

Cholera: mechanism for control and prevention

Report by the Secretariat

1. Cholera is an acute enteric infection characterized by profuse vomiting and acute watery diarrhoea caused by ingestion of the bacterium *Vibrio cholerae* serogroup O1 or O139. The infection can lead within hours to severe dehydration and death. If untreated, the case-fatality rate can reach 50%, but with timely and adequate treatment, that rate will remain below 1%. In 80% of cases patients recover when treated only with oral rehydration salts; between 10% and 20% of patients need administration of intravenous fluids for rehydration.

2. The incubation period of cholera is short, thus any weaknesses in early warning systems may lead to delays with timely control measures, resulting in outbreaks that are explosive in nature. In recent years, massive outbreaks have occurred in countries that have been free of the disease for decades. One of the biggest such outbreaks took place in Zimbabwe within a 12-month period, accounting for 98 591 cases including 4288 deaths between August 2008 and July 2009. Most recently, an outbreak of cholera has occurred in Haiti, in the aftermath of the earthquake that struck in early January 2010. The first cases were diagnosed in mid-October; by early February 2011, the Ministry of Public Health and Population of Haiti reported close to 230 000 cholera cases, including more than 4500 deaths. AMRO/PAHO and health partners continue to support the Ministry of Public Health and Population in its response to the outbreak. However, the long-lasting endemic occurrence of cholera in several countries in the South-East Asia Region as well as in the African Region should not be underestimated and remains a burden on public health.

3. Analysis of global trends in the incidence of cholera by five-year periods shows a steady increase since the beginning of the millennium. From 2004 to 2008, a cumulative total of 838 315 cases was notified to WHO, compared with 676 651 cases between 2000 and 2004, representing a 24% increase in the number of cases reported for this most recent five-year period. However, the actual number of cholera cases is known to be much higher. The reported figures exclude the estimated 500 000–700 000 cases of “acute watery diarrhoea” that occur every year in vast areas of central and south-east Asia and in some African countries. The discrepancy results from underreporting and other limitations of surveillance systems, including inconsistencies in case definitions and lack of a standard vocabulary.¹

4. Underreporting may also occur because of concerns over possible sanctions on travel and trade. Sanctions have been shown not to contribute to the efficient control of cholera. Effective public health interventions such as access to appropriate health care, proper and timely case management, improved environmental management and appropriate use of oral cholera vaccines all depend upon a solid surveillance system and a coordinated multisectoral approach to mitigate or avert epidemics. The

¹ Cholera 2009. *Weekly epidemiological record*, 2010, **85** (31):293–308.

International Health Regulations (2005),¹ which entered into force in June 2007, encourage sharing of information, with the aim of contributing to efficient prevention and containment of epidemics, including cholera epidemics.

5. Cholera, a waterborne disease closely linked to poor environmental conditions and lack of personal hygiene, is associated with the same risk factors as other waterborne diarrhoeal diseases. The absence or shortages of safe water and proper sanitation, as well as poor waste management, contribute to the spread of such diseases. The same circumstances exist in many places of the developing world, particularly in overcrowded settlements but also in rural areas, along rivers or near lake shores. The 2010 update of the WHO/UNICEF Joint Monitoring Programme for Water Supply and Sanitation² indicates that 884 million people still lack access to an “improved drinking-water source”. This fact applies to 40% of people living in sub-Saharan Africa.³ The occurrence of cholera highlights economically and socially determined inequalities in health.

6. Many countries are making substantial efforts to contain cholera by focusing on responses to outbreaks, but cholera control depends on far more than prompt medical treatment of cases. There is an important interplay between prevention, preparedness and response, and the existence of an efficient surveillance system. Maintaining this balance is crucial for mitigating outbreaks and lowering case-fatality rates. Cholera prevention and control require access to safe water, adequate sanitation, adequate food safety and an appropriate level of personal hygiene. The core elements of this approach are community involvement, open and transparent sharing of information, and policy dialogue. In addition, such an approach has the advantage of enhancing the prevention and control of other waterborne diarrhoeal diseases.

7. In 1991, the Forty-fourth World Health Assembly adopted resolution WHA44.6 on cholera as a response to the spread of the seventh pandemic and its re-emergence in southern Africa. As a result, the WHO Global Task Force on Cholera Control was launched in 1992 with the aim of supporting Member States in reducing the morbidity and mortality rates associated with cholera and in diminishing the social and economic consequences of the disease.

8. The management of water resources is crucial. Access to safe water sources needs to be improved and sustained, along with the promotion of household-level water treatment and safe storage in order to prevent the occurrence of cholera and to reduce morbidity in the case of outbreaks. Even households that have access to improved drinking-water sources may suffer from recontamination within the home; such a risk requires specific action to prevent exposure.

9. Preventive measures at the global level have not controlled the disease. They have been rendered less effective by continued growth of the world population, increased rural migration, failing infrastructure, climate change, and competing public health priorities. Efforts to control cholera are now entering a new phase with the development of safe and effective oral cholera vaccines, which are complementary to, but not substitutes for, traditional preventive measures.

¹ *International Health Regulations (2005)*, 2nd ed. Geneva, World Health Organization, 2008.

² World Health Organization and United Nations Children’s Fund Joint Monitoring Programme for Water Supply and Sanitation. *Progress on sanitation and drinking-water: 2010 update*. Geneva, World Health Organization, 2010.

³ See also document EB127/6.

