

# Cholera

## Introduction

Cholera is an acute diarrhoeal disease caused by the gram negative bacillus *Vibrio cholerae*. Although more than 100 serogroups exist, only two cause human disease: *V. cholerae* O1, of which there are two biotypes (Classical and El Tor) and *V. cholerae* O139 which emerged in 1992. Cholera is known to cause worldwide pandemics. *V. cholerae* O1, biotype El Tor accounts for most cases in the current, seventh pandemic, although serogroups O139 and O1 (Classical biotype) are present in India and Bangladesh.

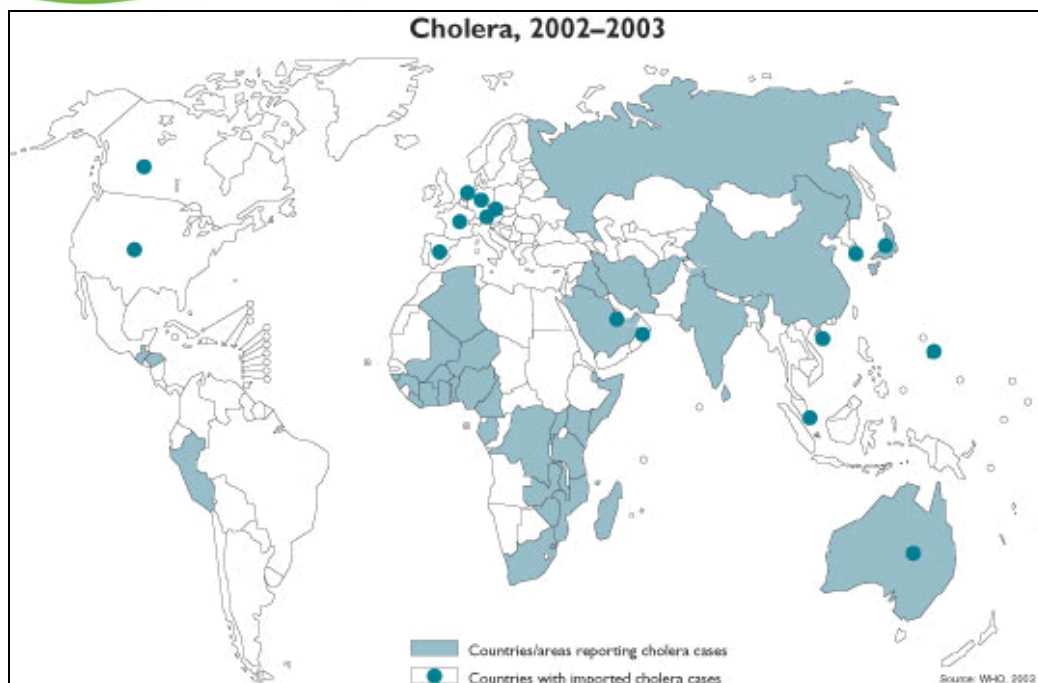
*V. cholerae* is endemic in many resource-poor countries, particularly in areas of inadequate sanitation and food hygiene practices. Man is the only known host of cholera.

## Epidemiology

(Data from the Travel Health Surveillance Section of the Health Protection Agency Communicable Disease Surveillance Centre)

## Global Epidemiology of Cholera

Cholera is a disease that occurs in regions of the world where sanitation and food and water hygiene are inadequate or lacking. In circumstances where there is no clean water or adequate sewage disposal (as may occur for example, after natural disasters or in displaced populations in war zones), cholera can spread very quickly. The main areas of the world where cholera is currently prevalent are in Africa, Asia, the Middle East, Peru and some countries of Central America. Imported cases are reported sporadically around the world from travellers to endemic countries.



The organism responsible for causing cholera is *Vibrio cholerae* serogroup O1 of which there are 2 biotypes, Classical and El Tor. The biotypes are further split into serotypes Inaba, Ogawa and (rarely) Hikojima. Cholera usually occurs in large epidemics or pandemics and in the 19<sup>th</sup> century pandemics frequently originated from the Ganges delta in India and up to the mid 20<sup>th</sup> century, were largely confined to Asia (except for a large epidemic in Egypt in 1947). The current, seventh pandemic caused by *V. cholerae* O1 El Tor originated in Indonesia in 1961 and spread rapidly through most of Asia into eastern Europe.<sup>1</sup> In 1970, this biotype was introduced into West Africa, where it spread rapidly and is now endemic in many African countries, and in 1991, it was re-introduced into Peru, where it had been absent for over 100 years. Another serogroup, *V. cholerae* O139, was discovered as being the cause of cholera epidemics in India and Bangladesh in 1992 and has since spread to eleven other countries in south east Asia; apart from a few imported cases, this serogroup is not known to have occurred outside of these countries.

