

IN THIS ISSUE: CHOLERA

An Overview of Cholera

Introduction

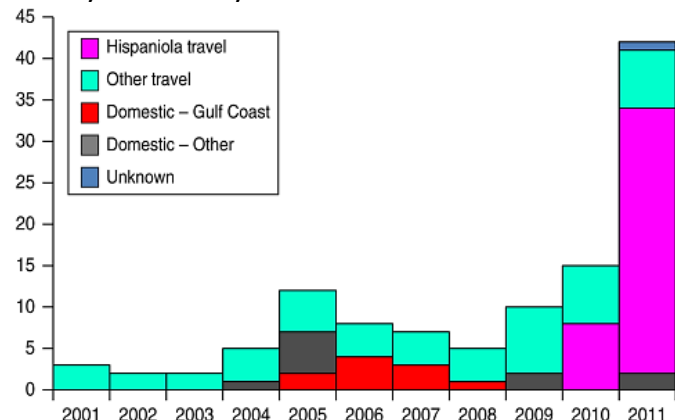
The World Health Organization (WHO) reports approximately 1.3 to 4.0 million cases of cholera, and 21,000 to 143,000 deaths occur worldwide each year.<sup>1</sup> This is a disease that disproportionately affects developing nations as they often lack access to sanitary water and ability to engage in proper hygiene.<sup>1</sup> A global pandemic of cholera has been affecting parts of Asia, Africa, and Latin America for the past 60 years.<sup>4</sup>

Epidemiology

Cholera is an intestinal illness caused by the bacteria *Vibrio cholerae* (*V. cholerae*) serogroup O1 or O139.<sup>1,3</sup> These two serogroups are toxigenic strains and are responsible for causing widespread epidemics.<sup>1</sup> Watery diarrhea is a defining characteristic of cholera, but not all infected persons exhibit symptoms.<sup>3,4</sup> Those who do experience symptoms run the risk of severe dehydration and death within hours if left untreated.<sup>1,3</sup>

Cholera is contracted by ingesting food and/or water contaminated with feces containing the bacteria.<sup>3</sup> Humans are the only known host, but *V. cholerae* is found naturally in brackish and coastal waters.<sup>1,3,4</sup> Spread of cholera is more likely to occur in locations with poor waste and water management systems.<sup>1,3</sup> Because of this, cholera is a public health indicator of inequity and poor social development.<sup>1</sup>

Figure 1: Number (N=111) of cholera cases by year and source, 2001-2011, United States



Source: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4615619/>

Though prevalent in the 1800's, cases of cholera have become rare in the United States (U.S.) due to improvements in water and sewage management systems.<sup>2,3</sup> The Centers for Disease Control and Prevention (CDC) reports 0-5 cases of cholera per year, where most cases are linked to travel and consumption of contaminated seafood.<sup>5</sup> Increases in cases have been observed in the U.S. since 1991 because of the ongoing global pandemic. The 2010 *V. cholerae* serogroup O1 outbreak on the island of Hispaniola resulted in at least 40 U.S. cases of cholera – all linked to travel or ingestion of contaminated food.<sup>4,6</sup>

Risk Factors & Prevention

People who are the most at risk of contracting cholera are those traveling to or residing in an area with an ongoing cholera activity.<sup>3</sup> The best way to prevent contracting the illness in a high-risk location is to:<sup>3</sup>

- Use water from sealed bottles or that has been boiled or chemically treated for drinking, washing dishes, brushing teeth, and food preparation.
- Avoid tap water, fountain drinks, and drinks with ice cubes.
- Wash hands with soap and clean water often or use a hand sanitizer with at least 60% alcohol.
- Eat pre-packaged food or food that has been completely cooked and served hot. Avoid raw or undercooked meats, seafood, and produce (unless peeled).
- Properly dispose of feces so not to contaminate food and water sources.

Cholera is a vaccine preventable disease. Vaxchora<sup>®</sup> is an FDA-approved single-dose live vaccine recommended for adults aged 18-64 traveling to areas of high cholera incidence.<sup>3</sup> Other vaccines approved by the WHO, which are not available in the U.S., include Dukoral<sup>®</sup>, ShanChol<sup>®</sup>, and Euvichol-Plus<sup>®</sup>/Euvichol.<sup>3</sup>

## Signs & Symptoms

Once exposed to cholera, it can take 12 hours to 5 days for symptoms to show, with an average of 2-3 days.<sup>1,3</sup> Symptoms may range from mild to severe and may last up to 3-7 days. Although, most people are asymptomatic, they can still shed the bacteria in their feces for up to 10 days.<sup>1,3</sup> Those who do present with symptoms may experience the following:<sup>3,4</sup>

- Watery diarrhea
- Vomiting
- Leg cramps
- White-tinged stool with small flecks of mucus (rice-water appearing)

**Figure 2: Rice-water like stool from a cholera patient**



Source: [https://publications.aap.org/view-large/figure/8964301/152\\_08.jpeg](https://publications.aap.org/view-large/figure/8964301/152_08.jpeg)

Severe symptoms of watery diarrhea can result in rapid dehydration and death. Individuals with blood type O and low hydrochloric acid are at a greater risk of experiencing severe cholera illness.<sup>4,5</sup>

