



## ECDC RAPID RISK ASSESSMENT

# Risk of travel-associated cholera from the Dominican Republic

June 2011

### Conclusions and recommendations:

- The cholera epidemic in the Dominican Republic has given rise to more than 5 000 cases since it began in November 2010. The disease is becoming endemic in the country.
- Response activities are focusing on reducing mortality and interrupting transmission.
- As the Dominican Republic is a very popular destination for tourists, imported cases are expected in the European Union. However, with appropriate precautionary measures the risk of infection and further transmission upon return to Europe remains low.
- Travellers should seek information on how to prevent cholera contamination prior to visiting affected areas.
- ECDC is closely monitoring the situation in the Dominican Republic and will provide a new assessment in response to a change in the epidemiological situation.

### Source and date of request

Internal ECDC decision following field visit, supported by EWRS messages from United Kingdom (17 June 2011) and Germany (20 June 2011).

### Public health issue

Risk for travel-related cholera in European citizens returning from Dominican Republic.

### Consulted experts and organisations

- World Health Organization
- Christina Frank, Robert Koch Institute, Germany

## Disease background information

Cholera is an acute diarrhoeal infection caused by the bacterium *Vibrio cholerae*. There are two serogroups - O1 and O139 - related to epidemic cholera. The O1 serogroup is divided into three biotypes: classical, El Tor and Hikojima, the latter being very rare. Each of the O1 biotypes is subdivided into two serotypes, Ogawa and Inaba.

Most individuals infected with *V. cholerae* remain asymptomatic or experience only mild diarrhoea. Symptomatic cases of human infection are characterised by nausea and abdominal discomfort, followed by acute watery diarrhoea (rice water stools) and vomiting. About 20% of the cases can present a severe form of the disease with acute diarrhoea and severe dehydration which can lead to death (in up to 50%) if left untreated. Among people receiving appropriate treatment, the case fatality rate is below 1%. The incubation period of the infection is between 18 hours and five days.

*V. cholerae* is present throughout the environment in endemic areas where it can survive for long periods of time. However, the most common reservoir for epidemic *V. cholerae* is humans and water contaminated with human faeces. The bacterium can survive for a long time in coastal waters contaminated by human excreta. *V. cholerae* causes periodic, seasonal outbreaks in regions where it is a component of the indigenous aquatic flora. Transmission to humans is usually through the consumption of contaminated water and food (seafood from contaminated water, fruit and vegetables irrigated with contaminated water, etc.). Transmission also occurs through exposure to the faeces of an infected person, although direct human-to-human transmission is relatively rare. Treatment of cholera infection is through rehydration (oral rehydration salt solution and intravenous fluids in more severe clinical cases). Using anti-diarrhoeal drugs is not recommended in patients with cholera. There are two oral killed whole-cell cholera vaccines currently available, offering protection of over 50% lasting for two years in endemic settings. It has been suggested that providing a 1-3 day course of antibiotics in severely ill patients can shorten the illness and reduce the frequency of loose stools.

Every year there are an estimated three to five million cholera cases and 100 000–120 000 deaths due to the disease. The most common risk factors for cholera outbreaks are water source contamination, heavy rainfall and flooding and population displacement. The disease is most common in South East Asia, particularly on the Indian sub-continent, although outbreaks have occurred in other parts of the world. Cholera is currently also common in sub-Saharan Africa and Latin America. Outbreaks have recently been reported in Angola, Ethiopia, Somalia, Sudan and northern Vietnam. An epidemic in Zimbabwe, which lasted for almost one year, spread throughout the country and into neighbouring Zambia and South Africa, causing more than 98 000 cases and 4 000 deaths by the end of July 2009.

