Quarantine and Isolation

Contact Us:
Centers for Disease Control and Prevention
1600 Clifton Rd
MS E03
Atlanta, GA 30333
800-CDC-INFO
(800-232-4636)
TTY: (888) 232-6348
Contact CDC–INFO

Guidance for Cruise Ships on the Management of Varicella (Chickenpox)

In most years, varicella, commonly known as chickenpox, is the most common vaccine-preventable disease reported by cruise ships to the CDC Division of Global Migration and Quarantine (DGMQ). It is a frequent cause of outbreaks onboard cruise ships. Varicella is highly communicable, and secondary attack rates can be as high as 90%. Complications occur more frequently in persons older than 15 years, and as crew members and most cruise ship passengers are adults, outbreaks have the potential to involve serious illness.[1,2] Travelers at highest risk for severe disease are immunocompromised persons or pregnant women without a history of varicella disease or vaccination. A substantial proportion of crew members are from tropical countries, where infection generally occurs at a later age than in temperate climates.[3] Because of this differing epidemiology of varicella disease and lower rates of immunization, crew members are more likely to be susceptible to varicella than the general adult population in the United States. This document provides guidance to cruise ships for the reporting, investigation, management, and control of varicella-related illness and deaths in passengers and crew members of cruise ships traveling on international voyages destined for U.S. ports.

1. Background

Commercial maritime travel is characterized by the movement of large numbers of people in closed and semi-closed settings. As with other close-contact environments, these settings can facilitate the person-to-person transmission of varicella and other communicable diseases. Persons with active varicella disease should not travel and should remain isolated until the rash has crusted over. Efforts to reduce the spread of varicella on cruise ships should focus on preventing varicella through vaccination, [4,5] early identification and isolation of crew members and passengers with varicella, postexposure prophylaxis for persons exposed to a varicella case with varicella vaccine or varicella zoster immune globulin (VZIG; indicated for high-risk persons with contraindications to vaccination), and environmental controls to encourage proper hygiene. This document provides guidance for the management of varicella

during and after a voyage.

2. Varicella vaccination practices in the United States

CDC recommends two doses of varicella vaccine given at 12-15 months and 4-6 years for persons aged <13 years of age. Single-antigen varicella vaccine (VARIVAX) or the combination measles, mumps, rubella and varicella (ProQuad) vaccine can be used. Recommendations from the Advisory Committee on Immunization Practices (ACIP) for the use of combination Measles, Mumps, Rubella, and Varicella Vaccine have been published: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5903a1.htm.

For persons aged ≥13 years who have no contraindication, two doses of varicella vaccine should be given 4-8 weeks apart. Only single-antigen varicella vaccine can be used for vaccination of persons ≥13 years. Additional ACIP recommendations on the prevention of varicella can be found here: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5604a1.htm

3. Managing passengers and crew with varicella

Varicella disease

Varicella zoster virus (VZV) causes two distinct diseases: varicella (chickenpox) as the primary infection and later, when VZV reactivates, herpes zoster (shingles). Clinical signs and symptoms of varicella in unvaccinated persons include fever and rash. The rash is generalized and pruritic (itchy), generally occurring 14-16 days after exposure (range 10-21 days). It rapidly progresses within 24 hours from macules (flat lesions) and papules (bumps) to vesicular lesions (blisters) and crusts. Skin lesions are present simultaneously in several stages of development and are superficial; the vesicles contain a clear fluid. The rash spreads from head to trunk and extremities, with the highest concentration of vesicles usually on the trunk. In healthy children the clinical course is generally mild. Adults may have more severe disease and have a higher incidence of complications such as pneumonia and encephalitis. Varicella in previously vaccinated persons ("breakthrough" infection) is usually mild, without fever, and characterized by an atypical rash, with <50 lesions that are mostly maculopapular, with few or no vesicular lesions.

