

## Chapter 6 Conveyance & Transportation Issues

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### Cruise Ship Travel

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#### INTRODUCTION

Cruise ship travel presents a unique combination of health concerns. Travelers from diverse regions brought together in often crowded, semi-enclosed environments onboard ships can facilitate the spread of person-to-person, foodborne, or waterborne diseases. Outbreaks on ships can be sustained for multiple voyages by transmission among crew members who remain onboard or by persistent environmental contamination. Port visits can expose travelers to local vectorborne diseases. The remote location of the travelers at sea means that they may need to rely on the medical capabilities and supplies available onboard the ship for extended periods of time, and cruise travelers and their physicians should be aware of ships' medical limitations and prepare accordingly. Certain groups, such as pregnant women, the elderly, or those with chronic health conditions or who are immunocompromised, require special consideration when considering cruise travel.

#### CRUISE SHIP MEDICAL CAPABILITIES

Medical facilities on cruise ships can vary widely depending on ship size, itinerary, length of cruise, and passenger demographics. Generally, shipboard medical clinics can provide medical care comparable to that of ambulatory care centers. Although no agency officially regulates medical practice aboard cruise ships, consensus-based guidelines for cruise ship medical facilities were published by the American College of Emergency Physicians (ACEP) in 1995 and most recently updated in 2013. ACEP guidelines ([www.acep.org/content.aspx?id=29500](http://www.acep.org/content.aspx?id=29500) (<http://www.acep.org/content.aspx?id=29500>)), which are followed by most major cruise lines, state that the cruise ship medical facilities should maintain the following minimum capabilities:

- Provide emergency medical care for passengers and crew
- Stabilize patients and initiate reasonable diagnostic and therapeutic interventions
- Facilitate the evacuation of seriously ill or injured patients

#### ILLNESSES AND INJURY ABOARD CRUISE SHIPS

Cruise ship medical clinics deal with a wide variety of illnesses and injuries. Approximately 3%–11% of conditions reported to cruise ship infirmaries are urgent or an emergency. Approximately 95% of illnesses are treated or managed onboard, and 5% require evacuation and shoreside consultation for medical, surgical, or dental problems. Roughly half of passengers who seek medical care are older than 65 years of age. Most infirmary visits are due to acute illnesses, of which respiratory illnesses (19%–29%); seasickness (10%–25%); injuries from slips, trips, or falls (12%–18%); and gastrointestinal (GI) illness (9%–10%) are the most frequently reported diagnoses. Death rates for cruise ship passengers, most often from cardiovascular events, range from 0.6 to 9.8 deaths per million passenger-nights.

The most frequently reported cruise ship outbreaks involve respiratory infections, GI infections (norovirus), and vaccine-preventable diseases other than influenza, such as varicella (chickenpox). To reduce the risk of onboard introduction of communicable diseases by embarking passengers, ships may conduct medical screening during embarkation to identify ill passengers, preventing them from boarding or requiring isolation if they are allowed to board.

The following measures should be encouraged to limit the introduction and spread of communicable diseases on cruise ships:

- Passengers and their clinicians should consult CDC's Travelers' Health website ([www.cdc.gov/travel](http://www.cdc.gov/travel)) before travel for updates on outbreaks and travel health notices.
- Passengers ill with communicable diseases before a voyage should delay travel until they are no longer contagious.
- Passengers who become ill during the voyage should seek care in the ship's infirmary to receive clinical management, facilitate infection control measures, and maximize reporting of potential public health events.

#### SPECIFIC HEALTH RISKS

##### GI Illness

From 2008 through 2014, rates of GI illness among passengers on voyages lasting 3–21 days decreased from 27.2 to 22.3 cases per 100,000 travel days. Despite this decrease, GI illness outbreaks continue to occur. Updates on these outbreaks involving ships with US ports of call can be found at [www.cdc.gov/nceh/vsp/surv/gilist.htm](http://www.cdc.gov/nceh/vsp/surv/gilist.htm) (<http://www.cdc.gov/nceh/vsp/surv/gilist.htm>).

