

## The origins of the 2010 Haiti cholera outbreak

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**In 2010, just a few months after the earthquake that devastated Haiti and claimed so many victims, the country was hit by a cholera outbreak. It took the United Nations six years to half-heartedly acknowledge its responsibility for the epidemic. The three authors of this article review the chronology of this episode and draw lessons from it.**

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**A** cholera epidemic hit Haiti from 2010 to 2019, claiming roughly 10,000 lives. The issue of the origin of the outbreak emerged at the same time as the first cases were spreading. Although the scientific community had little difficulty establishing the origin of the outbreak, it would only be officially recognised in 2016, following years of controversy. What discussions were had which led to many stakeholders, including *Médecins Sans Frontières* (MSF), not wanting to speak up?

### **The start of the outbreak: early detection and epidemiological investigation**

Incredulity could have prevailed when the cholera outbreak began in Haiti in October 2010,<sup>1</sup> as the disease had not affected that part of Hispaniola for over a century. Epidemiological surveillance had been on the alert since the earthquake of 12 January 2010. The Haitian Ministry of Public Health and Population (MSPP), the US branch of the World Health Organization, the Pan American Health Organization and a US institution, the Center for Disease Control and Prevention (CDC), had deployed an epidemiological early warning system across fifty-one locations. This surveillance proved useful for detecting the cholera outbreak at an early stage.

The start of the outbreak was detected in record time. In mid-October, Haitian and Cuban healthcare workers at the hospital in Mirebalais (population 90,000) reported to the Centre Department's health authorities an outbreak of several dozen cases of acute watery diarrhoea and the death at the hospital of a 20-year-old male. On 18 October, a team from the Cuban medical mission passed on the information to Haiti's national health authorities in Port-au-Prince. Two epidemiologists were

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<sup>1</sup> Cholera is an epidemic diarrhoeal disease caused by bacteria and only suffered by humans. The current cholera pandemic (the seventh) has affected all the regions of the world. The World Health Organization estimates that there are roughly three million cases and over 95,000 deaths caused by the disease each year around the world. The global fatality rate was 1.8% in 2016, but it has exceeded 6% in vulnerable groups living in high-risk areas.

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appointed to support the investigation at the departmental level, with the investigation team having already reached the local districts in the Centre Department by 19 October.

The members of the investigative team collected six stool samples from identified symptomatic people by carrying out home visits in Meille. They were told by the residents and healthcare teams that this hamlet of a few dozen residents, located just over a couple of miles from Mirebalais, was where the first cases appeared. A waterway flows through Meille and joins the Latem River, which flows into the Artibonite River, Haiti's longest river. The first case of acute watery diarrhoea was detected in Meille on 12 October. The field investigation conducted by the department did not find any suspect cases downstream along the banks of the Artibonite River prior to that date.<sup>2</sup>

The village of Meille is home to the Annapurna camp, where a contingent of around 400 United Nations (UN) peacekeepers had arrived in small groups, from early October, from Kathmandu in Nepal, where cholera is endemic. The health investigation team were refused access to the military camp and its personnel. The camp doctor asserted that none of the peacekeepers had been affected by diarrhoea, an unlikely story given the high frequency of watery diarrhoea of all kinds among travellers. The investigators observed that the camp's wastewater was partly discharged into the waterway, which was subsequently confirmed by the journalists Jonathan Katz and Sebastian Walker from the Associated Press and Al-Jazeera in a report from the area on 27 October.<sup>3</sup> Roberson Alphonse, a journalist from the Haitian daily newspaper *Le Nouvelliste*, reported that another destination for the military camp's wastewater, after it was pumped and transported by truck, was an open-air septic tank, overflowing and located close to the waterway that crosses the hamlet.<sup>4</sup> Wastewater samples taken by the departmental health investigators looking for the cholera-causing bacterium were negative.<sup>5</sup> This was disturbing, but may suggest chlorination of the septic tank.

The samples taken on 19 October by the health investigation team were sent to Port-au-Prince for analysis at the National Public Health Laboratory (LNSP). Five of the six tested positive: the strain of cholera that caused the world's seventh cholera pandemic had been well and truly detected for the first time in Haiti.

### The question of the origins of the outbreak

The results caused a lot of controversy just as thousands of cases were emerging along the banks of the Artibonite River. One big question was nagging in the Haitians' minds: had the strain of cholera been introduced to the island by the UN peacekeepers from Nepal, or was there an environmental cause? The epidemiological investigation led straight to the gates of the Annapurna camp in Meille as the source of the outbreak. Moreover, the results of a second series of laboratory tests carried out by the CDC using samples provided by the LNSP were made public on 13 November. They showed that a single strain of cholera had been introduced onto the island in one go. A third series of results was published in the *New England*

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<sup>2</sup> Louise C. Ivers and David A. Walton, "The 'first' case of cholera in Haiti: lessons for global health", *The American Journal of Tropical Medicine and Hygiene*, vol. 86, no. 1, 2012, pp. 36–38.

