



# Cholera Vaccine for Travelers

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# Conflicts of Interest

- None

# Funding Sources

- None

# Information about the Webinar

- 15 interactive questions:
  1. Assess knowledge regarding cholera, cholera vaccines, and the Advisory Committee on Immunization Practices cholera vaccine guidance
  2. Learn if providers use CDC resources to help make clinical recommendations or influence cholera vaccine prescribing practices
  3. Gain insight on how CDC's cholera vaccine surveillance system recommendations are interpreted by healthcare providers

# Answering Webinar Questions

- Answering honestly will help us improve the way CDC reaches providers with recommendations
- Questions will be asked before the relevant information is presented
  - Correct answers will be provided throughout the webinar
- For almost all questions, there is a “Don’t Know” response
  - Don’t guess!
- Responses will NOT be tracked to an individual participant

# Cholera Biology

# *Vibrio cholerae* Microbiology

- Gram-negative bacteria
- Rod-shaped
- Single flagellum



Not all *Vibrio cholerae* is cholera



# *Vibrio cholerae*

- Many different serogroup strains
- Some serogroups include toxigenic strains; most serogroups are non-toxigenic
- All strains can cause diarrheal disease
- Only toxigenic strains in two serogroups have caused epidemic cholera





# Question 1

- Which of the following *Vibrio cholerae* serogroups does NOT cause the disease “cholera”?
  - A) O1
  - B) O139
  - **C) O141**
  - D) Don't know

# *Vibrio cholerae* Microbiology

- >200 serogroups defined by O-antigen structure
  - Toxigenic strains in these two serogroups cause cholera:
    - **O1**
      - Two biotypes: Classical and El Tor
        - » Two serotypes: Inaba and Ogawa
    - **O139**

## Question 2

- How is cholera transmitted?
  - **A) Fecal-oral**
  - B) Vector-borne
  - C) Airborne
  - D) Inoculation of skin
  - E) Don't know

# Modes of Cholera Transmission

## 1. Fecal-oral

- Water
- Food
- Fish or raw shellfish

## 2. Person-to-person (rare)

# Cholera Clinical Presentation

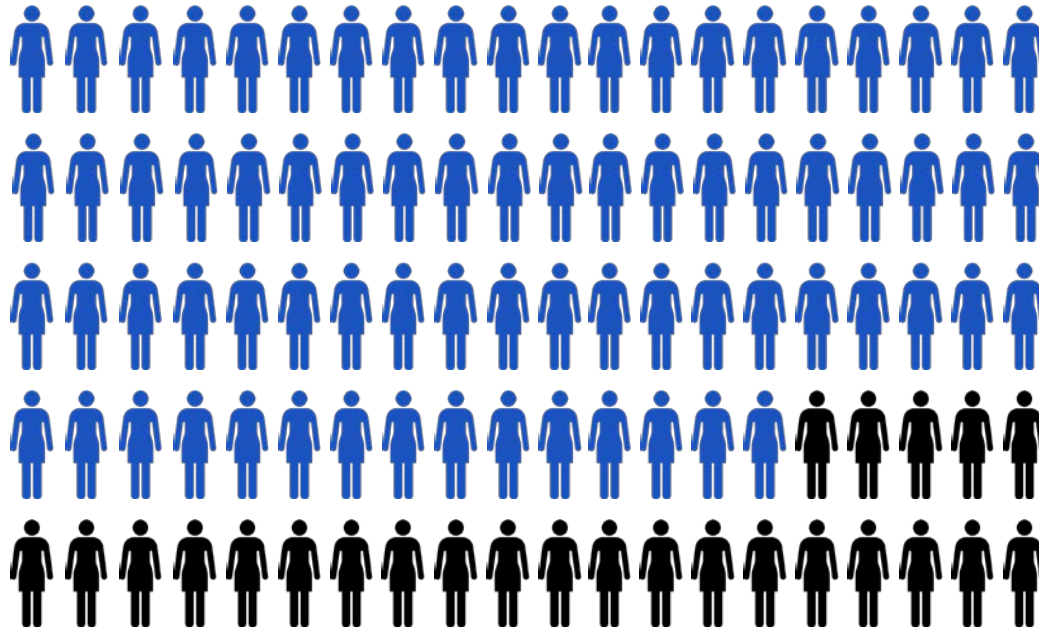
- Incubation period: hours to 5 days
- Duration of illness: 1 to 7 days
- Spectrum of clinical illness
  - Asymptomatic
  - Mild to severe diarrhea
  - Severe hypovolemic shock (cholera gravis)
  - Death