Exhibit LD  
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More than 90% of GI outbreaks with a confirmed cause are due to norovirus. Characteristics of norovirus that facilitate outbreaks are a low infective dose, easy person-to-person transmissibility, prolonged viral shedding, no long-term immunity, and the organism's ability to survive routine cleaning procedures. From 2010 through 2015, 8–16 outbreaks of norovirus infections occurred on cruise ships from food and water sources have also been associated with *Salmonella* spp., enterotoxigenic *Escherichia coli*, *Shigella* spp., *Vibrio* spp., *Staphylococcus aureus*, *Clostridium perfringens*, *Cyclospora cayentanensis*, and hepatitis A and E viruses.

To protect themselves from infections and reduce the spread of GI illnesses on cruise ships, passengers should be counseled on the following:

- Passengers should wash their hands with soap and water often, especially before eating and after using the restroom.
- Passengers who develop a GI illness, even if symptoms are mild, should promptly call the ship's medical center (or the ship's master, if no medical center exists) and follow cruise ship guidance regarding isolation and other infection control measures (see Chapter 3, [Norovirus](#)).
- Additional information on cruise ship outbreaks is available at [www.cdc.gov/nceh/vsp](http://www.cdc.gov/nceh/vsp) (<http://www.cdc.gov/nceh/vsp>).

## Respiratory Illness

### INFLUENZA

Respiratory illnesses are the most common medical complaint, and influenza is the most commonly reported vaccine-preventable illness on cruise ships. Since passengers and crew originate from all regions of the world, shipboard outbreaks of influenza A and B can occur year-round, and travelers on cruise ships can be exposed to strains circulating in different parts of the world. Using 2008–2011 surveillance data, CDC found a mean rate of influenzalike illness (defined as temperature  $\geq 100^{\circ}\text{F}$  plus cough or sore throat) of 0.065 cases per 1,000 person-nights, without a detectable seasonal pattern.

Given the cruise ship environment, population, and variable medical capabilities, the following measures are recommended year round to protect travelers from influenza:

- Clinicians should provide cruise travelers, particularly those at high risk for influenza complications, with the current seasonal influenza vaccine (if available)  $\geq 2$  weeks before travel.
- Passengers at high risk for influenza complications should discuss antiviral treatment and chemoprophylaxis with their health care provider before travel.
- Passengers should practice good respiratory hygiene and cough etiquette.
- Passengers should report their respiratory illness to the infirmary promptly and follow isolation recommendations, if indicated.

Additional guidance on the prevention and control of influenza on cruise ships is available at [www.cdc.gov/quarantine/cruise/management/guidance-cruise-ships-influenza-updated.html](http://www.cdc.gov/quarantine/cruise/management/guidance-cruise-ships-influenza-updated.html) (<http://www.cdc.gov/quarantine/cruise/management/guidance-cruise-ships-influenza-updated.html>). For more information, see Chapter 3, [Influenza](#).

### LEGIONNAIRES' DISEASE

Although it is not a common cause of respiratory illness on cruise ships, Legionnaires' disease is a treatable infection that can result in severe pneumonia leading to death. More than 20% of all Legionnaires' disease cases reported to CDC are travel-associated. Clusters of Legionnaires' disease associated with hotel or cruise ship travel are difficult to identify because travelers often disperse from the source of infection before symptoms begin. A total of 83 ship-associated cases of Legionnaires' disease were reported in the literature from 1977 through 2012. The cases involved outbreaks on 8 ships, with a median of 4 cases per outbreak (range, 2–50 cases); 6 cases resulted in death.

In general, Legionnaires' disease is not transmitted person to person but is contracted by inhaling or aspirating warm, aerosolized water contaminated with *Legionella* organisms. Person-to-person transmission may be possible in rare cases. Contaminated ships' hot tubs are the most commonly implicated sources of shipboard *Legionella* outbreaks; potable water supply systems have also been implicated. Improvements in ship design and standardization of water disinfection have reduced the risk of *Legionella* growth and colonization.

Most cruise ships have health care personnel who can perform *Legionella* urine antigen testing. People with suspected Legionnaires' disease require prompt antibiotic treatment. See Chapter 3, Legionellosis ([Legionnaires' Disease & Pontiac Fever](#)) for more information.