## Event background situation

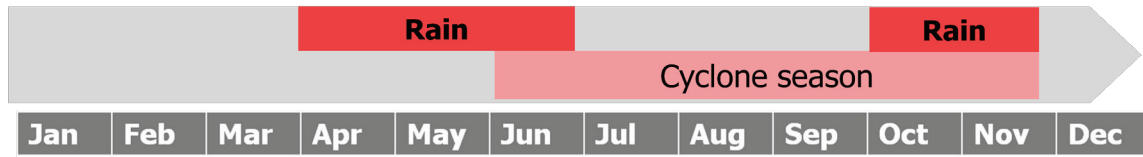
### Epidemiological situation

Less than one month after the start of the epidemic in Haiti, on 16 November 2010, the Dominican Ministerio de Salud Publica (Ministry of Public Health) confirmed the first case of cholera in the country. As of epidemiological week 23 (6–12 June 2011), the Ministry of Public Health had reported 5 367 suspected cases of cholera, including 46 deaths [5]. Among the suspected cases, 1 727 were laboratory confirmed by cell culture. To date, the provinces of Hermanas Mirabal and San José de Ocoa have not reported any confirmed cases. According to the Ministry, drinking contaminated water has been the main mode of transmission in the country.

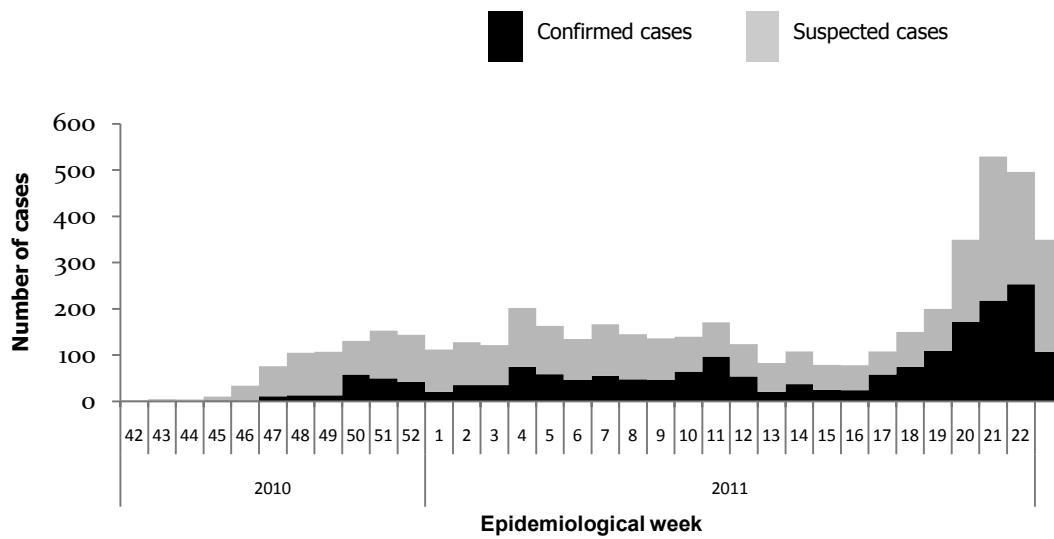
Since epidemiological week 18 (starting 2 May 2011), the number of cholera cases reported on a weekly basis through the national surveillance system has increased significantly (see Figure 4). Between weeks 18 and 23, a total of 23 fatalities were reported, with 11 during week 23. Most of the increase was reported in the provinces of Santo Domingo, San Pedro de Macoris, Distrito National (capital city) and San Cristobal. These four provinces represented around 70% of the cases (215 of 311) during week 22. In weeks 21 and 22, cases were reported in 21 provinces and 41 municipalities [6] (see Figure 3).

This increase in reporting coincided with heavy rains that caused flooding in certain areas of the country. The rainy season in the Dominican Republic (as in Haiti) occurs between April and June and between October and November. Additionally, the period from June to November is the cyclone season.