## Question 3

- What percent of people infected with cholera have severe disease?
  - A) 1%
  - B) 5%
  - **C) 10%**
  - D) 50%
  - E) Don't know

# Asymptomatic Cholera

- Approximately 75% of people infected with cholera are asymptomatic.



# Cholera Gravis

- One in ten cholera cases
- Profuse watery diarrhea (can be  $\geq 1$  L/hour)
  - “Rice-water stools” with mucus and epithelial cells
- Vomiting
- Leg cramps
- Severe dehydration: loss of skin turgor, hypotension, weak pulse

**Rapidly fatal if untreated**



# Cholera Diagnosis

- Culture of rectal swab or stool specimen
  - Gold standard
  - Special transport (Cary-Blair) and culture media (TCBS)
- Serology with acute/convalescent titers
- Rapid tests
  - Low sensitivity
  - Low specificity



# Cholera Treatment

- Supportive care: oral (ORS) or IV rehydration
  - Can reduce case-fatality to <1%
- Antibiotics for severely ill
  - Reduce fluid loss, duration of illness, duration of fecal carriage
- Zinc supplements in children reduce duration of illness and diarrhea volume



Photo credit: Flickr Jessica Lucia

# Cholera Epidemiology

## Question 4

- True or false? U.S. travelers who go to countries where there is active cholera transmission are at high risk of getting cholera.
  - A) True
  - **B) False**
  - C) Don't know

# Population-Based Risk of Cholera Illness

- Risk of cholera is very low for most U.S. international travelers
- At higher risk of exposure:
  - Outbreak response workers
  - Healthcare personnel
  - Visiting friends and relatives
  - Traveling or living in cholera-affected areas for extended periods

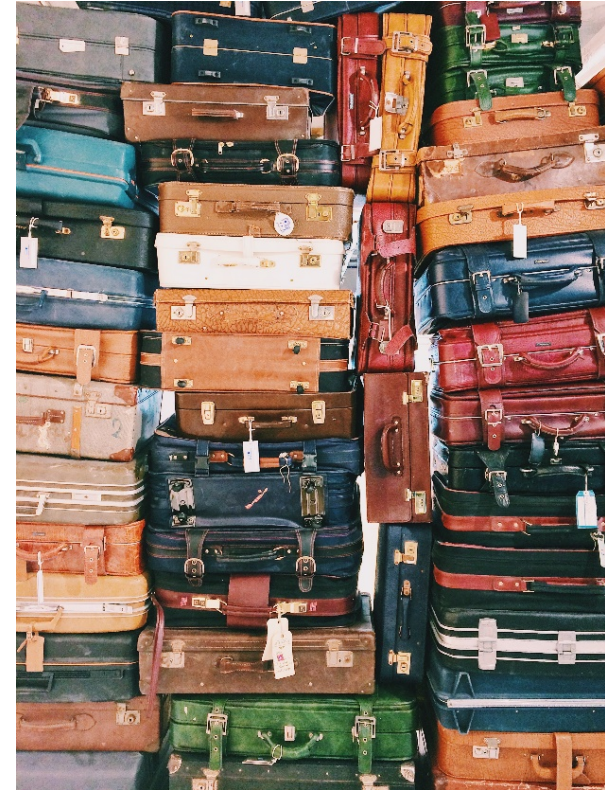


Photo credit: Caroline Selfors on Unsplash

# Cholera Epidemiology: Worldwide

- Endemic in >50 countries
  - Africa
  - South East Asia
  - Hispaniola (Haiti & Dominican Republic)

