

Summary

Date of assessment: 30 November 2022

Overall risk and confidence (based on information available at the time of assessment)

Overall risk		
Hispaniola	Regional	Global
Very High	Moderate	Low

Confidence in available information		
Hispaniola	Regional	Global
Low	Moderate	Moderate

Risk Assessment

Health authorities in Haiti, reported two confirmed cases of *Vibrio cholerae* O1 in the Port-au-Prince metropolitan area, on 2 October 2022, after three years with no reported confirmed cases in the country. During the ongoing outbreak, as of 29 November 2022, according to the Haiti Ministry of Public Health and Population (MSPP per its acronym in French) a total of 12,526 suspected cases^{1,2} were reported in 10 departments, of which 1,082 cases were laboratory confirmed (in 8 departments), including 230 confirmed deaths (Case fatality rate among suspected cases (CFR) is 2%). Additionally, as of 21 November 2022, the Ministry of Public Health of the Dominican Republic reported a total of two confirmed cases of cholera, both imported from Haiti (1-4).

Haiti is facing a complex humanitarian crisis that is rapidly deteriorating due to socio-political conflicts, insecurity, fuel shortages, and economic instability, which in turn limit access to health services and basic services of water and sanitation, as well as disrupt food and water supplies. Since September 2022, protests and acts of violence by armed groups have escalated, further limiting the access of health workers to vulnerable areas under the control of armed groups. This consequently results in late detection and seriously affects response activities to outbreaks, allowing transmission chains to be established and thus constituting a challenge for control and mitigation efforts. Significant epidemiological surveillance challenges in turn lead to an evident underreporting of cases. In this complex scenario, it will be important to take into account said biases when analysing the epidemiological situation of the cholera outbreak with the official data available. The response of non-governmental organizations and United Nations organizations working with the Haitian health authorities to contain the cholera epidemic is also hampered by the complex situation in Haiti, and most cholera treatment centers are operating at the limit of their capacity (5-9).

Currently, most of Haiti faces growing food insecurity, with acutely malnourished children at least three times more likely to die from cholera. According to UNICEF, approximately 100,000 children under the age of five in Haiti suffer from severe acute malnutrition and are therefore especially vulnerable to cholera. As of 7 October 2022, the armed groups have displaced approximately 20,000 people, including 8,200 children, to now live in the homes of relatives or temporary shelters, in overcrowded conditions and without access to basic services (9).

Additionally, there is a high global demand for cholera response supplies and vaccines due to existing outbreaks in 29 countries. The global strain on the supply chain consequently delays and hinders the operational response to the cholera epidemic in Haiti, as well as forced the International Coordinating Group (ICG)³ to temporarily suspend the standard two-dose vaccination regimen in cholera outbreak response campaigns, using instead a single-dose approach. The effectiveness of a single-dose strategy is low among children under 5 years old which are mainly affected in Haiti (10-11).

Considering the magnitude and wide spread of the cholera epidemic that is ongoing in Haiti, in conjunction with the complex humanitarian crisis the country is currently facing, the limited resources to control the epidemic, as well as the constant migratory flow towards the Dominican Republic, the **risk in Hispaniola is evaluated as Very High**.

In the Region of the Americas, considering the constant migratory flow from Haiti to countries and territories of the Region of the Americas, the heterogeneous capacity of the States Parties to detect and respond to cholera outbreaks, as well as the burnout of health workers from concurrent public health emergencies, the **Regional risk is assessed as Moderate**.

¹ Includes the cases reported during the cholera outbreak in a Port-au-Prince prison, as of 4 November 2022.

² Preliminary data subject to change based on retrospective investigation.

³ The International Coordinating Group (ICG) is the body which manages emergency supplies of vaccines.