**Figure 1: Rainy and cyclone seasons in the Dominican Republic and Haiti**

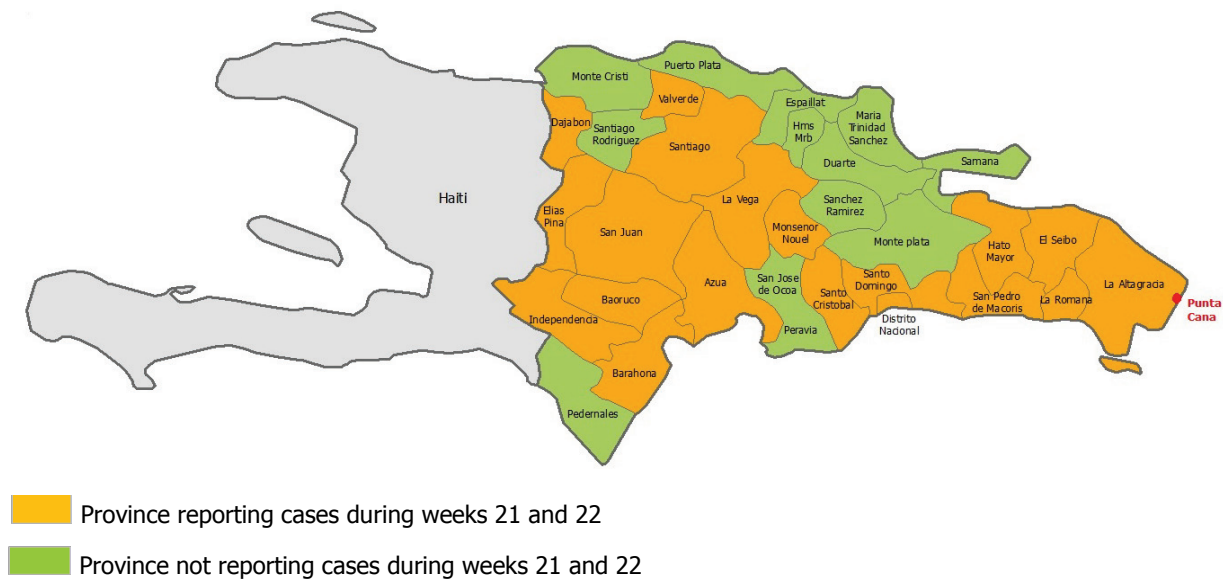


**Figure 2: Number of suspected and confirmed cholera cases reported per epidemiological week in the Dominican Republic, from week 42, 2010 to week 23, 2011**



Source: Ministry of Public Health, Dominican Republic. Cholera situation 14 June 2011.

**Figure 3: Provinces reporting cholera cases during week 21 and 22**



Source: Ministry of Public Health, Department of Epidemiology, Weekly Epidemiological Bulletin, Week 22, [http://www.salud.gob.do/download/docs/Boletin/Boletin\\_Semana\\_22-2011.pdf](http://www.salud.gob.do/download/docs/Boletin/Boletin_Semana_22-2011.pdf)

## Travel-related cholera case in a British citizen returning from the Dominican Republic [7]

On 17 June, the Health Protection Agency in the United Kingdom reported a confirmed cholera case (*Vibrio cholerae* O1 El Tor Ogawa) in North West England who developed symptoms while visiting the Dominican Republic. The case is a 69-year old woman who had recently returned from Punta Cana. The woman stayed at a resort between 17 May and 1 June 2011. The onset of illness was 27 May 2011 and the patient received hospital treatment prior to returning home. Both the patient and her husband remained in the resort for their entire holiday and ate all their meals onsite. The patient's husband did not present with symptoms. The patient is recovering.

The British Federation of tour operators is aware of the case and is investigating the public health measures being taken at the resort in question.

## Travel-related case in a German citizen returning from the Dominican Republic [8]

On 20 June, the Robert Koch Institute in Germany reported a confirmed case of cholera O1 El Tor Ogawa in a 60-year old German woman. She stayed in a hotel at Punta Cana between 12 and 26 May 2011. The woman claimed to have only eaten at the hotel. The onset of illness was 26 May (diarrhoea). The woman had not been vaccinated against cholera before travelling to the Dominican Republic. She has already recovered.

A female fellow-traveller also suffered from diarrhoea on 25 May however, no stool sample was collected.

