

BI0034 / **BIOLOGICAL / Infectious Diseases (Human and Animal)**

Cholera (Human)

Definition

Cholera is an acute diarrhoeal infection caused by ingestion of food or water contaminated with the bacterium *Vibrio cholerae*. Cholera remains a global threat to public health (WHO, 2019).

Reference

WHO, 2019. Cholera. World Health Organization (WHO). www.who.int/news-room/fact-sheets/detail/cholera Accessed 4 November 2020.

Annotations

Synonyms

Not identified.

Additional scientific description

During the 19th century, cholera spread across the world from its original reservoir in the Ganges delta in India. Six subsequent pandemics killed millions of people across all continents. The current (seventh) pandemic started in South Asia in 1961 and reached Africa in 1971 and the Americas in 1991. Cholera is now endemic in many countries (WHO, 2019).

There are many serogroups of *V. cholerae*, but only two – O1 and O139 – cause outbreaks. *V. cholerae* O1 has caused all recent outbreaks. *V. cholerae* O139 – first identified in Bangladesh in 1992 – has caused outbreaks in the past, but recently has only been identified in sporadic cases. It has never been identified outside Asia. There is no difference in the illness caused by the two serogroups. These are extremely virulent, and it usually takes between twelve hours and five days for symptoms to develop following infection (WHO, 2019).

The disease can affect both adults and children. Most of those infected with *Vibrio cholera* do not develop any symptoms, although the bacteria are present in their faeces for one to ten days after infection, and are shed back into the environment, potentially affecting other people. Among people who develop symptoms, the majority have mild or moderate symptoms, while a minority develop acute watery diarrhoea which can lead to death if untreated. Treatment should be rapid, with intravenous fluids and antibiotics (WHO, 2019).

Cholera diagnosis is confirmed by identifying *Vibrio cholera* in the stools of affected individuals. Detection can be facilitated by the use of rapid diagnostic tests (RDTs) where one or more positive samples triggers a cholera alert. The samples should be sent to a laboratory for confirmation by culture or polymerase chain reaction (PCR) (WHO, 2019).

Cholera can be endemic or epidemic. A cholera-endemic area is an area where confirmed cholera cases were detected during the last three years with evidence of local transmission (meaning the cases are not imported from elsewhere). A cholera outbreak/epidemic can occur in both endemic countries and in countries where cholera does not regularly occur (WHO, 2019).

In cholera endemic countries an outbreak can be seasonal or sporadic and represents a greater than expected number of cases. In a country where cholera does not regularly occur, an outbreak is defined by the occurrence of at least one confirmed case of cholera with evidence of local transmission in an area where there is not usually cholera (WHO, 2019).

The consequences of a humanitarian crisis – such as disruption of water and sanitation systems, or the displacement of populations to inadequate and overcrowded camps – can increase the risk of cholera transmission, should the bacteria be present or introduced. Uninfected dead bodies have never been reported as the source of epidemics (WHO, 2019).

The number of cholera cases reported to the World Health Organization (WHO) has continued to be high over the last few years. In 2017, 1,227,391 cases were notified from 34 countries, including 5,654 deaths. The discrepancy between these figures and the estimated burden of the disease is because many cases are not recorded due to limitations in surveillance systems and fear of impact on trade and tourism (WHO, 2019).

Metrics and numeric limits

Researchers have estimated that every year, there are roughly 1.2 to 4.0 million cases, and 21,000 to 143,000 deaths worldwide due to cholera (WHO, 2019).

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The WHO has published case definitions and recommendations for surveillance (WHO, 2014).

Key relevant UN convention / multilateral treaty

International Health Regulations (2005), 3rd ed. (WHO, 2016).

Examples of drivers, outcomes and risk management

Cholera remains a global threat to public health and an indicator of inequity and lack of social development. Provision of safe water and sanitation is critical for the prevention and control of cholera (WHO, 2019).

A multifaceted approach is key to control cholera, and to reduce deaths (WHO, 2019). A combination of surveillance, water, sanitation and hygiene, social mobilisation, treatment, and oral cholera vaccines are used.

