

Infectious Diarrhea

Infectious Diarrheal Diseases

Russell Lewis Associate Professor, Infectious Diseases Department of Molecular Medicine MEP 2491 Infectious Diseases 27



UNIVERSITÀ
DEGLI STUDI
DI PADOVA

March 2023

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 pathogen	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
<i>Clostridioides</i> (formerly <i>Clostridium difficile</i>)	N/A	N/A	Antibiotic use- Hospitalization- Cancer chemotherapy- Gastric acid suppression- Inflammatory bowel disease	
<i>Clostridium perfringens</i>	8 to 16 hours	Meat, poultry, gravy, home-canned goods		

	Likely pathogen	Mean incubation period	Classic/common food sources	Other epidemiologic clues
Enterotoxigenic <i>Escherichia coli</i>	to 3 days	Fecally contaminated food or water	Travel to resource-limited settings	
Other enteric viruses (rotavirus, enteric adenovirus, astrovirus, sapovirus)	10 to 72 hours	Fecally contaminated food or water	Daycare centers- Gastroenteritis in children- Immunocompromised adults	
<i>Giardia lamblia</i>	7 to 14 days	Fecally contaminated food or water	Daycare centers- Swimming pools- Travel, hiking, camping (particularly when there is contact with water in which beavers reside)	

		Mean incuba- tion period	Likely pathogen	Classic/common food sources	Other epidemiologic clues
<i>Cryptosporidium parvum</i>	28 days	to fruit, unpasteurized milk	Vegetables, Daycare centers- Swimming pools and recreational water sources- Animal exposure- Chronic diarrhea in advanced HIV infection		
<i>Listeria monocytogenes</i>	1 day (gas-troenteritis)	Processed meats, hot dogs, soft cheese, pâtés, and fruit	Religiosity, Immunocompromising condition- Extremes of age		
<i>Cyclospora cayentensis</i>	1 to 11 days	Imported berries, herbs	Chronic diarrhea in advanced HIV infection		
Inflammatory diarrhea (fever, mucoid or bloody stools)¶	Not typical	Non-typhoidal <i>Salmonella</i>	Poultry, eggs, and egg products, fresh produce, meat, fish, unpasteurized milk or juice, nut butters, spices	Animal contact (petting zoos, reptiles, live poultry, other pets)- Travel to resource-limited settings	

		Mean incuba- tion period	Classic/common food sources	Other epidemiologic clues
<i>Campylobacter</i> spp	Likely pathogen	Poultry, to meat, 3 unpa- days steurized milk	Travel to resource- limited settings- Animal contact (young puppies or kittens, occupational contact)	
<i>Shigella</i> spp	1 to 3 days	Raw vegeta- bles	Daycare centers- Crowded living conditions- Men who have sex with men- Travel to resource- limited settings	
Enterohemorrhagic <i>E. coli</i>	6 to 8 days	Ground beef and other meat, fresh produce, unpa- steurized milk and juice	Daycare centers- Nursing homes- Extremes of age	

		Mean incuba- tion period	Classic/common food sources	Other epidemiologic clues
<i>Yersinia</i> spp	4 to 6 days	Pork or pork prod- ucts, un- treated water	Abnormalities of iron- metabolism (eg, cirrhosis, hemochromato- sis, thalassemia)- Blood transfusion Cirrhosis	
<i>Vibrio</i> <i>parahaemolyticus</i>	1 to 3 days	Raw seafood and shellfish		
<i>Entamoeba</i> <i>histolytica</i>	1 to 3 weeks	Fecally contam- inated 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).