

## **Working with *Vibrio Cholerae* and Post Exposure Plan (PEP).**

### **Background**

*Vibrio cholerae* is a Gram-negative, non-spore forming, curved rod bacterium. Certain toxigenic strains cause the disease cholera, while non-toxigenic strains may result in mild or asymptomatic gastrointestinal illness. Serogroups O1 and O139 are primarily responsible for cholera outbreaks. Symptoms of infection include abrupt onset of watery diarrhea (a grey and cloudy liquid), occasional vomiting, and abdominal cramps. Outside of the laboratory, human infection is normally caused by consumption of undercooked or raw seafood or drinking contaminated water. Disease symptoms are caused by the cholera toxin (CT), a protein secreted by the bacterium.

### **Modes of Transmission**

*Vibrio cholerae* infection may occur through:

- Accidental ingestion of the bacteria from contaminated surfaces or hands.
- Mucous membrane exposure of the eyes, nose, and mouth through direct contact or potential aerosolization during procedures like centrifugation or vortex mixing.
- Dermal inoculation via sharps (needle-sticks), through scratches, cuts, abrasions, dermatitis or other lesions.
- Handling contaminated animals or bedding and self-inoculating through one of the methods listed above.

### **Incubation Period**

Ranges from a few hours to 5 days for symptoms to appear after infection.

### **Laboratory Hazards**

Risks include direct contact with skin and mucous membranes of the eye, nose and mouth, parental inoculation, and ingestion. Laboratory activities and conditions that can lead to exposure risks include:

- High energy, aerosol-generating activities (centrifugation, sonication, high-pressure systems, vortexing, tube cap popping)
- Handling of sharps (needles, scalpels, microtome blades, broken glass, etc.)
- Splash/droplet-generating activities (shaking incubators, liquid culturing, mechanical pipetting)
- Inadvertent equipment contamination
- Exposed skin/uncovered wounds/broken or chapped skin

- Handling/touching contaminated feces and naturally or experimentally infected animals without personal protective equipment and good hand hygiene.
- Working with the bacteria outside of the biosafety cabinet

## **Signs and Symptoms**

Infection with *Vibrio cholerae* may be asymptomatic or result in mild to severe gastrointestinal illness. Symptoms may include watery diarrhea, vomiting, and abdominal cramps. Severe illness with toxigenic strains may lead to dehydration if untreated. Other symptoms include dry mucous membranes, decreased skin turgor, sunken eyes, hypotension, weak or absent radial pulse, tachycardia, tachypnea, hoarse voice, oliguria, cramps, renal failure, seizures, somnolence, coma and death. The disease is particularly dangerous for pregnant women and their fetuses during late pregnancy as it can cause premature labor and fetal death.

## **Vaccines**

The U.S. Food and Drug Administration (FDA) has approved a single-dose, live oral cholera vaccine, Vaxchora, for use in the United States.

For individuals working with toxigenic strains of *Vibrio cholerae* and performing procedures with high potential for exposure, vaccination with Vaxchora may be considered following Occupational Health risk assessment.

UCR Occupational Health maintains a service agreement with Riverside Medical Clinic to provide the Vaxchora vaccine to researchers working with *Vibrio cholerae*.

To request a referral, please contact Occupational Health at [ehsochealth@ucr.edu](mailto:ehsochealth@ucr.edu) for additional information. Individuals who elect to not receive the vaccine, following the Occupational Health Surveillance System (OHSS) medical assessment, may complete a Vaxchora declination form. All declinations must be submitted through the Enterprise Health electronic medical record (EMR) system.

## **Treatment**

Cholera can be successfully treated by immediate replacement of fluid and salts lost through diarrhea. Severe cases also require intravenous fluid replacement. With prompt appropriate rehydration, less than 1% of cholera patients die. Antibiotics, typically fluoroquinolones or tetracyclines, can shorten the course and diminish the severity of the illness.

## **Biosafety Requirements and Procedures**

### **Physical Containment**

Risk Group 2 classification is applied to wild-type *Vibrio cholerae*. Research can safely be performed by using standard Biosafety Level 2 (BSL-2) facilities, practices, and procedures with the aid of personal protective equipment (PPE) and a certified biosafety cabinet or comparable engineering controls. ABSL-2 practices, containment equipment, and facilities are recommended with naturally or experimentally infected animals. The Institutional Biosafety Committee (IBC) may increase containment and practice requirements based on assessment of work with elevated risks (e.g. genetic modification, deliberate aerosolization, etc.).

### **Personal Protective Equipment (PPE)**

Standard laboratory personal protective equipment including a lab coat, eye protection, disposable gloves, long pants and closed-toed shoes must be worn when handling *Vibrio cholerae* and cholera treated materials.

Depending on the research activities being performed, a fit-tested respirator (N95, etc.) may also be recommended or required.