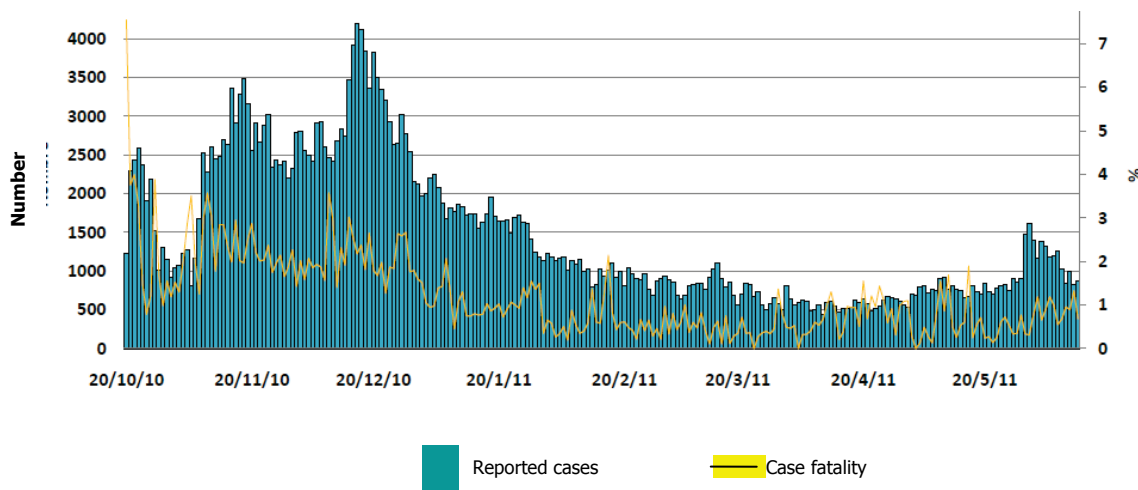
The German local health authority applied public health measures for the household of the confirmed case (hygiene measures, regular stool investigations and a ban on working in childcare institutions).

## Haiti

Given the close link between the outbreaks in the Dominican Republic and that in Haiti, a short overview of the epidemiological situation in the neighbouring country is provided below.

On 21 October 2010, the Haitian Ministère de la Santé Publique et de la Population (Ministry of Public Health and Population) confirmed the first cases of cholera in the Artibonite Department. The outbreak rapidly progressed and was soon affecting all 10 Departments in Haiti. After the outbreak reached its peak in December 2010, disease incidence slowed down during the first months of 2011.

**Figure 4: Number of reported cases and case-fatality in Haiti, 20 October 2010–12 June 2011**



Source: Ministry of Public Health and Population, 12 June 2011

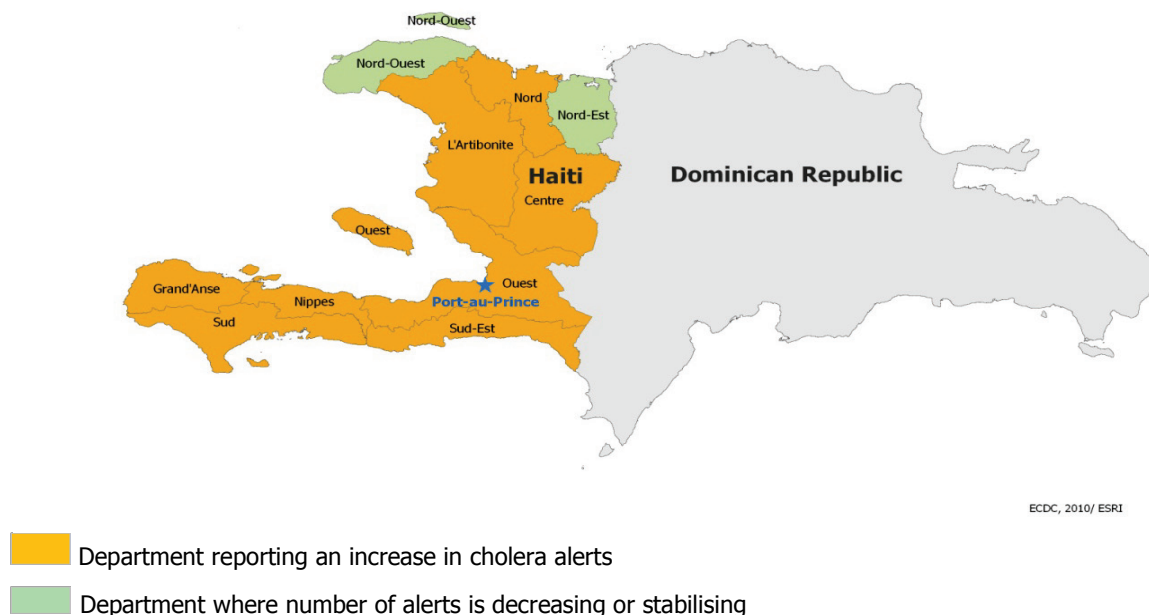
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As of 20 June 2011, the Ministry of Public Health and Population had reported 363 117 cases of cholera in Haiti, 53% of which (191 508 persons) required hospitalisation. A total of 5 506 deaths have been reported associated with this outbreak. The high case-fatality rate (>2%) in the first months of the epidemic was mainly due to the