Risk Assessment Questions

Risk question		Assessment		Risk	Rationale
		Likelihood	Consequences		
Potential risk for human health?	National	Highly likely	Severe	Very high	<p>Cholera infection is asymptomatic or has a mild to moderate clinical presentation in 80-90%. However due to the complex economic situation, humanitarian crisis and food insecurity facing Haiti, the high rate of malnutrition makes children especially vulnerable to cholera and severe clinical presentation. Additionally, the fuel shortage and insecurity lead to limited or no access to health services, increasing the probability that the cases have a severe clinical presentation in the absence or delay to care, which could lead to death. Between 2010 and 2019, the cholera outbreak in Haiti recorded a case fatality rate (CFR) between 0.8% and 2.2%. In most other countries and territories in the Region, severe clinical manifestations and deaths are less likely to occur.</p> <p>According to the available literature, with adequate and timely rehydration, the CFR of cholera should be less than 1%, however, in cases with extreme dehydration the CFR can be higher than 50%.</p>
	Regional	Likely	Minor	Moderate	
	Global	Unlikely	Minor	Low	
Risk of event spreading?	National	Highly likely	Major	Very high	<p>Cholera transmission is closely linked to inadequate access to clean water and sanitation facilities. Typical at-risk areas include peri-urban slums, and camps for internally displaced persons or refugees, where minimum requirements of clean water and sanitation are not met. Therefore, Haiti currently faces multiple concurrent risk factors that lead to the establishment of transmission. The constant displacement and migration of the population from Haiti to the Dominican Republic, as well as to other countries in the Region, increases the probability of spread inside and outside the island of Hispaniola. Most of the countries and territories of the Region have the capacity to detect and respond to cholera outbreaks, however, the concurrent emergencies have overloaded these capacities.</p>
	Regional	Likely	Minor	Moderate	
	Global	Unlikely	Minor	Low	
Risk of insufficient control capacities with available resources?	National	Highly likely	Major	Very high	<p>Since September 2022, protests and acts of violence by armed groups have increased in Haiti, as well as shortages of fuel, water, food supplies, among others, has led to the drastic limitation of the response capacity of the public health system, as well as non-governmental organizations and the United Nations that support the response to the outbreak. Additionally, the simultaneous outbreaks of cholera in 29 countries worldwide generate a great demand for resources and supplies, including the oral vaccine against cholera, which limits the immediate distribution of these to Haiti and the Dominican Republic, directly affecting the capacity and speed of operational emergency response.</p> <p>Other countries in the Region could have sufficient control capacity and the resources available to respond to possible imported cases, however, the capacities and resources are not homogeneous among the different countries and territories of the Region.</p>
	Regional	Likely	Minor	Moderate	
	Global	Likely	Minor	Moderate	

Supporting Information

Hazard assessment

Cholera is an acute diarrheal infection caused by ingestion of food or water contaminated with the bacteria *Vibrio cholerae*. It has a short incubation period, ranging between two hours and five days. The bacteria produce an enterotoxin that causes a copious, painless, watery diarrhea that can quickly lead to severe dehydration and death if treatment is not promptly given. Vomiting also occurs in most patients. It affects both children and adults and can kill within hours if untreated. Person-to-person transmission is not common.

Among people who develop symptoms, about 80-90% of episodes are of mild or moderate severity and are difficult to distinguish clinically from other types of acute diarrhea. Less than 20% of ill persons develop acute watery diarrhea with severe dehydration. People with low immunity, such as malnourished children or people living with HIV, are at greater risk of death if infected. In cases with extreme dehydration (cholera gravis) the patient can die within hours and the fatality rate can be higher than 50%. With adequate and timely rehydration, the lethality of cholera should be less than 1%.

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 – caused outbreaks in the past but has recently only been identified in sporadic cases. It has never been identified outside Asia. There is no difference in the clinical presentation caused by the two serogroups.

Cholera transmission is closely linked to inadequate access to clean water and sanitation facilities. Typical at-risk areas include peri-urban slums, and camps for internally displaced persons or refugees, where minimum basic services of clean water and sanitation are not met. The consequences of a humanitarian crisis – such as disruption of water and sanitation systems, or the displacement of populations to improvised and overcrowded shelters – can increase the risk of cholera transmission if the bacteria is present or introduced. Uninfected dead bodies have never been reported as the source of epidemics.

Cholera is an easily treatable disease. The majority of people can be treated successfully through prompt administration of oral rehydration solution (ORS). The WHO/UNICEF ORS standard sachet is dissolved in 1 litre (L) of clean water. Adult patients may require up to 6 L of ORS to treat moderate dehydration on the first day. Currently, there are three WHO pre-qualified oral cholera vaccines (OCV): Dukoral®, Shanchol™, and Euvichol-Plus®. All three vaccines require two doses.