Varicella is highly contagious. In households, secondary attack rates among susceptible household contacts may reach 85%-90%. Person-to-person transmission is by direct contact with vesicular fluid, inhalation of aerosolized fluid from skin lesions of acute cases, or inhalation of infected respiratory tract secretions. The incubation period is 10-21 days (commonly 14-16 days). The contagious period is from 1-2 days before rash appearance until all lesions have crusted, or, in vaccinated persons, until no new lesions appear within a 24-hour period.

Isolation of infectious persons onboard

Passengers who develop varicella en route should be medically evaluated (see next section) and remain isolated in their cabins until all lesions have crusted over or no new lesions appear within a 24-hour period (usually 4-6 days after rash onset).

Crew members with varicella should take the following actions:

- Notify their supervisors.
- Report to the infirmary for medical evaluation, according to shipboard protocols.
- Remain isolated in their cabins or quarters until all lesions

have crusted over or no new lesions appear within a 24-hour period (usually 4-6 days after rash onset).

Only crew members with evidence of immunity to varicella should care for passengers or other crew members under isolation (see criteria in Section 4).

Medical evaluation and management

Updated resources for clinicians and guidance on the medical evaluation and management of persons with varicella are available at: http://www.cdc.gov/chickenpox/hcp/index.html and http://www.cdc.gov/chickenpox/outbreaks/control-investigation.html

Diagnostic tests

Laboratory confirmation is not routinely required, since the typical varicella rash has a highly characteristic appearance. However, as vaccination rates increase, a higher proportion of cases may occur in vaccinated persons, who usually have atypical disease. Clinical diagnosis in atypical disease may be more difficult, and laboratory confirmation may be required.

Skin lesions are the preferred specimen for laboratory confirmation of varicella disease. The following are guidelines for cruise ships regarding collecting and shipping specimens to be sent to state or local health departments or CDC once the ship arrives at a U.S. port:

- Vesicular lesions: Remove the top of the vesicle, swab the base vigorously enough to ensure cell collection, put the dry swab into a snap-cap tube or other closable container, and ship at room temperature.
- Scabs: Collect several dry scabs from crusted-over lesions and place each in a separate, small Ziploc© bag or other container for shipping. No transport medium is needed, and specimens may be stored indefinitely at room temperature.

Additional resources on laboratory testing for varicella are available at: http://www.cdc.gov/chickenpox/lab-testing/collecting-specimens.html.

Management of passengers with varicella upon disembarkation

A cruise ship passenger with varicella whose lesions have not crusted over should be advised to wear clothes that cover the lesions (e.g., long sleeves, long pants). Persons with varicella should stay in home or hotel isolation in the city of disembarkation and should not travel until all lesions have crusted over or no new lesions appear within a 24-hour period.

The CDC Quarantine Station with jurisdiction over the port of entry will notify local public health authorities if varicella is a reportable disease in that state.

Crew members should remain in shipboard isolation until their rash has crusted over or no new lesions appear within a 24-hour period.

4. Managing passengers and crew members following exposure to an ill person

Identify all passengers and crew members who may have been exposed to a person suspected of having varicella.

Varicella case contact — a person who has had ≥5 minutes of direct face-to-face contact with a varicella case during the infectious period, from 1 to 2 days before rash onset until lesions are crusted (generally 4-6 days after rash onset).

Assess crew members and passenger contacts for evidence of immunity to varicella. Evidence of immunity includes:

- Written documentation of receipt of two doses of varicella-containing vaccine; OR
- Serologic evidence of immunity or confirmed disease; OR
- Birth in the United States before 1980; OR
- A diagnosis or history of varicella or herpes zoster verified by a health-care provider or the cruise ship clinician based on the patient's description of the illness.

Recommend contacts among passengers and crew members monitor their health for up to 21 days after the last exposure to an active case and report fever or rash to the shipboard infirmary immediately.

Identify high-risk crew members and passenger contacts without evidence of immunity (i.e., pregnant, immunosuppressed with HIV infection, those with a malignant condition affecting the bone marrow or lymphatic systems, or persons taking oral steroids or other immunosuppressant medications).

Provide postexposure prophylaxis (as indicated below) to all susceptible contacts.