## Global Cases of Cholera Reported to WHO, 2017

- **34 countries**
  - **1.2 million cases**
  - **5,600 deaths**

## Cholera Epidemiology: United States

**<25** cases/year in the  
U.S. since 2012



# Cholera Epidemiology: United States

- Imported
  - Travel to cholera-endemic areas
  - Southeast Asia, Caribbean
- Domestic
  - Primarily associated with Gulf Coast seafood consumption
- Likely underreported
  - Short incubation period
  - Infections during travel often resolve before return

# How to Minimize Risk of Acquiring Cholera

- Drink and use only boiled, treated, or bottled water
- Eat foods that are packaged or that are cooked and hot (especially seafood)
- Wash hands often with soap and clean water
  - Alcohol-based hand sanitizer
- Use the cholera vaccine

# **Cholera Vaccine for US Travelers**

# Vaxchora

- In June 2016, the U.S. Food and Drug Administration approved Vaxchora (CVD 103-HgR), the first cholera vaccine licensed for use in the United States.

## Question 5

- What kind of vaccine is Vaxchora?
  - A) Killed (inactivated)
  - B) Subunit or conjugate
  - C) Toxoid (inactivated toxin)
  - **D) Live attenuated**
  - E) Don't know

## Question 6

- How is Vaxchora administered?
  - **A) Oral**
  - B) Parenteral (intravenous)
  - C) Subcutaneous
  - D) Intradermal
  - E) Don't know

# Vaxchora Specifics

- Live, attenuated bacterial vaccine
- Oral administration
- Provided in suspension (one single sachet)
- Contains the *V. cholerae* strain CVD 103-HgR
  - Serogroup O1, El Tor
  - Serotype Inaba
- Administer at least 10 days before potential cholera exposure

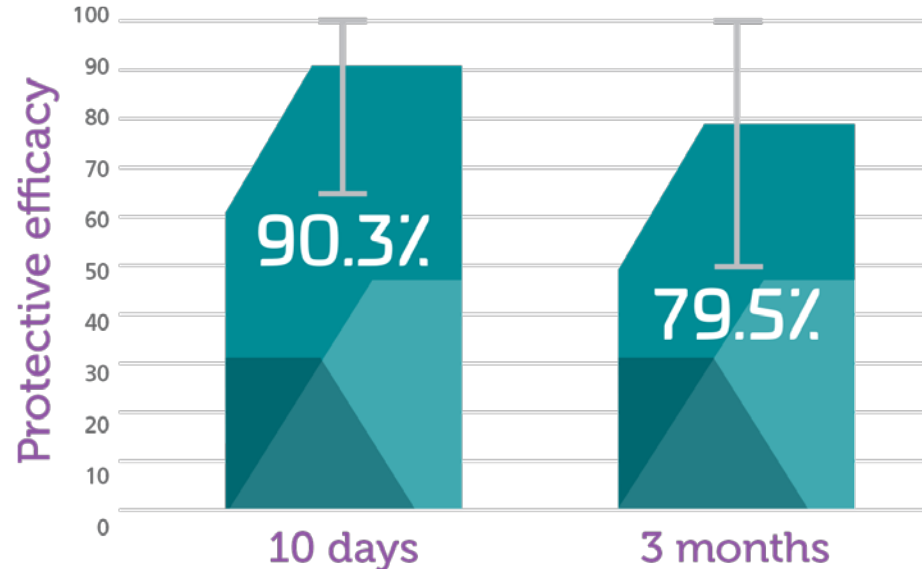
## Question 7

- How long does Vaxchora provide protection against cholera?
  - A) 1 month
  - B) 3–6 months
  - C) 8–12 months
  - D) Over 12 months
  - E) Lifelong immunity
  - **F) Don't know**



