become more common with longer duration of diarrhea

(Dryden et al., 1996)

Causes of acute infectious diarrhea in adults in resource-rich settings

	Likely pathogens	Mean incubation period	Classic/common food sources	Other epidemiologic clues
Watery diarrhea	Norovirus	24 to 48 hours	Shellfish, prepared foods, vegetables, fruit	Outbreaks in: - Restaurants - Health care facilities - Schools and childcare centers - Cruise ships - Military populations

	Likely pathogens	Mean in- cubation period	Classic/commo- n food sources	Other epi- demiologic clues
<i>Clostridioides</i> (formerly <i>Clostrid- ium difficile</i>)	N/A	N/A	Antibiotic use- Hospitalization- Cancer chemotherapy- Gastric acid suppression-	
<i>Clostridium perfrin- gens</i>	8 to 16 hours	Meat, poultry, gravy, home- canned goods		Inflamma- tory bowel disease
Enterotoxigenic <i>Es- cherichia coli</i>	1 to 3 days	Fecally contami- nated food or water	Travel to resource- limited settings	
Other enteric viruses (ro- tavirus, enteric aden- ovirus, astro- virus, sapovirus)	10 to 72 hours	Fecally contami- nated food or water	Daycare centers- Gastroen- teritis in children- Immuno- compro- mised adults	

	Likely pathogens	Mean in- cubation period	Classic/commo food sources	Other epi- demiologic clues
<i>Giardia lamblia</i>	7 to 14 days	Fecally contami- nated food or water	Daycare centers- Swimming pools- Travel, hiking, camping (particu- larly when there is contact with water in which beavers reside)	
<i>Cryptosporidium parvum</i>	2 to 28 days	Vegetables, fruit, unpas- teurized milk	Daycare centers- Swimming pools and recre- ational water sources- Animal exposure- Chronic diarrhea in advanced HIV infection	
<i>Listeria monocytogenes</i>	1 day (gas- troenteri- tis)	Processed/deli- meats, hot dogs, soft cheese, pâtés, and fruit	Picnics- Immuno- compromis- ing condition- Extremes of age	

	Likely pathogens	Mean in- cubation period	Classic/common food sources	Other epi- demiologic clues
<i>Cyclospora cayetensis</i>	1 to 11 days	Imported berries, herbs	Chronic diarrhea in advanced HIV infection	
Inflammatory diarrhea (fever, mucoid or bloody stools)¶	Non-typhoidal <i>Salmonella</i>	1 to 3 days	Poultry, eggs, and egg products, fresh produce, meat, fish, unpasteur- ized milk or juice, nut butters, spices	Animal contact (petting zoos, reptiles, live poultry, other pets)- Travel to resource- limited settings
<i>Campylobacter</i> spp	1 to 3 days	Poultry, meat, unpas- teurized milk	Travel to resource- limited settings- Animal contact (young puppies or kittens, oc- cupational contact)	

	Likely pathogens	Mean in- cubation period	Classic/commo food sources	Other epi- demiologic clues
<i>Shigella</i> spp	1 to 3 days	Raw veg- etables	Daycare centers- Crowded living conditions- Men who have sex with men- Travel to resource- limited settings	
Enterohemorrhagic <i>E. coli</i>	1 to 8 days	Ground beef and other meat, fresh produce, unpas- teurized milk and juice	Daycare centers- Nursing homes- Extremes of age	
<i>Yersinia</i> spp	4 to 6 days	Pork or pork products, un- treated water	Abnormalities of iron- metabolism (eg, cirrhosis, hemochro- matosis, thalassemia)- Blood transfusion	
<i>Vibrio</i> <i>paraha-</i> <i>molyticus</i>	1 to 3 days	Raw seafood and shellfish	Cirrhosis	

	Likely pathogens	Mean in- cubation period	Classic/commo food sources	Other epi- demiologic clues
<i>Entamoeba histolytica</i>	1 to 3 weeks	Fecally contami- nated food or water	Travel to resource- limited settings- Men who have sex with men	

References

Dryden MS, Gabb RJ, Wright SK. Empirical treatment of severe acute community-acquired gastroenteritis with ciprofloxacin. *Clinical Infectious Diseases: An Official Publication of the Infectious Diseases Society of America* 1996;22:1019–25. <https://doi.org/10.1093/clinids/22.6.1019>.

Fang FC, Patel R. 2017 Infectious Diseases Society of America Infectious Diarrhea Guidelines: A View From the Clinical Laboratory. *Clinical Infectious Diseases* 2017;65:1974–6. <https://doi.org/10.1093/cid/cix730>.

GBD 2016 Diarrhoeal Disease Collaborators. Estimates of the global, regional, and national morbidity, mortality, and aetiologies of diarrhoea in 195 countries: A systematic analysis for the Global Burden of Disease Study 2016. *The Lancet Infectious Diseases* 2018;18:1211–28. [https://doi.org/10.1016/S1473-3099\(18\)30362-1](https://doi.org/10.1016/S1473-3099(18)30362-1).