In evaluating cruise travelers for Legionnaires' disease, clinicians should do the following:

- Obtain a thorough travel history of all destinations from 10 days before symptom onset (to assist in the identification of potential source of exposure).
- Collect urine for antigen testing.
- Culture lower respiratory secretions on selective media, which is essential to identify the species or serogroup.
- Inform CDC of any travel-associated Legionnaires' disease cases by sending an email to [travellegionella@cdc.gov](mailto:travellegionella@cdc.gov). Cases of Legionnaires' disease should be quickly reported to public health officials in order to determine if there are links to previously reported clusters and to stop potential clusters and new outbreaks.

### Vaccine-Preventable Diseases (VPDs)

Although most cruise ship passengers are from countries with routine vaccination programs (such as the United States and Canada), many crew members originate from developing countries with low immunization rates. Outbreaks of measles, rubella, meningococcal disease and, most commonly, varicella have been reported on cruise ships. Preventive measures to reduce the spread of VPDs onboard cruise ships should be followed:

- Crew members should have documented proof of immunity to VPDs (see Chapter 2, [General Recommendations for Vaccination & Immunoprophylaxis](#)).
- Passengers, especially older passengers (>65 years of age) and immunocompromised people, should be up-to-date with routine vaccinations before travel, as well as any recommended vaccinations specific for their destinations.
- Women of childbearing age should be immune to varicella and rubella before cruise ship travel.

## Vectorborne Diseases

Cruise ship port visits may include countries where vectorborne diseases such as malaria, dengue, yellow fever, Japanese encephalitis, and Zika are endemic. New diseases might surface in unexpected locations. For example, chikungunya was reported in late 2013 for the first time in the Caribbean (with subsequent spread throughout the Caribbean and numerous North, Central, and South American countries and territories). Zika virus was first reported in Brazil in 2015 and subsequently spread across the Caribbean and Latin America. See Chapter 3 for additional information on specific vectorborne diseases.

Passengers should follow recommendations for avoiding mosquito bites and vectorborne infections:

- Use an effective insect repellent (see Chapter 2, [Protection against Mosquitoes, Ticks, & Other Arthropods](#)).
- Treat clothing and gear with permethrin or purchase permethrin-treated items.
- While indoors, remain in well-screened or air-conditioned areas.
- When outdoors, wear long-sleeved shirts, long pants, boots, and hats.
- Obtain yellow fever vaccination if recommended or required.
- Take antimalarial chemoprophylaxis if needed (see Chapter 3, [Yellow Fever & Malaria Information, by Country](#)).

## Other Health Concerns

Stresses of cruise ship travel include varying weather and environmental conditions, as well as unaccustomed changes in diet and physical activity. Foreign travel may increase the likelihood of risk-taking behaviors such as alcohol misuse, drug use, and unsafe sex. In spite of modern stabilizer systems, seasickness is a common complaint (affecting up to one-fourth of travelers) (see Chapter 2, [Motion Sickness](#)). Cruise lines may not allow women to board after the 24th week of pregnancy, and pregnant women should contact the cruise line for specific policies and recommendations before booking (for additional information, see Chapter 8, [Pregnant Travelers](#)).

## PREVENTIVE MEASURES FOR CRUISE SHIP TRAVELERS

Cruise ship travelers often have complex itineraries due to multiple, short port visits. Although most of these port visits do not include overnight stays off the cruise ship, some trips have options for travelers to venture off the ship for  $\geq 1$  night. Therefore, cruise ship travelers may be uncertain about potential exposures and which antimicrobial prophylaxis, immunizations, and preventive measures should be considered. [Box 6-01](#) summarizes recommendations for cruise travelers and clinicians advising cruise travelers in pretravel preparation and healthy behaviors during travel. Travelers with special medical needs, such as wheelchairs, oxygen tanks, or dialysis, should inform their cruise line before traveling. Travelers with health conditions should carry a written summary of essential health information (electrocardiogram, chest radiograph, if abnormal, blood type, chronic conditions, allergies, treating physician contact information, and medication list) that would facilitate their care during a medical emergency. In addition, all prospective cruise travelers should verify coverage with their health insurance carriers and, if not included, consider purchasing additional insurance to cover medical evacuation and health services in foreign countries (see Chapter 2, [Travel Insurance, Travel Health Insurance, & Medical Evacuation Insurance](#)).