lack of coordinated response at the start [1]. As the response has improved, including case management, the current case-fatality rate in hospitalised cases has decreased below 1% [2].

Although the number of cholera cases stabilised during February, March and April, a resurgence of cases has been observed since week 19 (9–15 May), specifically in the Departments of West, South-East, South, Centre and Grand'Anse [3] (see Figure 2). By the end of May, several Cholera Treatment Centres (CTCs) and Cholera Treatment Units (CTUs) in Port-au-Prince and neighbouring municipalities were working at near full capacity. In response to the rapidly evolving epidemiological situation, some CTCs and CTUs that had previously closed re-opened to deal with the emergency [4].

**Figure 5: Departments reporting an increase in cholera cases since week 19 (as of 22 June 2011)**



Source: Pan American Health Organization (PAHO), *Epidemiological Alert: Update on the cholera situation in Haiti and the Dominican Republic*, 22 June 2011.

[http://new.paho.org/hq/index.php?option=com\\_content&task=blogcategory&id=1218&Itemid=2291](http://new.paho.org/hq/index.php?option=com_content&task=blogcategory&id=1218&Itemid=2291)

This recent increase in cases coincides with heavy rain and flooding, mainly affecting the Departments of West, South and Grand Anse.

## Laboratory

The strain associated with the outbreak in both the Dominican Republic and Haiti is *Vibrio cholerae* O1, serotype Ogawa, biotype El Tor. The strain is susceptible to tetracycline and kanamycin. However, it shows resistance to nalidixic acid, sulphonamides, cotrimoxazole, streptomycin, furazolidone, and intermediate susceptibility to ampicillin and chloramphenicol, and a reduced susceptibility to ciprofloxacin.

## ECDC threat assessment for the EU

Despite intense efforts by the Ministries of Health in Haiti and the Dominican Republic and by humanitarian workers involved in the response to the epidemic, cholera is becoming endemic in both countries. It is anticipated that further epidemic peaks will occur, particularly during the rainy season. Despite some similarities in the predicted pattern of the disease, the situation in both countries is different. Unlike Haiti, the Dominican Republic has a network of health services in place with human resources available, and the overall sanitary conditions and access to safe water are better in most places.

Considering the incubation period of the disease and the date of onset, the travel-related cases reported from the UK and Germany were most likely infected during a recent peak of cases in week 20 or 21. The two cases stayed

at different hotels in Punta Cana and both report having eaten all their meals at their respective hotels. At this point, it is not possible to specify the source of infection and both water and/or food could be suspected.

Travel-associated cholera cases reported in Europe are rare and are usually associated with travel to the Indian subcontinent and Africa where outbreaks frequently affect local populations. The two cholera cases in British and German tourists after travelling to the Dominican Republic are the first cases reported by European Member States since the beginning of the epidemic in the country. However, it should be noted that in January 2011, a group of Venezuelans reported cholera infection after attending a wedding celebration in the province of La Romana in the Dominican Republic. This infection was linked to the consumption of lobster [9, 10].