# Duration of Vaxchora protection

- Vaxchora efficacy was 90.3% 10 days after vaccination and 79.5% 3 months after vaccination



# Vaxchora protection

- Few side effects
  - Mild GI illness
- No vaccine-related serious adverse events

## Question 8

- What age group is eligible to receive Vaxchora under current FDA licensure?
  - A) All ages
  - B) Persons over the age of 5 years
  - **C) Adults from 18–64 years**
  - D) Don't know

# Vaxchora Age Eligibility

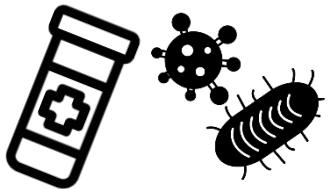
- FDA licensure is for adult travelers < 65 years old
- Information not available for:
  - children < 18 years
  - pregnant or lactating women
  - immunocompromised persons



# Vaxchora Precautions and Contraindications



- Avoid use of chloroquine for 10 days after vaccine administration



- Avoid administration if the patient has received antibiotics in the previous 14 days



- Vaccine strain may be shed in stool; potential for transmission to immunocompromised close contacts



- Should not be given to patients with a severe allergic reaction to an ingredient or other cholera vaccine

**Cholera Vaccine Advisory Committee on  
Immunization Practices (ACIP) Working  
Group**

# Objectives of the Cholera Vaccine ACIP Working Group

- Review evidence for use of Vaxchora
- Inform recommendations for use of Vaxchora in adult travelers

## Question 9

- Per the Advisory Committee on Immunization Practices (ACIP), which of the following travelers should receive oral cholera vaccine?
  - A) A traveler visiting areas with rare or sporadic cholera transmission
  - B) A traveler visiting friends and relatives in a low income country
  - **C) A traveler going to an area with active cholera transmission in the previous 12 months**
  - D) A traveler going to an area with cholera reported anytime in the previous 2 years
  - E) Don't know



# ACIP Working Group Recommendation

- ACIP recommends cholera vaccine for adults (18–64 years) traveling to an area with active toxigenic *Vibrio cholerae* O1 transmission

**What is an “area” with active toxigenic cholera transmission?**

# Definition of “area of active toxigenic cholera transmission” per ACIP

- “a **province, state, or other administrative subdivision** within a country with **endemic or epidemic cholera** caused by toxigenic *V. cholerae* O1 and **includes areas** with cholera activity **within the last year** that are **prone to recurrence of cholera epidemics**; it **does not include** areas where only **rare imported or sporadic cases** have been reported”

# Items to Consider in the Decision to Offer Cholera Vaccine

- Age
- Whether the destination country has active cholera transmission
- Whether the region/province/state within a country has active cholera transmission
- Number of cholera cases in the destination
- Type of travel (e.g., vacation, visiting family, medical mission)
- Availability of medical care at destination
- Risk factors for poor outcome (e.g., low gastric acidity, long distance to a healthcare facility)

## Question 10

- Have you ever offered the Vaxchora oral cholera vaccine?
  - A) Yes
  - B) No
  - C) Don't remember

# **CDC's Role Following the ACIP Guidance**

# CDC and Cholera Vaccine

- Developed cholera vaccine surveillance
  - Listed countries with active toxigenic cholera transmission
  - Provided healthcare providers with information about areas of active toxigenic cholera transmission
- Continued to monitor toxigenic cholera cases among U.S. travelers


# Question 11

- Have you accessed the CDC Traveler's Health destination pages for travel preparation (as either a healthcare provider or traveler) since May 2017?
  - A) Yes
  - B) No
  - C) Don't remember