Since January 2022, a total of 29 countries have reported cholera cases, including Haiti, Malawi and Syria which are facing large outbreaks. The global trend is moving towards more numerous, more widespread and more severe outbreaks, due to floods, droughts, conflict, population movements and other factors that limit access to safe drinking water and raise the risk of cholera outbreaks. Therefore, a strained global supply of cholera vaccines has obliged the International Coordinating Group (ICG)² to temporarily suspend the standard two-dose vaccination regimen in cholera outbreak response campaigns, using instead a single-dose approach. The one-dose strategy has proven to be effective in responding to outbreaks, even though evidence on the exact duration of protection is limited, and protection appears to be much lower in children. With a two-dose regimen, when the second dose is administered within 6 months of the first, immunity against infection lasts for 3 years (10-11).

Exposure assessment

In Haiti, on 2 October 2022, health authorities reported two confirmed cases of *Vibrio cholerae* O1 in the Port-au-Prince metropolitan area, after 3 years without any confirmed cases being reported in the country. During the ongoing outbreak, as of 29 November 2022, the Haiti Ministry of Public Health and Population (MSPP per its acronym in French) reported 12,526 suspected cases^{4,5}, of which 1,082 cases were laboratory confirmed, including 230 confirmed deaths (Case fatality rate among suspected cases (CFR) is 2%). Of the total of suspected cases, 10,584 hospitalizations have been registered. Additionally, as of 21 November 2022, the Ministry of Public Health of the Dominican Republic reported a total of two confirmed imported cases of cholera, both from Haiti (1-4).

⁴ Includes the cases reported during the cholera outbreak in a Port-au-Prince prison, as of 4 November 2022.

⁵ Preliminary data subject to change based on retrospective investigation.

In a cholera outbreak in a Port-au-Prince prison, as of 4 November 2022, a total of 368 suspected cases have been identified, including 14 confirmed cases and 14 deaths. Since 4 November 2022, no information has been received on the situation of the outbreak in the prison (1-4). All the cases and deaths registered during this outbreak in the prison are included in the cases and deaths of the Ouest department.

As of 29 November, the department that registers the highest proportion of suspected cases is Ouest with 89%. However, suspected cases have been reported in all 10 departments of the country. The most affected age group are children aged 1 to 4 years (20%) followed by adults aged 20 to 29 years (14%) and 30 to 39 years (14%) (1-4).

As of 29 November 2022, of the total confirmed cases with available information reported in 8 of the 10 departments of the country, those with the highest proportion are Ouest (80%), followed by Centre (11%) and Artibonite (2%). The most affected age groups are 1 to 4 years (21%) followed by 30 to 39 years (15%) and 5 to 9 years (14%) (1-4).

The first cholera outbreak in Haiti was reported in October 2010 (*V. cholerae* serogroup O1, Ogawa biotype), after the earthquake that occurred in January of the same year, constituted the largest outbreak worldwide in modern history, with a case fatality rate between 0.8% and 2.2%. In January 2020, PAHO/WHO declared that the country had reached one year free of cases confirmed (3-4).

Due to the current conditions in Haiti, most of the population in the country is in a highly vulnerable situation in the face of established cholera transmission chains in the departments and communes. The humanitarian crisis and insecurity have exacerbated in recent months. This has considerably undermined the efforts of the MSPP and other organizations to implement prevention and control measures, including epidemiological surveillance, leading to underreporting of cases. These biases need to be taken into account when analyzing the epidemiological situation of this cholera outbreak using the available official data (5-9).

In the Region of the Americas, confirmed cases of cholera have been reported since 2010 in Haiti primarily, followed by the Dominican Republic, Cuba, and Mexico. Sporadic imported cases have also been reported in other countries of the Region. In 2021, WHO received no notification of cholera cases from the Region of the Americas (3).

Context assessment

Currently, Haiti faces multiple concurrent threats, related to violence by armed groups, social unrest, insecurity and lack of fuel and supplies. This has left large parts of the population highly vulnerable to additional public health events of diverse nature and magnitude.