### Box 6-01. Cruise travel health precautions

#### ADVICE FOR CLINICIANS GIVING PRETRAVEL CRUISE CONSULTATIONS

##### *Risk Assessment and Risk Communication*

- Discuss itinerary, including season, duration of travel, and activities at port stops.
- Review the traveler's medical and immunization history, allergies, and special health needs.
- Discuss relevant travel-specific health hazards and risk reduction.
- Provide the traveler with documentation of his or her medical history, immunizations, and medications.

##### *Immunization and Risk Management*

- Provide immunizations that are routinely recommended (age-specific), required (yellow fever), and recommended based on risk.
- Discuss food and water precautions and insect-bite prevention.
- Older travelers, especially those with a history of heart disease, should carry a baseline electrocardiogram to facilitate onboard or overseas medical care.

##### *Medications Based on Risk and Need*

- Consider malaria chemoprophylaxis if itinerary includes port stops in malaria-endemic areas.
- Consider motion sickness medications for self-treatment (see Chapter 2, [Motion Sickness](#)).

#### PRECAUTIONS FOR CRUISE SHIP TRAVELERS

##### *Pretravel*

- Evaluate the type and length of the planned cruise in the context of personal health requirements.
- Consult medical and dental providers before cruise travel.

- Notify cruise line of special needs (such as wheelchair access, dialysis, oxygen tank).
- Consider additional insurance for overseas health care and medical evacuation.
- Carry prescription medications in their original containers, with a copy of the prescription and accompanying physician's letter.
- Bring insect repellent and sunscreen and consider treating clothes and gear with permethrin.
- Defer travel while acutely ill.
- Consult [wwwnc.cdc.gov/travel/notices](http://wwwnc.cdc.gov/travel/notices) for travel health notices.
- Check [www.cdc.gov/nceh/vsp/surv/gilist.htm](http://www.cdc.gov/nceh/vsp/surv/gilist.htm) (<http://www.cdc.gov/nceh/vsp/surv/gilist.htm>) for gastrointestinal outbreaks.

#### *During Travel*

- Wash hands frequently with soap and water. If soap and water are not available, use an alcohol-based sanitizer that contains ≥60% alcohol.
- Follow safe food and water precautions when eating off the ship at ports of call.
- Use measures to prevent insect bites during port visits, especially in malaria- or dengue-endemic areas or areas where outbreaks of vectorborne diseases, such as chikungunya and Zika, are occurring.
- Use sun protection.
- Maintain good fluid intake, but avoid excessive alcohol consumption.
- Avoid contact with ill people.
- If sexually active, practice safe sex.
- Report illness to ship's infirmary and follow medical recommendations.

## REPORTING ILLNESS AFTER TRAVEL

Travelers who become ill after returning home should inform their health care providers of where they have traveled. Clinicians should report suspected communicable diseases in recently returned cruise ship travelers to public health authorities:

- Report GI illnesses related to cruise ship travel to the CDC VSP by calling 800-CDC-INFO (800-232-4636) or by visiting [www.cdc.gov](http://www.cdc.gov) (<http://www.cdc.gov>) and clicking on "Contact CDC-INFO" in the bottom right hand corner.
- Inform CDC of any travel-associated Legionnaires' disease cases by sending an e-mail to [travellegionella@cdc.gov](mailto:travellegionella@cdc.gov).
- Report communicable diseases to their local public health authority. Health departments should notify the CDC quarantine station of jurisdiction ([www.cdc.gov/quarantine/quarantinestationcontactlistfull.html](http://www.cdc.gov/quarantine/quarantinestationcontactlistfull.html)) (<http://www.cdc.gov/quarantine/quarantinestationcontactlistfull.html>) for communicable diseases of public health concern during travel.

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