The screenshot shows the CDC Traveler's Health website interface. At the top, the CDC logo and tagline "Centers for Disease Control and Prevention" are visible, along with a search bar and a "CDC A-Z INDEX" dropdown. The main heading is "Travelers' Health". A navigation menu on the left lists various options: Home, Destinations (245), Kenya (Traveler View), Healthy Travel Packing List, Kenya (Clinician View), Travel Notices, Yellow Fever Information, Zika Travel Information, Find a Clinic, Disease Directory, Resources, Resources for Travelers, Resources For Clinicians, and Resources for the Travel. The main content area displays "Health Information for Travelers to Kenya" in "Traveler View", featuring a map of Kenya and social media icons. A "Vaccines and Medicines" section is highlighted at the bottom, with a "Hide" button. A "Clinician View" button is also present on the right side of the page.

# Question 12

- Did you know that the CDC Traveler's Health destination pages have cholera-specific recommendations available for countries with active cholera transmission?
  - A) Yes
  - B) No

Some travelers		
Ask your doctor what vaccines and medicines you need based on where you are going, how long you are staying, what you will be doing, and if you are traveling from a country other than the US.		
<a href="#">Cholera</a>	<p>CDC recommends this vaccine for adults who are traveling to areas of active cholera transmission. Areas of active cholera transmission include the counties of Busia (last case reported February 2018), Elgeyo-Marakwet (last case reported June 2018), Embu (last case reported October 2018), Garissa (last case reported August 2018), Istolo (last case reported October 2018), Kiambu (last case reported June 2018), Kilifi (last case reported July 2018), Kirinyaga (last case reported January 2018), Kwale (last case reported January 2018), Machakos (last case reported June 2018), Meru (last case reported July 2018), Mombasa (last case reported August 2018), Nairobi (last case reported June 2018), Nakuru (last case reported April 2018), Siaya (last case reported March 2018), Tana River (last case reported July 2018), Tharaka Nithi (last case reported June 2018), Turkana (last case reported October 2018), Trans Nzoia (last case reported April 2018), Wajir (last case reported January 2018), and West Pokot (last case reported June 2018) of Kenya (<a href="#">see map</a>). Cholera is rare in travelers but can be severe. <a href="#">Certain factors</a> may increase the risk of getting cholera or having severe disease (<a href="#">more information</a>). Avoiding unsafe food and water and washing your hands can also prevent cholera.</p>	



## Question 13

- You are seeing a traveler in clinic who requests the cholera vaccine for their upcoming trip. What resources would you use to help you make a decision about whether this traveler needs the vaccine for their destination? Select all that apply.
  - A) ProMED
  - B) News outlets and media reports
  - C) CDC Travelers' Health website
  - D) CDC Yellow Book
  - E) World Health Organization (WHO) website
  - F) Travex
  - G) Other source

# Scenarios

## **Scenario A: Assume the Current Date is JANUARY 2019**

- "CDC recommends Vaxchora for adults who are traveling to areas of active cholera transmission. **Cholera is found in most parts of Nigeria.** Cholera is rare in travelers but can be severe. Certain factors may increase the risk of getting cholera or having severe disease. Avoiding unsafe food and water and washing your hands can also prevent cholera."

## Scenario A: Assume the Current Date is JANUARY 2019

- "Cholera is found in most parts of Nigeria."
  - A) I would offer cholera vaccine to all adult travelers going to Nigeria
  - B) I would offer cholera vaccine only to adult travelers going to Nigeria who would be at risk for cholera (e.g., travelers who will be providing healthcare)
  - C) I would not offer cholera vaccine to any adult traveler going to Nigeria.
  - D) I would not use this information to inform my decision to offer cholera vaccine

## **Scenario B: Assume the Current Date is JANUARY 2019**

■ "CDC recommends Vaxchora for adults who are traveling to areas of active cholera transmission. **Areas of active cholera transmission include the provinces of Kradft (last case reported June 2018) and Lilyway in the country of Nigeria.** Cholera is rare in travelers but can be severe. Certain factors may increase the risk of getting cholera or having severe disease. Avoiding unsafe food and water and washing your hands can also prevent cholera."