The shortage of fuel and electricity and the control of oil terminals by armed groups have led to the closure of some hospitals and forced others to limit their services since they depend on generators to operate. As a result, persons who might need essential health care services and/or intensive care are at risk of not receiving it (5).

Healthcare facilities are facing severe shortages of supplies, such as cholera kits, oral rehydration salts, lactated Ringer's solutions, cholera patient beds, intravenous sets, and appropriate antibiotics. An increasing number of countries experiencing cholera outbreaks in 2022 has led to global shortages of critical supplies needed for the cholera outbreak response (5-9).

In Haiti, before the current cholera epidemic, 15% of healthcare facilities in the Port-au-Prince metropolitan area were closed or not working due to insecurity and lack of resources. A small proportion of the population depends on public healthcare facilities due to the prevailing situation of insecurity that affects the mobility of people and their inability to pay for health services (5).

Internal displacement has increased due to the direct and indirect effects of insecurity. The increase in violence in April made civilians the target of assassinations, kidnappings, and other extreme forms of violence, forcing people to flee their homes. The current wave of gang violence and political instability, combined with a declining economy and lack of access to essential services, is likely to lead to further displacement. Additionally, households were displaced by the August 2021 earthquake (approximately 835 households), people who continue to live in camps for internally displaced persons. People living in sites for internally displaced persons are isolated by the presence of armed groups and insecurity. Shelters for internally displaced persons have intermittent or no water supply for prolonged periods, as well as overcrowding and zero waste management, which constitute a challenge for mitigating the cholera outbreak (5).

In Haiti, more than a third of the population (35%) lacks basic drinking water services and two-thirds (65%) have limited or no sanitation services due to the current crisis of lack of drinking water and irregular supply of water services, significant difficulties in guaranteeing the emptying of latrines and adequate waste management. Haiti continues to lag behind the rest of Latin America and the Caribbean in terms of access to drinking water and sanitation (5-9).

Table 1: Capacities and vulnerabilities related to Cholera outbreak in Hispaniola. November 2022.

Capacities
<p>PAHO/WHO is supporting the Haiti Ministry of Public Health (MSPP) in strengthening epidemiological surveillance, as well as laboratory capacity by training of nurses and sampling teams to perform rapid diagnostic tests in the Centre and Ouest departments. Given the complexity of land transport, PAHO/WHO is also facilitating the transport of samples to the national reference laboratory (LNSP) through United Nations Humanitarian Service Flights (UNHAS). Samples from the Nord-Ouest department were transported to the LNSP (2).</p> <p>PAHO/WHO supports the MSPP in carrying out field missions to the Artibonite and Centre Departments, to assess the quality of services provided in the Cholera Treatment Centers (CTCs), capacity for scaling up case management, and determine needs and gaps for the cholera response (2).</p> <p>PAHO/WHO trained departmental health officials on cholera outbreak response at the community level, conducted an investigation of WASH (WHO Water, Sanitation and Hygiene strategy) conditions in cholera hotspots, and assisted departmental health directorates in estimating their current WASH needs for cholera response (2).</p> <p>In Haiti, PAHO/WHO produced and distributed over 90,000 printed brochures and posters with messages on cholera prevention in the Ouest Department, with the support of partner agencies and NGO's (2).</p> <p>In Haiti, PAHO/WHO, in coordination with UNICEF and the MSPP, developed a communication strategy to support the cholera vaccination campaign (2).</p> <p>The MSPP authorized an emergency vaccination campaign against cholera, and with the support of PAHO/WHO a request for vaccines was sent to the International Coordinating Group (ICG) (2). The ICG has partially approved the oral cholera vaccine (OCV) request for 1,640,411 doses of Euvichol-Plus to implement a reactive vaccination campaign (1-dose strategy).</p> <p>The Dominican Republic has the support of PAHO/WHO, as well as the capacity to detect and respond to outbreaks and/or imported cases of cholera in its territory (2).</p>
Vulnerabilities
<p>Haiti is facing a complex humanitarian crisis aggravated by multiple social crises, as a result of which the population is particularly vulnerable to events of diverse nature and magnitude.</p> <p>In Haiti, the lack of fuel supply, which affects the ability of health workers to mobilize, has affected the operation of health facilities at all levels, epidemiological surveillance activities, the installation of Oral Rehydration Points and Cholera Treatment Centers (CTCs), the transportation of patients to the CTCs, and health promotion activities.</p> <p>In Haiti, the lack or intermittent supply of water and food affects the quality of life of the population and conditions their vulnerability to the outbreak.</p> <p>In Haiti, with the increase in insecurity and violence by armed groups, patients and health workers have difficulties accessing health facilities at all levels. Likewise, community health activities are affected in areas controlled by armed groups. This limits the implementation of prevention and control measures, including epidemiological surveillance.</p> <p>In Haiti, there is a significant underreporting of cases, and the current context is not favorable for carrying out epidemiological surveillance activities, so the delay in the detection and response to ongoing outbreaks could lead to the occurrence of severe cases and deaths.</p> <p>In Haiti, severe acute malnutrition in children under 5 years of age exposed to <i>V. cholerae</i>, combined with the lack of timely treatment, can consequently lead to high mortality in this vulnerable group.</p> <p>In Haiti, there is limited or no access to basic drinking water and sanitation services affect to the general population, including healthcare facilities.</p>

