

A 10-year-old boy is brought to the emergency department due to sudden-onset nausea, abdominal cramps, and several episodes of vomiting over the last 2 hours. He has not had diarrhea. His mother notes that the patient's 6-year-old sister has similar symptoms. The children ate barbecued chicken with potato salad at a community lunch 4 hours before the symptoms began. They also swam in the community pool and played with a pet turtle. The patient has a history of upper respiratory infections and received antibiotics a month ago for acute otitis media. Temperature is 36.8 C (98.2 F), blood pressure is 112/70 mm Hg, and pulse is 88/min. Abdomen is soft and nontender. Which of the following is the most likely cause of this patient's symptoms?

- ☐ A. *Bacillus cereus*
- ☐ B. *Campylobacter jejuni*
- ☐ C. *Clostridium difficile*
- ☐ D. *Clostridium perfringens*
- ☐ E. Enterotoxigenic *Escherichia coli*
- ☐ F. *Giardia lamblia*
- ☐ G. *Listeria monocytogenes*
- ☐ H. Nontyphoidal salmonella
- ☐ I. Shiga toxin-producing *Escherichia coli*
- ☐ J. *Staphylococcus aureus*



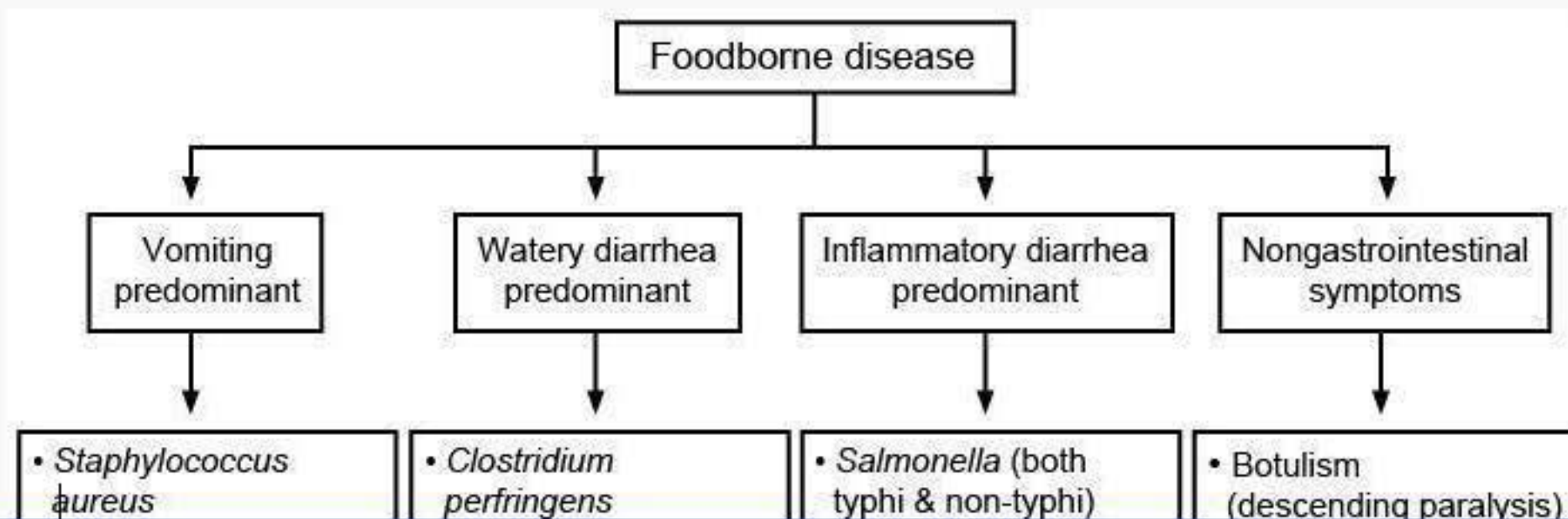
A 10-year-old boy is brought to the emergency department due to sudden-onset nausea, abdominal cramps, and several episodes of vomiting over the last 2 hours. He has not had diarrhea. His mother notes that the patient's 6-year-old sister has similar symptoms. The children ate barbecued chicken with potato salad at a community lunch 4 hours before the symptoms began. They also swam in the community pool and played with a pet turtle. The patient has a history of upper respiratory infections and received antibiotics a month ago for acute otitis media. Temperature is 36.8 C (98.2 F), blood pressure is 112/70 mm Hg, and pulse is 88/min. Abdomen is soft and nontender. Which of the following is the most likely cause of this patient's symptoms?