Surveillance Cholera surveillance should be part of an integrated disease surveillance system that includes feedback at the local level and information-sharing at the global level. Cholera cases are detected based on clinical suspicion in patients who present with severe acute watery diarrhoea. The suspicion is then confirmed by identifying *V. cholerae* in stool samples from affected patients. Detection can be facilitated using rapid diagnostic tests where one or more positive samples triggers a cholera alert. The samples are sent to a laboratory for confirmation by culture or PCR. Local capacity to detect (diagnose) and monitor (collect, compile, and analyse data) cholera occurrence, is central to an effective surveillance system and to planning control measures. Countries affected by cholera are encouraged to strengthen disease surveillance and national preparedness to rapidly detect and respond to outbreaks. Under the International Health Regulations, notification of all cases of cholera is no longer mandatory (WHO, 2021). However, public health events involving cholera must always be assessed against the criteria provided in the regulations to determine whether there is a need for official notification (WHO, 2014, 2019).

Water and sanitation interventions. The long-term solution for cholera control lies in economic development and universal access to safe drinking water and adequate sanitation. Actions targeting environmental conditions include the implementation of adapted long-term sustainable WASH solutions to ensure use of safe water, basic sanitation and good hygiene practices in cholera hotspots (WHO, 2021). In addition to cholera, such interventions prevent a wide range of other water-borne illnesses, as well as contributing to achieving Sustainable Development Goals related to poverty, malnutrition, and education. The WASH solutions for cholera are aligned with those of the Sustainable Development Goals (SDG 6) (WHO, 2021).

Treatment. Cholera is an easily treatable disease. The majority of people can be treated successfully through prompt administration of oral rehydration solution. Severely, dehydrated patients are at risk of shock and require the rapid administration of intravenous fluids. These patients are also given appropriate antibiotics to diminish the duration of diarrhoea, reduce the volume of rehydration fluids needed, and shorten the amount and duration of *V. cholerae* excretion in their stool. Rapid access to treatment is essential during a cholera outbreak. Oral rehydration should be available in communities, in addition to larger treatment centres that can provide intravenous fluids and 24 hour care. With early and proper treatment, the case fatality rate should remain below 1% (WHO, 2021).

Hygiene promotion and social mobilisation. Health education campaigns, adapted to local culture and beliefs, should promote the adoption of appropriate hygiene practices such as hand-washing with soap, safe preparation and storage of food and safe disposal of the faeces of children. Funeral practices for individuals who die from cholera must be adapted to prevent infection among attendees. Further, awareness campaigns should be organised during outbreaks, and information should be provided to the community about the potential risks and symptoms of cholera, precautions to take to avoid cholera, when and where to report cases and to seek immediate treatment when symptoms appear. The location of appropriate treatment sites should also be shared. Community engagement is key to long-term changes in behaviour and to the control of cholera (WHO, 2021).

Oral cholera vaccines. Currently there are three WHO pre-qualified oral cholera vaccines: Dukoral®, Shanchol™, and Euvichol-Plus®. All three vaccines require two doses for full protection. More than 30 million doses of oral cholera vaccines have been used in mass vaccination campaigns. The campaigns have been implemented in areas experiencing an outbreak, in areas at heightened vulnerability during humanitarian crises, and among populations living in highly endemic areas, known as 'hotspots' (WHO, 2014, no date).

A global strategy on cholera control with a target to reduce cholera deaths by 90% was launched in 2017 (WHO, 2017).

References

WHO, no date. Oral cholera vaccines. World Health Organization (WHO). www.who.int/cholera/vaccines/en Accessed 15 November 2019.

WHO, 2014. Cholera surveillance to inform OCV vaccination campaigns: "Working copy". World Health Organization (WHO). www.who.int/cholera/vaccines/surveillance_protocol.pdf?ua=1 Accessed 15 November 2019.

WHO, 2016. International Health Regulations (2005), 3rd ed. World Health Organization (WHO). www.who.int/ihr/publications/9789241580496/en Accessed 3 October 2020.

WHO, 2017. Ending Cholera: A Global Roadmap to 2030. World Health Organization (WHO). www.who.int/cholera/publications/global-roadmap/en Accessed 15 November 2019.

WHO, 2019. Cholera. World Health Organization (WHO). www.who.int/news-room/fact-sheets/detail/cholera Accessed 4 November 2020.

WHO, 2021. Cholera. World Health Organization (WHO). www.who.int/news-room/fact-sheets/detail/cholera#:~:text=Under%20the%20International%20Health%20Regulations%2C%20notification%20of%20all,need%20for%20official%20notification.%20Water%20and%20sanitation%20interventions Accessed 7 April 2021.

Coordinating agency or organisation

World Health Organization.