10. Several oral cholera vaccines have been developed and proven safe, immunogenic and effective.¹ So far, the WC-rBS vaccine consisting of killed whole-cell *Vibrio cholerae* O1 with purified recombinant B subunit of cholera toxoid, is the only WHO prequalified vaccine. It is given in two doses – each diluted in 1.5 dl of buffered water – at an interval of not less than one week and not more than six weeks. It elicits protective efficacy 10 days after the second dose. A reformulation of this vaccine, developed as a result of North–South and South–South technology transfer, is now manufactured and licensed in India. This vaccine does not require any buffer and is in the pipeline for WHO prequalification.

11. Following several mass vaccination campaigns using the original two-dose vaccine, WHO issued recommendations in 2005 for the use of oral cholera vaccines in complex emergencies, stressing a multidisciplinary approach and the need to consider cholera prevention and control within the larger context of public health priorities in times of crisis.² A three-step decision-making tool was developed for use by countries in assessing the (i) risk of an outbreak; (ii) capacity to contain a potential outbreak; and (iii) feasibility of a mass immunization campaign using oral cholera vaccines in a given context.

12. Recommendations for oral cholera vaccine use were discussed in October 2009 by the Strategic Advisory Group of Experts on immunization, providing background information for the recently issued WHO position paper on cholera vaccines. The recommendations are as follows:^{1,3} (i) cholera control should be a priority in areas where the disease is endemic; and (ii) given the availability of two oral cholera vaccines – one prequalified and the other pending prequalification – immunization with these vaccines should be used in conjunction with other prevention and control strategies in areas where the disease is endemic and should be considered for use in areas at risk of outbreaks. Vaccination should not disrupt the provision of other high-priority health interventions to prevent or control cholera outbreaks. Vaccines provide a short-term effect that can be implemented to bring about an immediate response while the longer-term interventions of improving water and sanitation, which involve large investments, are put into place.

13. Although considerable efforts have been made to control cholera, global trends have been increasing steadily and countries have become discouraged by the challenges faced in trying to control epidemics. The following describes some of the challenges and the recommended responses.

- Current responses to cholera outbreaks tend to be reactive, taking the form of an ad hoc emergency response. This approach may prevent deaths, but it fails to prevent the occurrence of cases. A programmatic, concerted and coordinated approach is necessary that fully covers prevention, preparedness and response by considering strategies to reduce the risk of cholera.
- Coordination across sectors has been challenging, nevertheless improvements to the links between the health and the water sectors are necessary for sustained activities to control cholera.

¹ Cholera vaccines: WHO position paper. *Weekly epidemiological record*, 2010, **85**(13):117–128.

² Document WHO/CDS/NTD/IDM/2006.2.

³ Meeting of the Strategic Advisory Group of Experts on immunization, October 2009 – conclusions and recommendations. *Weekly epidemiological record*, 2009, **84**(50):526–528.

- National action plans, when they exist, are often not adapted to the local context. Such an adaptation is a necessary step in order to enhance multidisciplinary prevention and control activities.
- Adequate household water treatment and safe water storage are ongoing challenges. In line with the recently launched WHO/UNICEF seven-point action plan,¹ these issues need to be promoted, scaled up and supported by effective policy frameworks.
- The surveillance of cholera is not efficiently integrated into overall surveillance systems. Local capacities for data collection and analysis need to be strengthened in order to be part of such integrated systems. This would facilitate the identification of high-risk areas and trends over time, and guide control activities.
- Assessing or forecasting the risk of occurrence of epidemics is difficult. Collecting data on cholera cases alone is not sufficient to conduct a risk assessment or to identify the trigger responsible for outbreaks. Surveillance needs to encompass information on crucial factors such as the existence of water sources, environmental conditions, means of transportation, and cultural beliefs and practices.
- Experience gained from mass vaccination campaigns with oral cholera vaccines highlights the difficulty of performing both vaccination and other preventive measures in parallel. The vaccines need to be administered in conjunction with other recommended prevention and control methods and should not be used as a substitute for the usual, recommended preventive measures. Further, mass vaccination campaigns need to be well planned and prepared.
- The availability of rapid diagnostic tests for early warning and triggering intervention is inadequate and needs to be further enhanced through research.

14. The WHO Global Task Force on Cholera Control continues to provide support for comprehensive and coordinated cholera-control activities and technical guidance to Member States. It also contributes to operational research on best practices.

15. Know-how and tools for efficient prevention and control are available and can make a difference, provided that they are put in place in a timely manner, a concerted and coordinated approach is adopted, and funds are made available.

16. The inclusion of a strong programmatic and multidisciplinary approach for cholera as part of prevention and control activities for diarrhoeal diseases has proven effective in both diminishing the occurrence of epidemics and decreasing the case-fatality rate during outbreaks.² Such an approach to prevention and control requires strong leadership, political commitment and the involvement of all concerned. Further efforts need to be made and means made available for WHO to play its role in supporting efficient programmes for control of both cholera and diarrhoeal diseases in countries.

¹ UNICEF, WHO. *Diarrhoea: why children are still dying and what can be done*. New York, UNICEF, 2009.

² Review of the project for improving preparedness and response to cholera and other epidemic diarrhoeal diseases in Southern Africa; April 1997. WHO Regional Office for Africa, January 1998.

17. An earlier version of this report was discussed by the Executive Board at its 128th session,¹ and the Board adopted resolution EB128.R7.²

ACTION BY THE HEALTH ASSEMBLY

18. The Health Assembly is invited to adopt the resolution recommended by the Executive Board in resolution EB128.R7.

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¹ See document EB128/2011/REC/2, summary records of the third, fourth, eighth and ninth meetings.

² See document EB128/2011/REC/1 for the resolution, and for the financial and administrative implications for the Secretariat of the adoption of the resolution.