- ☐ A. *Bacillus cereus* [4%]
- ☐ B. *Campylobacter jejuni* [2%]
- ☐ C. *Clostridium difficile* [0%]
- ☐ D. *Clostridium perfringens* [1%]
- ☐ E. Enterotoxigenic *Escherichia coli* [4%]
- ☐ F. *Giardia lamblia* [0%]
- ☐ G. *Listeria monocytogenes* [1%]
- ☐ H. Nontyphoidal salmonella [6%]
- ☐ I. Shiga toxin-producing *Escherichia coli* [2%]
- ☒ J. *Staphylococcus aureus* [81%]

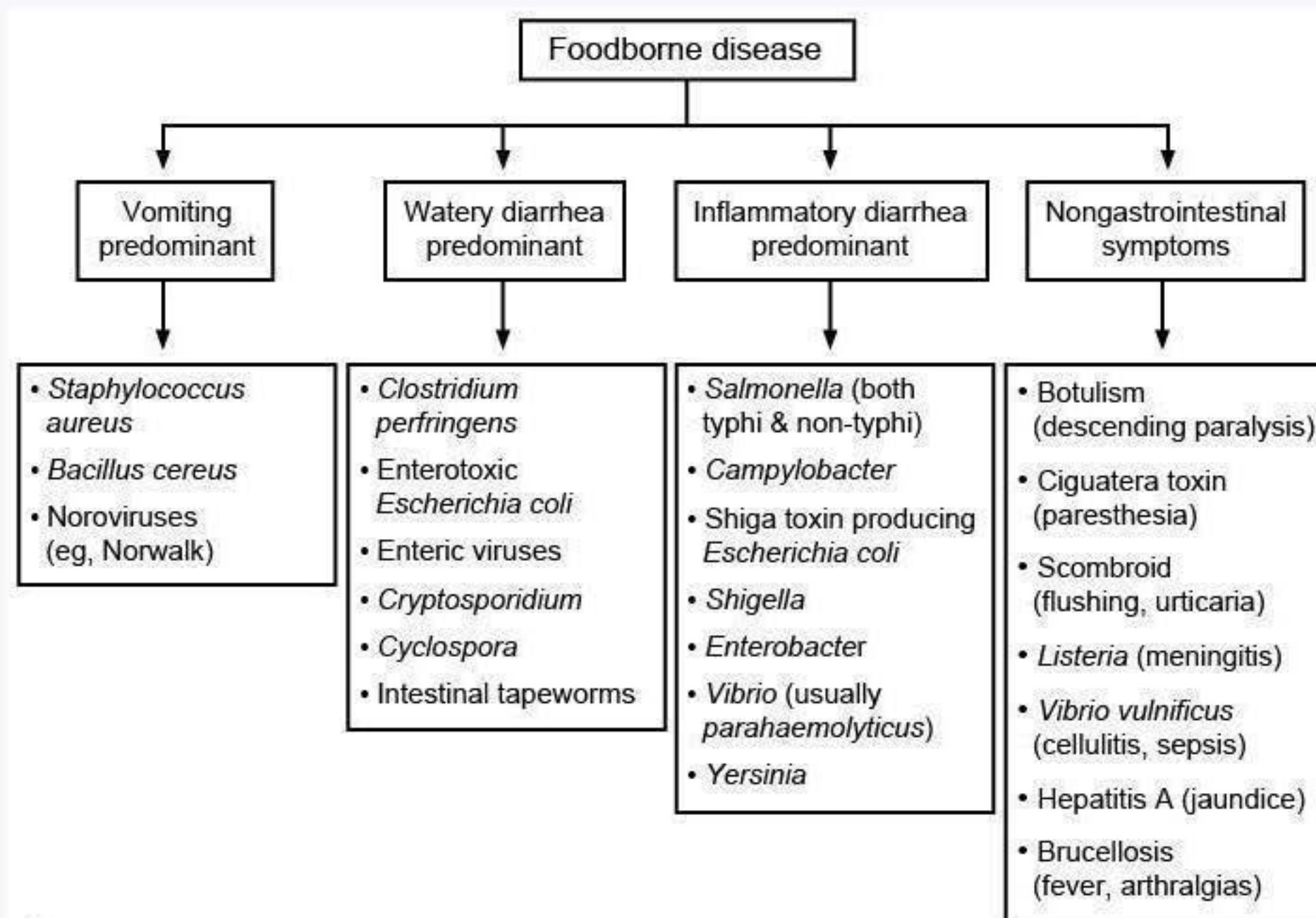
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Explanation:

User Id: [REDACTED]







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This boy and his sister developed concomitant acute gastrointestinal symptoms after attending a community lunch, suggesting a **foodborne illness**. Approximately 50 million cases of foodborne illness occur in the United States each year. Pathogens include bacteria, viruses, and parasites. Suspicion for a specific etiologic organism is often suggested by the food consumed, length of time to symptoms, and symptom complex.

***Staphylococcus aureus*** is found in the nose and on the skin of ~25% of the population. Most people are asymptomatic, but colonized food handlers can transmit *S aureus* to food during preparation. Dairy items (eg, mayonnaise in potato salad), meats, eggs, produce, and salads are particularly vulnerable. *S aureus* produces **enterotoxins** in the contaminated food that rapidly cause symptoms after ingestion (often within **1-6 hours**). **Vomiting** is the primary symptom; diarrhea may or may not be present. Illness is usually self-limited, resolving completely within 24-48 hours.

**(Choice A)** *Bacillus cereus* also causes rapid-onset vomiting due to a toxin formed outside of the body. However, *B cereus* is usually transmitted via starch products (particularly rice that has been reheated or left at room temperatures for extended



(Choice A) *Bacillus cereus* also causes rapid-onset vomiting due to a toxin formed outside of the body. However, *B cereus* is usually transmitted via starch products (particularly rice that has been reheated or left at room temperatures for extended periods). The mayonnaise in this patient's potato salad was likely the culprit.

(Choices B and H) *Campylobacter jejuni* and nontyphoidal salmonella directly attack colonic epithelial cells and usually cause watery diarrhea (with blood/mucus), severe abdominal pain, and fever. Both organisms are transmitted by poultry (salmonella is also associated with turtles). This patient had a vomiting-predominant illness (not diarrhea-predominant).

(Choice C) *Clostridium difficile* causes antibiotic-associated colitis (watery diarrhea, abdominal pain). Although this patient had antibiotics a month ago, vomiting is his primary symptom (not diarrhea).

(Choices D, E, and I) *Clostridium perfringens*, enterotoxigenic *Escherichia coli* (ETEC), and Shiga toxin-producing *E coli* (STEC) produce toxins after the organism is ingested. As such, symptoms are typically delayed >1 day (not 4 hours). Both *C perfringens* and ETEC cause watery diarrhea; STEC causes watery diarrhea that becomes bloody, often with renal failure (O157:H7).

(Choice F) *Giardia* is transmitted primarily by contaminated water. Incubation takes 7-14 days, and symptoms include foul-smelling, watery diarrhea.

(Choice G) *Listeria monocytogenes* is a foodborne illness that occasionally causes self-limited, febrile gastroenteritis (watery diarrhea). Patients who are immunocompromised, pregnant, or at the extremes of age (<2, >50) may develop invasive disease (bacteremia, meningoenzephalitis). This patient did not have diarrhea or fever.

#### Educational objective:

*Staphylococcus aureus* causes foodborne illness due to the ingestion of preformed toxins. Vomiting is the preeminent symptom and usually begins 1-6 hours after exposure. Diarrhea may or may not be present. Food containing mayonnaise is often implicated in staphylococcal food poisoning.

#### References:

1. [Diagnosis and management of foodborne illnesses: a primer for physicians.](#)
2. [Staphylococcal enterotoxins.](#)