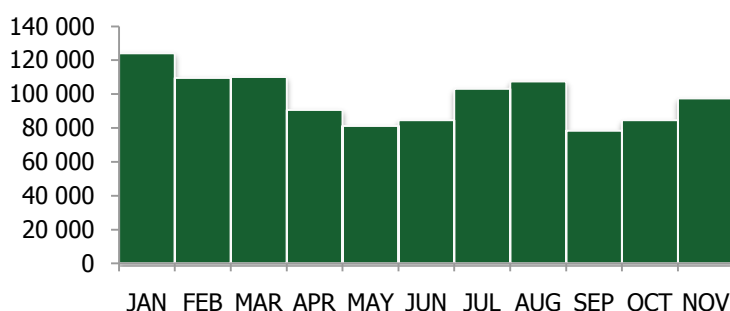
## European tourism to the Dominican Republic

In 2010, 4 135 480 tourists arrived in the Dominican Republic by air [11]. Over one million of these visitors were European citizens, mainly French, Spanish, German, British and Italian. Punta Cana is a particularly popular destination, with large hotels, resorts and spas.

**Table 1: Number of tourist arrival by air in the Dominican Republic, according to nationality (European) in 2010 [11]**

Member State	Number of tourists
France	216 108
Spain	176 703
Germany	163 579
United Kingdom	158 890
Italy	89 981
Other European countries	265 435
<b>Total</b>	<b>1 070 696</b>

**Figure 6: Arrival by air of European tourists per month in 2010 [11]**



In comparison, Haiti receives fewer foreign visitors, with just over 23 000 European visitors in 2007 (44% from France) [12]. However, as sanitation is poor throughout the country, the risk of contamination while visiting Haiti is higher.

Given the magnitude of the outbreak in the Dominican Republic, occasional travel-related cases can be expected. The number of imported cases may rise during higher seasons of transmission (e.g. rainy seasons) and holiday periods. However, overall the risk of cholera infection in travellers visiting the Dominican Republic should be considered low. Applying precautionary sanitary-hygienic measures plays a key role in the prevention of the disease. Visitors to cholera-endemic countries should only drink bottled water or water treated with chlorine; carefully wash all fruit and vegetables with bottled or chlorinated water before consumption; regularly wash their hands (especially before eating) and only eat thoroughly cooked seafood products [13]. Further information on preventive measures is available from the WHO website (<http://www.who.int/topics/cholera/en/>). The travel-related cases reported by two EU Member States indicate that such measures also need to be applied in hotel resorts. Given the hygiene standards in the EU, the risk of further transmission of cholera upon return is considered negligible.

In EU Member States, cholera vaccine is not routinely recommended for travellers. However, it might be considered for humanitarian health workers and military personnel working in refugee camps; persons travelling to cholera epidemic/endemic countries with limited access to safe drinking water and/or no access to medical care and those who are immune-compromised [14-22]. Travellers should seek advice from travel medicine clinics to assess their personal risk.

As of 27 June 2011, no other islands of the Caribbean region had been affected by cholera. However, the risk remains that cholera may spread to other Caribbean islands or neighbouring countries. The situation in the region must be monitored closely to prevent and control the spread of the disease.

## Conclusions

The cholera epidemic in the Dominican Republic has resulted in more than 5 000 cases since it began in November 2010. The disease is becoming endemic in the country. Response activities focus on reducing mortality by caring for patients in cholera centres and interrupting transmission by improving sanitation and providing safe water.

As the Dominican Republic is a very popular destination for tourists, imported cases are expected in the European Union. However, with appropriate precautionary measures the risk of infection and further spread upon return to Europe remains low. Travellers should seek information on how to prevent cholera contamination prior to visiting affected areas.

ECDC is closely monitoring the situation in the Dominican Republic (and in Haiti) and will provide a new assessment in response to a change in the epidemiological situation.

## Contact

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