Postexposure prophylaxis (PEP)

Varicella vaccine

To prevent illness, a first dose of varicella vaccine should be administered within **3 days of exposure** (possibly up to 5 days) to all susceptible contacts who lack evidence of immunity except those who are pregnant or immunosuppressed.

A second dose should be given at the ACIP-recommended intervals:

- At least **3 months** for persons aged <13 years
- At least **4 weeks** for persons aged ≥13 years. Only single-antigen varicella vaccine may be used for vaccination of persons in this age group.

Vaccination is still recommended beyond 5 days to prevent infection from future exposures and further spread of disease. Susceptible contacts with written documentation of receipt of one dose of varicella vaccine may be vaccinated with a second dose—except for those who are pregnant or immunosuppressed—if the time interval between doses is appropriate, following the manufacturer's dosing schedule.

Varicella zoster immune globulin (VZIG)

High-risk contacts for whom varicella vaccine is contraindicated (i.e., pregnant women or immunosuppressed persons) should be evaluated for administration of VZIG. VZIG should be administered as soon as possible but may be effective if administered as late as 10 days after exposure.

VZIG can be obtained in the United States under an Investigational New Drug protocol and is available on an as-needed basis: http://www.cdc.gov/Mmwr/preview/mmwrhtml/mm5508a5.htm.

If administration of VZIG is needed, contact CDC for further assistance with management of persons receiving VZIG.

Surveillance and Management of Contacts

Susceptible crew members who receive the first dose of varicella vaccine within 3 days of exposure may return to work

immediately after vaccination. Persons receiving varicella vaccine do not need to be separated from others but should be monitored daily for signs and symptoms of varicella for up to 21 days after their last exposure to an active varicella case. Active surveillance of crew members requires that supervisors question all susceptible crew member contacts **daily** about the presence of a fever or rash. If the exposure date is unknown, active surveillance should be conducted through 27 days after rash onset of the last case (i.e., one incubation period after the end of the infectious period of the last case).

From the 8th through the 21st day (or 28 days if VZIG is received) after last exposure to the case, susceptible crew members who do not receive varicella vaccine and persons who receive VZIG should have no passenger contact, minimize contact with other crew members, and be placed under active surveillance for signs and symptoms of varicella. Contact with other crew members during this period should be limited to those who have evidence of immunity to varicella.

Isolate any crew member who develops a fever within 21 days (or 28 days if VZIG is received) after contact with a varicella case and observe for rash onset. If a rash develops, then continue isolation until all lesions are crusted or no new lesions appear within a 24-hour period. If a rash does not develop within 2 days of fever onset, the crew member may be released from isolation but should minimize contact with others and continue active surveillance until a total of 21 days (or 28 days if VZIG is received) has passed since exposure.

Conduct passive surveillance for rash illness aboard the ship until 27 days after the rash onset date of the last case. Passive surveillance is defined as monitoring clinic visits for rash illnesses suggestive of varicella.

Preventing varicella in crew members

Crew members whose work activities involve contact with ill passengers or crew members should have evidence of immunity to varicella. The following precautions are recommended for all persons who come in contact with varicella cases, regardless of immune status.

Standard precautions (apply to all patients, regardless of suspected or confirmed diagnosis or presumed infection status):

- Practice good hand hygiene. Wash hands often for at least 20 seconds with soap and warm water. If soap and water are not available and hands are not visibly soiled, an alcohol-based hand cleaner can be used as an interim measure.
- Avoid direct contact with the ill person while interviewing, escorting, or providing other assistance.
- Keep interactions with ill persons as brief as possible.
- Limit the number of persons who interact with ill persons. To the extent possible, the ill person should receive care and meals from a single person.
- Ask the ill person to follow good cough and sneeze etiquette and hand hygiene and to wear a face mask while in contact with others, if it can be tolerated.
- If a face mask cannot be tolerated, provide tissues and ask the ill person to cover his or her mouth and nose when coughing or sneezing. Used tissues should be disposed of immediately in a disposable container (plastic bag) or a washable trash can.