### **Spills**

#### **Biological Agent Spill within a Biosafety Cabinet**

1. Keep the biosafety cabinet on.
2. Don appropriate PPE for cleaning up the spill (gloves, lab coats, safety goggles, etc.).
3. Place absorbent materials on and around the spill (e.g., paper towels).
4. Apply an effective disinfectant (e.g., 1:10 dilution of bleach) to the spill and allow it to sit for the appropriate contact time (e.g., 15-30 minutes for bleach). Avoid splashing and creation of aerosols.
5. Clean/Wipe the spill area
6. Check the spill tray under the front grille for any residue.
7. Dispose waste into red biohazard bag.
8. Clean the area again (if using bleach as a disinfectant, do a final wash of the area with 70% alcohol or water to prevent corrosion of your biosafety cabinet).
9. Remove PPE.
10. Wash hands with soap and water.
11. Report the spill to your PI/Lab Manager/Supervisor

#### **Biological Agent Spill Outside of a Biosafety Cabinet (BSL-2 Laboratories):**

1. Notify all personnel in the area that a spill has occurred and evacuate everyone in the vicinity.

2. Close the door
3. Remove any contaminated clothing and wash exposed areas with mild soap and water for 15 minutes.
4. Report details and/or request assistance.
  - i. EHSRM During business hours (951) 827 – 5228
  - ii. UCPD Non-Emergency/ Non-Business Hours (951) 827 – 5222
  - iii. UCPD Emergency 9-1-1
5. Wait 30 minutes to allow aerosols to settle or vent.
6. Don appropriate PPE for cleaning up the spill (e.g., gloves, lab coat, safety eyewear).
7. Place absorbent materials on and around the spill (e.g., paper towels).
8. Apply an effective disinfectant (e.g., 1:10 dilution of bleach) to the spill and allow it to sit for the appropriate contact time (e.g., 30 minutes for bleach). Avoid splashing and creation of aerosols.
9. Clean/Wipe the spill area.
10. Dispose waste into red biohazard bag.
11. Clean the area again.
12. Remove PPE.
13. Wash hands with soap and water.
14. Report the spill to your PI/Lab Manager/Supervisor.

### **Disinfection and Inactivation**

Cholera can be effectively inactivated by exposure to 10% bleach solution. Bleach solution is recommended to be made fresh daily and contact time must be 30 minutes. Autoclaving at 121 degrees Celsius and 15psi for one hour is also effective.

Follow disinfection/inactivation protocols approved by the Institutional Biosafety Committee (IBC) and/or Institutional Animal Care and Use Committee (IACUC) as outlined in your Biological Use Authorization (BUA) and/or Animal Use Protocol (AUP), respectively.

### **Laboratory Practices**

- Standard microbiological and BSL-2 practices including all work with *V. cholerae* performed inside a certified biosafety cabinet.
- A BSL-2/ABSL-2 door sign is posted on the laboratory door when *V. cholerae* is being stored or in use.
- Animal cages must be labeled to identify inoculated animals and include the pathogen name, date of inoculation, and the biohazard symbol.
- Cage changes for infected animals must occur in a biosafety cabinet.
- Use of engineered or safety sharps whenever possible.

## Waste Disposal Procedures

- Sharps Waste: Place all sharps in red sharps container that is rigid, leak proof, and has the international biohazard symbol. Do not recap needles. Once  $\frac{3}{4}$  full or at the fill line, close and secure the lid. Closed and secured sharps containers can be placed in the EHSRM provided biohazardous waste collections bins for pickup and disposal. Additional sharps containers can be requested for free from EHSRM.
- Solid Waste: Label a dual-test compliant red biohazard bag with PI name, building and room number before filling it. Bag should be placed in a hard-walled, leak-proof container with a tight fitting lid before adding waste. Within 7 days of first waste generation or once bag is  $\frac{3}{4}$  full, whichever is earlier, close the bag and transfer to EHSRM provided biohazardous waste collection bin.
- Liquid Waste: Prepare a compatible waste bottle with a tight fitting cap. Add enough undiluted bleach to the bottle to achieve 10% final concentration of bleach (1 part bleach: 9 part liquid waste). Cap tightly, invert, and gently mix contents to ensure bleach contacts all inner surfaces of the bottle. Let bottle sit for appropriate contact time (30 minutes) before pouring down laboratory sink drain followed by copious amounts of water to flush the pipes. If using another liquid disinfectant, create and affix Waste Accumulation Storage Tracking electronically (WASTE) label to bottle and dispose of as chemical waste following the WASTE process.
- Animal Bedding, Waste and Caging Equipment: Follow vivaria standard operating procedures for disinfection of reusable caging equipment prior to cage washing or dispose of disposable cages as biohazardous waste. Bedding and other waste in contact with animals or their excretions should be disposed of as biohazardous waste.
- Animal Carcasses: Dispose of carcasses as pathological biohazardous waste.