In Haiti, there is a limited or non-existent capacity to guarantee the emptying of latrines and the proper management of waste.

In Haiti, the displaced population lives in camps for internally displaced persons with a lack of adequate basic services and in poor hygiene and sanitation conditions.

In Haiti, insecurity due to protests and armed groups affects the importation of supplies, which can delay the distribution of essential response supplies, including oral cholera vaccine, and its distribution and administration to the population.

In the Dominican Republic, there is a constant documented and undocumented migratory flow from Haiti, which could condition the occurrence of imported cholera cases and potential outbreaks.

Simultaneous global cholera outbreaks create high demand for supplies and resources, including oral cholera vaccine, resulting in limited supplies for immediate distribution to all cholera-affected countries, including Haiti and the Dominican Republic. This strained global supply of cholera vaccines has obliged the ICG to temporarily suspend the standard two-dose vaccination regimen in cholera outbreak response campaigns, using instead a single-dose approach. The one-dose strategy has proven to be effective in responding to outbreaks, even though evidence on the exact duration of protection is limited, and protection appears to be much lower in children under 5 years of age (10 -11).

Reference documents

1. Haiti Ministry of Public Health and Population (MSPP). Available at: <https://bit.ly/3VnCexV>
2. PAHO/WHO. Resurgence of cholera in Hispaniola. Available at: <https://bit.ly/3GYFFaF>
3. PAHO/WHO Event Management System.
4. PAHO. Haiti reaches one-year free of Cholera. 23 January 2020. Available at: <https://bit.ly/3SyV8RI>
5. ACAPS. Deterioration of humanitarian crises in Port-au-Prince. 1 November 2022. Available at: <https://bit.ly/3ATVtHM>
6. Médecins Sans Frontières (MSF). Relief web. An urgent scale up in response to cholera must be mobilized. 17 November 2022. Available at: <https://bit.ly/3UfSKPL>
7. Médecins Sans Frontières (MSF). Haiti. Available at: <https://bit.ly/3gJIG84>
8. Save the Children. Relief web. Haiti: 200,000 more children pushed into hunger since March, as nearly half the population goes hungry. 14 November 2022. Available at: <https://bit.ly/3XDgj82>
9. UNICEF. Haiti. Available at: <https://uni.cf/3EDv41K>
10. WHO. Shortage of cholera vaccines leads to temporary suspension of two-dose strategy, as cases rise worldwide. 19 October 2022. Available at: <https://bit.ly/3uw6ADj>
11. Song, K. R., Lim, J. K., Park, S. E., Saluja, T., Cho, S. I., Wartel, T. A., & Lynch, J. (2021). Oral Cholera Vaccine Efficacy and Effectiveness. *Vaccines*, 9(12), 1482. <https://doi.org/10.3390/vaccines9121482>
12. PAHO/WHO. Cholera. <https://www.paho.org/en/topics/cholera>
13. WHO. Cholera. <https://www.who.int/news-room/fact-sheets/detail/cholera>
14. Control of Communicable Diseases. 20th Edition. Dr David Heymann, Editor. 2017. American Public Health Association.