Contact precautions (intended to prevent transmission of

infectious agents, including epidemiologically important microorganisms, which are spread by direct or indirect contact with the patient or the patient's environment):

- Standard precautions
- Gloves: crew members should wear impermeable, disposable gloves if they need to have direct contact with ill persons or potentially contaminated surfaces, rooms, or lavatories used by ill passengers and crew members. Crew members should wash their hands with soap and water after removing gloves. Gloves should be discarded in the trash and should not be rewashed or saved for reuse. Crew members should avoid touching their faces with gloved or unwashed hands.

Airborne precautions:

- Standard precautions
- In physician offices and similar settings, masking the patient, placing the patient in a private room with the door closed, and providing N95 or higher-level respirators or masks for health-care personnel will reduce the likelihood of airborne transmission.
- Use of N95 respirators or face masks is not generally recommended for cruise ship crew members for general work activities.
- Whenever possible, nonimmune health care workers should not care for patients with airborne vaccine-preventable diseases (e.g., measles, mumps, and varicella).

For additional information, please refer to the 2007 Guideline for Isolation Precautions: Preventing Transmission of Infectious Agents in Healthcare Settings, located at: http://www.cdc.gov/hicpac/2007IP/2007ip_part1.html

5. Additional recommendations

Medication and supplies

Ships should ensure availability of conveniently located dispensers of alcohol-based hand cleaner; where sinks are available, they should ensure that supplies for hand washing (i.e., soap, disposable towels) are consistently available.

Ships should carry a sufficient quantity of medical supplies to meet day-to-day needs. Contingency plans are recommended for rapid resupply in outbreak situations.

Cleaning and disinfection

Environmental management of varicella should include routine cleaning and disinfection strategies, as well as more frequent cleaning of commonly touched surfaces, such as handrails, countertops, and doorknobs.

- Ship-wide cleaning or disinfection is not recommended.
- Clean articles soiled by discharges from the patient's nose and throat with soap and water and disinfect by using an alcohol- or chlorine-based disinfectant or ordinary cleaning or disinfecting solutions.

For additional recommendations on infection control practices by CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC), please refer to the Guidelines for Environmental Infection Control in Health-Care Facilities, located at: http://www.cdc.gov/mmwr/preview/mmwrhtml/rr5210a1.htm.

Reporting

Quarantine regulations found in the U.S. Code of Federal

Regulations (CFR) Title 42, Part 71 require ships destined for a U.S. port of entry from a foreign country or possession to report to the CDC Quarantine Station at or nearest the next intended U.S. port of arrival any shipboard death or reportable illness among passengers or crew, including passengers or crew who have disembarked or who have been removed.

The Maritime Illness and Death Reporting System (MIDRS) website (https://wwwn.cdc.gov/midrs/) is the preferred method of reporting varicella cases. Ships may also submit death and illness reports via e-mail (midrs@cdc.gov) or phone to the nearest quarantine station with jurisdiction over the arriving port of entry (http://www.cdc.gov/quarantine/QuarantineStationContactListFull.html).

The CDC Quarantine Station of jurisdiction will continue to review and evaluate varicella reports; however, for routine cases this web guidance should be sufficient for the ship to conduct case and contact management. Under certain conditions, additional quarantine station involvement may be indicated. Criteria for an enhanced response include but are not limited to:

- Cruise line requests CDC assistance
- Varicella cases exhibit atypical clinical characteristics, including greater than expected severity of illness.
- Any death attributed to varicella disease
- Ship requires assistance for vaccine or VZIG acquisition or administration
- A sustained outbreak involving one or more voyages

For questions concerning this guidance, contact:

Maritime Administrative Support
MaritimeAdmin@cdc.gov
888-892-1320

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National Center for Emerging and Zoonotic Infectious Diseases (NCEZID)
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Centers for Disease Control and Prevention 1600 Clifton Rd. Atlanta, GA 30333, USA
800-CDC-INFO (800-232-4636) TTY: (888) 232-6348 - Contact CDC–INFO