## Diagnosis & Testing

Cholera is difficult to distinguish from other diarrheal pathogens without a lab test. Stool culture is the gold standard for diagnosis of cholera; however, vomitus can also be cultured.<sup>4,7</sup> Cary Blair is the optimal media transport and thiosulfate-citrate-bile salt agar the ideal culture plate for cholera isolates.<sup>7</sup> All state public health laboratories have the reagents for serogrouping *V. cholerae* isolates.<sup>7</sup> Isolates should be forwarded to the CDC for toxin-testing and subtyping.<sup>7</sup>

Rapid tests are available, but the sensitivity and specificity of these test are less accurate.<sup>4</sup> Stool culture should be used to confirm a rapid positive test of *V. cholerae* O1 and O139.<sup>4</sup>

The CDC provides serum antibody testing of *V. cholerae* with pre-approval.<sup>4</sup> Acute and convalescent serum specimen submissions are required.<sup>4</sup> Acute

specimens should be collected within the first week of illness onset, while convalescent within 3-4 weeks.<sup>8</sup> A fourfold increase of antibody titer between the two specimens is indicative of cholera.<sup>4</sup>

## Treatment

Immediate fluid and salt replacement is the recommended treatment for patients and can reduce the mortality of cholera from 10% to 0.5%.<sup>3,4</sup> Oral rehydration solution is the standard treatment, but intravenous fluid placement can also be used.<sup>3,4</sup> The WHO endorses initiating rehydration treatment within 3-4 hours of symptom onset.<sup>4</sup>

Antibiotic treatment should be reserved for individuals with moderate to severe cholera symptoms.<sup>4</sup>

Treatment can lower duration of symptoms and the number of bacteria shed.<sup>4</sup> For a list of antibiotic therapy for cholera, please see the table at the end of this report.

## Reporting

The list of reportable communicable diseases and reporting forms can be found at:

<http://tinyurl.com/WashoeDiseaseReporting>

Report communicable diseases to the Washoe County Health District. To report a communicable disease, please call 775-328-2447 or fax report to 775-328-3764.

## Acknowledgement

Thanks to all health care providers, infection control practitioners, laboratory staff, schools, and daycares for reporting and collaboration to make this work possible.

## References

1. The World Health Organization. Cholera. Accessed January 2022 <https://www.who.int/news-room/fact-sheets/detail/cholera>.
2. Dunkin, Mary. Cholera. (2021, July 25). Accessed January 2022 <https://www.webmd.com/a-to-z-guides/cholera-faq>.
3. The Centers for Disease Control and Prevention. Cholera – *Vibrio cholerae* infection: General Information. Accessed January 2022 <https://www.cdc.gov/cholera/general/index.html#one>.
4. American Academy of Pediatrics. Committee on Infectious Diseases. Red Book: 2021-2024 Report of the Committee on Infectious Diseases.
5. The Centers for Disease Control and Prevention. Cholera – *Vibrio cholerae* infection: Sources of Infection & Risk Factors. Accessed January 2022 <https://www.cdc.gov/cholera/infection-sources.html#:~:text=A%20person%20can%20get%20cholera,shellfish%20that%20are%20naturally%20contaminated>.
6. Loharikar A, Newton AE, Stroika S, et al. Cholera in the United States, 2001-2011: a reflection of patterns of global epidemiology and travel. *Epidemiol Infect.* 2015;143(4):695-703. doi:10.1017/S0950268814001186
7. The Centers for Disease Control and Prevention. Cholera – *Vibrio cholerae* infection: Diagnosis and Detection. Accessed January 2022 <https://www.cdc.gov/cholera/diagnosis.html>
8. Lew JF, LeBaron CW, Glass RI, Török T, Griffin PM, Wells JG, Juraneck DD, Wahlquist SP. Recommendations for collection of laboratory specimens associated with outbreaks of gastroenteritis. *MMWR Recomm Rep.* 1990 Oct 26;39(RR-14):1-13. PMID: 2172760.

**Table 1: Antibiotics for Suspected Cholera**

Antibiotic	Pediatric Dose <sup>a</sup>	Adult Dose	Comment(s)
Doxycycline	4.4 mg/kg, single dose	300 mg, single dose	Use should be in epidemics caused by susceptible isolates. Not recommended for pregnant women.
Ciprofloxacin <sup>b</sup>	15 mg/kg, twice daily for 3 days (single dose 20 mg/kg has been used)	500 mg, twice daily for 3 days	Decreased susceptibility to fluoroquinolones is associated with treatment failure. Ciprofloxacin is not recommended in children and pregnant women.
Azithromycin	20 mg/kg, single dose	1 g, single dose	
Erythromycin	12.5 mg/kg, 4 times/day for 3 days	250 mg, 4 times/day for 3 days	
Tetracycline <sup>c</sup>	12.5 mg/kg, 4 times/day for 3 days	500 mg, 4 times/day for 3 days	

<sup>a</sup>Not to exceed adult dose.

<sup>b</sup>Fluoroquinolones are not approved for children for children younger than 18 years for this indication.

<sup>c</sup>For use in children ≥8 years.

Source: <https://publications.aap.org/redbook/book/347/chapter/5758157/Cholera-Vibrio-cholerae>