## Scenario B: Assume the Current Date is JANUARY 2019

- "Areas of active cholera transmission include the provinces of Kradft (last case reported June 2018) and Lilyway, in the country of Nigeria."
  - A) I would offer cholera vaccine to adult travelers going to Kradft only
  - B) I would offer cholera vaccine to adult travelers going to Lilyway only
  - C) I would offer cholera vaccine to adult travelers going to Kradft and Lilyway
  - D) I would offer cholera vaccine to all adult travelers going to Nigeria (including jurisdictions outside Kradft and Lilyway)
  - E) I would not offer cholera vaccine to any adult traveler going to Nigeria
  - F) I would not use this information to inform my decision to offer cholera vaccine

# Three Categories of Cholera Transmission

- Widespread
- Localized
- No reliable information

# Widespread Transmission

- **Equal to or more than half** of all country jurisdictions have been affected by cholera in the previous 12 months.
- Language: **Cholera is found in most parts of [country].**
- Interpretation: Travelers to [country] may be offered cholera vaccine



## Widespread Transmission Example: Yemen

CDC recommends this vaccine for adults who are traveling to areas of active cholera transmission. **Cholera is found in most parts of Yemen.** Cholera is rare in travelers but can be severe. Certain factors may increase the risk of getting cholera or having severe disease. Avoiding unsafe food and water and washing your hands can also prevent cholera.

# Localized Transmission

- **Less than half** of all country jurisdictions have been affected by cholera in the previous 12 months and/or cholera transmission is **localized to a containable geographic area** (will vary by country)
- Language: **Areas of active cholera transmission include the [region/province/district(s)] of [country].**
- Interpretation: Variable

## Localized Transmission Example: Angola

CDC recommends this vaccine for adults who are traveling to areas of active cholera transmission. **Areas of active cholera transmission include the provinces of Cabinda (last case reported June 2018), Luanda (last case reported July 2018), and Uige in Angola.** Cholera is rare in travelers but can be severe. Certain factors may increase the risk of getting cholera or having severe disease. Avoiding unsafe food and water and washing your hands can also prevent cholera.

## No Reliable Information

- No reliable information is available for these countries (due to suboptimal surveillance, case definition inconsistencies, etc.)
- Language: **Cholera is assumed to be present in [country].**
- Interpretation: Travelers to [country] may be offered cholera vaccine

## No Reliable Information Example: Bangladesh

CDC recommends this vaccine for adults who are traveling to areas of active cholera transmission. **Cholera is assumed to be present in Bangladesh.**

Cholera is rare in travelers but can be severe. Certain factors may increase the risk of getting cholera or having severe disease. Avoiding unsafe food and water and washing your hands can also prevent cholera.

# Take Home Messages of the CDC's Cholera Vaccine Surveillance

- Relies on available surveillance information
- Modifications will be made as necessary to meet the needs of ACIP, travelers, and their healthcare providers
  - We always welcome feedback
  - We hope your responses to the questions from today's webinar will help inform our efforts
- **Remember to always use clinical judgement.**

# Acknowledgments

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# Thank you for your time!

For more information, contact CDC  
1-800-CDC-INFO (232-4636)  
TTY: 1-888-232-6348 [www.cdc.gov](http://www.cdc.gov)

The findings and conclusions in this report are those of the authors and do not necessarily represent the official position of the Centers for Disease Control and Prevention.





# CDC Web Resources

- [Clinical Update Cholera Vaccine for Travelers](#)
- [Cholera Information for Travelers](#)
- [Destination List for Travelers and Clinicians](#)

# Essential Cholera Reading

- Love in the Time of Cholera by Gabriel García Márquez
- Death in Venice by Thomas Mann
- The Ghost Map by Steven Johnson
- The Painted Veil by W. Somerset Maugham