In 2002, 142,311 cases of cholera including 4564 deaths were officially reported to the World Health Organization,<sup>2</sup> although this is almost certainly an underestimate. Ninety-seven per cent of reported cases were reported from Africa. Large outbreaks occurring in Malawi, Mozambique and Zambia accounted for 44% of the African cases. *Vibrio cholerae* O1 El Tor is responsible for the majority of reported cases. *V. cholerae* O139, which emerged in the Bay of Bengal in 1992, is confined to south east Asia and is responsible for approximately 15% of laboratory-confirmed cases of cholera reported from cholera-endemic countries in Asia. Five cases were reported in Australia in 2002, two of which were imported and three were locally acquired. (In Australia, *Vibrio cholerae* (non-O1 serogroups) is occasionally identified in sewage and natural water.)<sup>3</sup>

## Risk for Travellers

The overall risk of cholera for travellers is extremely low and is in the order of two to three cases per million travellers.<sup>4,6</sup> For long-term travellers in areas of outbreaks the rate may be as high as 5 cases per 1,000 persons<sup>7</sup> and when routine screening for *V. cholerae* is done in all returned travellers with diarrhoea the rate is on the order of 5 cases per 100,000.<sup>6</sup> Activities that could predispose to infection include drinking untreated water or eating poorly cooked seafood in endemic areas. Travellers living in unsanitary conditions, for example humanitarian relief workers in disaster areas, are also at risk.

## Transmission

Cholera is transmitted through the faecal-oral route, most commonly by consumption of contaminated water and to a lesser degree food; direct person-to-person transmission is rare. A high infecting dose (as many as  $10^{11}$  organisms) is required to cause illness in healthy individuals.

## Signs and Symptoms

Usually, in healthy individuals cholera is asymptomatic or mild; in the latter, diarrhoea may be the only symptom.

Following a usual incubation period of 6-72 hours, severe illness is heralded by a sudden onset of profuse, watery diarrhoea accompanied by nausea and vomiting. Up to 20 litres of diarrhoea can be passed in a 24 hour period, which if left untreated rapidly leads to serious dehydration and circulatory collapse.

## Treatment

Rapid fluid replacement with a balanced solution of sugar, electrolytes and water (oral rehydration salts) should be initiated as a matter of urgency. This may be done orally, but in severe cases may require intravenous administration. Cases may also be treated with antibiotics, usually a tetracycline, if the organism is sensitive. Patients who are promptly treated should respond rapidly and recover.

## Prevention

For the majority of travellers advice on food and water hygiene precautions is adequate prevention.

An oral cholera vaccine is now available in the UK. The vaccine is not indicated for most travellers but may be appropriate for those who are unable to take adequate precautions in highly endemic or epidemic settings. This would include aid workers assisting in disaster relief or refugee camps, and more adventurous backpackers who do not have access to medical care.

## References

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3. Global Infectious Disease and Epidemiology Network (GIDEON) online Database. USA: Gideon Informatics, Inc.; 2004.
4. Mahon BE, Mintz ED, Greene KD, Wells JG and Tauxe RV. Reported cholera in the United States, 1992-1994. *Journal of the American Medical Association* 1996;276:307-312
5. Morger H, Steffen R and Schär M. Epidemiology of cholera in travellers, and conclusions for vaccination recommendations. *British Medical Journal* 1983;286:184-186
6. Wittlinger F, Steffen R, Watanabe H and Handszuh H. Risk of cholera among Western and Japanese travelers. *Journal of Travel Medicine* 1995;2:154-158
7. Taylor DN, Rizzo J, Meza R, Perez J and Watts D. Cholera among Americans living in Peru. *Clinical Infectious Diseases* 1996;22:1108-1109

## Reading List

Sack DA, Sack RB, Nair GB, Siddique AK. Cholera. *The Lancet* 2004; 363: 223-33

## Links

World Health Organisation [www.who.int/ith/chapter05\\_02.html#cholera](http://www.who.int/ith/chapter05_02.html#cholera)