

REACH Notes

Recent Developments to Promote Judicious Antibiotic Prescribing

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REACH Notes: From Ship to Shore: Cruise Ships Infections

We take a break from our primary topic of bacterial antibiotic resistance to focus on recent reports of gastrointestinal illness in cruise passengers. Patients may ask you about the safety of bringing children on such cruises or present with GI illness after a vacation. We hope the following information will be useful.

The recent outbreaks of Norwalk virus on several Disney cruises and another on Holland America have heightened awareness of the risks of food and water-borne illnesses among cruise ships.

Cruise-related diarrheal illness is uncommon. In an 8-year CDC survey¹ of 13,442 cruise ship surveillance reports from 1986-1993, less than one percent (0.2%) of cruises reported potential diarrheal outbreaks. This amounts to 6 outbreak-related illnesses per 100,000 passenger days. Of the outbreaks, 61% of outbreaks occurred on cruise ships sailing to the Caribbean, and almost all (94%) occurred during non-summer months.

The above data is from the U.S. Vessel Sanitation Program (VSP), instituted in 1975. 24-hours prior to docking in the U.S., all cruise ships must report the percent of passengers who consulted a ship physician for diarrhea. In ships reporting a percentage $\geq 3\%$, the CDC determines if further investigation is needed. In addition, the VSP conducts unannounced ship inspections, generally occurring twice a year. In 1975, no ship passed the VSP standard, compared to over 60% of ships today. Green Sheets detail the inspection points (water, food preparation, potential food contamination, and general cleanliness) and are publicly available at www.cdc.gov/nceh/programs/sanit/vsp/vsp.htm.

Causes of cruise ship outbreaks are numerous.² Among diarrheal illnesses, 51% of outbreaks have an unknown etiologic agent. 36% are bacterial, and 13% are viral in origin. Illnesses are generally mild, last 2-3 days, and are characterized by nausea, diarrhea, abdominal cramps, and occasionally fever.

Most Common Diarrheal Pathogens

1. *Vibrio parahaemolyticus*
2. *Norwalk virus*
3. *Escherichia coli*
4. *Shigella* species

Most Common Food Sources

1. Seafood (cocktail, salad, lobster, scallops)
2. Water/ice
3. Chicken, egg, or potato salad
4. Dairy desserts (cream pastries)

Various other agents of cruise ship diarrheal outbreaks include salmonella species, *Staphylococcus aureus* (toxin, "food poisoning"), and cyclospora. Notably, respiratory outbreaks have also occurred, including several legionella outbreaks due to whirlpool spas and water systems (often from water sources obtained at non-U.S. ports). Reports of influenza, even off-season influenza, chicken pox, and rubella have also occurred.

Pre-Cruise Prevention

1. Check the cruise ship's Green Sheets
2. Encourage handwashing
3. Counsel on risk of undercooked seafood, meats, and eggs
4. Counsel on risk of whirlpools
5. Travel vaccines, as needed

Post-Cruise Investigation

1. Ask about recent travel, destinations
2. Send stool specimens
3. Consider legionella urinary antigen for respiratory illness in adults/parents
4. Notify the CDC of suspected cruise outbreaks
5. Ask about receipt of antibiotics on the cruise; consider acquisition of antibiotic-resistant organisms, and *Clostridium difficile*

¹ Koo D, Maloney K, Tauxe R. Epidemiology of diarrheal disease outbreaks on cruise ships, 1986 through 1993. JAMA 1996; 275(7): 545-7.

² Minoee A, Rickman LS. Infectious diseases on cruise ships. Clin Infect Dis, 1999; 29:737-44.