## Immediate Response Following Exposure

- Eyes or Mucous Membrane Exposure from Splash or Aerosols - rinse a minimum of 15-minutes using eye wash and report to your supervisor immediately. Follow *Reporting Exposure Incidents* protocol.
- Skin Contamination - Wash affected areas with soap and water for 15-minutes and report the incident to your supervisor immediately. Follow *Reporting Exposure Incidents* protocol.
- Needlestick and/or Sharps Exposure – Wash and express wound with soap and water for 15 minutes. Immediately notify your supervisor. Follow *Reporting Exposure Incidents* protocol.

## Post-Exposure Medical Monitoring

Individuals with a known or suspected exposure to *Vibrio cholerae* should:

- Monitor for symptoms for up to 5 days following exposure.
- Report watery diarrhea, vomiting, abdominal cramps or fever immediately to Occupational Health and your primary care physician.
- Maintain adequate hydration if gastrointestinal symptoms develop.
- Avoid laboratory work and food handling duties if symptomatic until medically cleared.

## Reporting Exposure Incidents

Any exposure incidents such as with eyes, nose, mouth, skin contamination, needlestick and/or sharps exposure—must **be immediately reported** to:

- **Your PI or laboratory supervisor**
- **UCR Biosafety Officer (BSO) and EHSRM at (951) 827-5528** or using the [online reporting link](#) at the top of the [EHSRM webpage](#).
- **Occupational Health [ehsocchealth@ucr.edu](mailto:ehsocchealth@ucr.edu)**
- **You may contact the UCI Medical Center Infectious Disease Fellow on call at 714-456-6011 for immediate counseling and guidance. UCR maintains an agreement with the UCI Center for Occupational and Environmental Health (COEH) Clinic, which serves as our Occupational Health provider and reviews UCR's Animal Occupational Health Program.**

Undergraduate Student Employees report your injury to your supervisor (or go to [Employee Injuries](#)).

For life-threatening injuries, call 911 immediately.

For all other injury types, seek Medical Treatment at UCR's preferred Occupational Clinics. Visit the [Medical Treatment Facilities](#) webpage to learn more about where to seek medical treatment.

## References

Cornell University Environment, Health and Safety. "[Vibrio spp. \(cholerae, vulnificus, parahaemolyticus\) Biological Agent Reference Sheet \(BARS\)](#)." Environment, Health and Safety, Cornell University, 30 Nov. 2023. Accessed 6 Apr. 2026.

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The George Washington University Office of Research Safety. "[Vibrio cholerae \(VC\)](#)." Pathogen Data Sheets, The George Washington University. Accessed 6 Apr. 2026.

University of California, Riverside, Environmental Health & Safety. [Bloodborne Pathogens and ATD Exposure Control Plan](#). 2020. Accessed 6 Apr. 2026.

University of South Carolina, Environmental Health and Safety. "[Cholera Toxin Safety Guide](#)." University of South Carolina, n.d. Accessed 6 Apr. 2026

University of Wisconsin–Madison, Office of Biological Safety. "[Biological Toxin Guidance: Cholera Toxin](#)." Environment, Health & Safety, 2023. Accessed 6 Apr. 2026



**University of California, Riverside  
BIOLOGICAL AGENT CARD**



**My job requires me to work with *Vibrio Cholerae* and animals orally injected with it.**

If the person with this card exhibits any of the symptoms listed on the back, immediately contact the UCI Medical Center Infectious Disease Fellow on call at (714) 456-6011. For immediate medical counseling on what to do right away, proceed to the nearest Emergency Department and present this card. For more information or to report an incident call: UC Riverside, Occupational Health, at (951) 827-5528.

***Vibrio Cholerae*** can enter the body through direct contact, mucous membranes, animal bites, ingestion, and percutaneous.

**INCUBATION PERIOD:** Ranges from a few hours to 5 days for symptoms to appear after infection.

**SYMPTOMS:** Gastrointestinal symptoms (i.e., loss of appetite, nausea, vomiting, diarrhea), Neurological symptoms (i.e., loss of sensation, ataxia), Reproductive Health concerns (i.e., abortion, fetal abnormalities)

**TREATMENT:** Formal medical advice is obtained through medical consultations with occupational health provider or primary healthcare provided as needed.

**Acknowledgement of Working with Vibrio Cholerae**

By signing below, I confirm that I have reviewed and understood the requirements for working with Vibrio Cholerae I agree to comply with all outlined responsibilities, including:

- Following safe laboratory practices and use of appropriate PPE
- Applying proper first aid and decontamination procedures in the event of an exposure
- Promptly reporting any exposures, incidents, or safety concerns to my supervisor, Biosafety Officer, and Occupational Health

Name (Print)	Identification *	Signature	Date	Supervisor / Principal Investigator

\*Identification: Provide your UCR Student ID, Employee ID, UCR NetID, UCR Email, or Date of Birth.