<sup>3</sup> Sebastian Walker, "UN Investigates Cholera Spread in Haiti", *Al Jazeera English*, October 28, 2010, [https://www.youtube.com/watch?v=gk-2HyQHUZ0&ab\\_channel=AlJazeeraEnglish](https://www.youtube.com/watch?v=gk-2HyQHUZ0&ab_channel=AlJazeeraEnglish)

<sup>4</sup> Roberson Alphonse, Louis F., Pierre Louis J.S., « Mirebalais. Cholera, Part 1 », *Le Nouvelliste*, 8 novembre 2010, [https://www.youtube.com/watch?v=Ke4m7mtBuks&ab\\_channel=LeNouveliste](https://www.youtube.com/watch?v=Ke4m7mtBuks&ab_channel=LeNouveliste)

<sup>5</sup> *Vibrio* is the name given to comma-shaped bacteria, like those that cause cholera.

*Journal of Medicine* on 6 December 2010,<sup>6</sup> confirming South Asia, rather than the Americas or East Africa, as the geographical area that was the source of the strain responsible for Haiti's outbreak.

These findings should have put an end to any further debate. Indeed, when the first cases were detected in mid-October 2010, there were no other influxes of people into Meille from cholera-endemic areas, other than the Nepalese Blue Helmets, who arrived from 8-24 October. However, the controversy went on for another five years. The outbreak is thought to have claimed at least 10,000 lives over this period of time, without it being officially acknowledged how the bacterium came to Haiti in the first place. The ban on examining the Nepalese soldiers or accessing their medical records, originally opposed by the UN and subsequently kept in place, fuelled doubts.

The publication in December 2010 of data showing that the genomes<sup>7</sup> of the strains causing the Haitian cholera outbreak were completely identical to those collected in Nepal in 2009 and 2010 settled the matter in the scientific community.<sup>8</sup> However, in the sociopolitical arena, notably the UN, it wasn't settle until 2016.

To gain a better understanding of the controversy, we can categorise the participants in the debate based on their differing attitudes towards the Nepalese peacekeepers: their defenders, those who pointed the finger publicly and those who criticised them behind closed doors.

### The defenders

Those who sought to gather information to defend the Nepalese peacekeepers were the UN agencies, Rita Colwell, a researcher at the University of Maryland regarded as an authority in her area of expertise, the US National Academy of Medicine's review, David Sack, a researcher at John Hopkins University, the British daily newspaper *The Guardian*, *The Lancet* medical journal and Alejandro Cravioto, a Mexican researcher and the executive director of the International Centre for Diarrhoeal Disease Research, based in Dhaka in Bangladesh, who the UN tasked with investigating the origin of the outbreak.

They all championed the environmental hypothesis, according to which cholera emerged due to a transformation of strains dormant in the Haitian environment but which did not usually cause the disease. This transformation was thought to be linked to the increased temperature and salinity of the brackish estuary waters following the January 2010 earthquake.

Under the guise of scientific rigour, the UN engaged in what the French expert Renaud Piarroux describes as an exercise in the generation and dissemination of misinformation.<sup>9</sup> Several pieces of information are needed to define an outbreak: a case definition, locations and periods in question. However, for all these parameters the UN provided explanations that contradicted the ministry's own epidemiological investigation that lay the blame on the UN peacekeepers. The biological definition of cases was therefore challenged by the UN using arguments borrowed from scientists favouring the

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<sup>6</sup> Chen-Shan Chin, Jon Sorenson, Jason B. Harris *et al.*, "The origin of the Haitian cholera outbreak strain", *New England Journal of Medicine*, vol. 364, no. 1, 2011, pp. 33–42. December 2010 results updated January 2011.

<sup>7</sup> The complete set of genes or genetic material present in a living being.

<sup>8</sup> Chen-Shan Chin, Jon Sorenson, Jason B. Harris *et al.*, "The origin of the Haitian cholera...", *art. cit.*

<sup>9</sup> Renaud Piarroux, *Choléra. Haïti 2010-2018. Histoire d'un désastre*, CNRS Éditions, 2019.

<https://www.cnrseditions.fr/catalogue/biologie-et-sante/cholera-haiti-2010-2018-histoire-d-un-desastre>

environmental hypothesis. The UN supported Rita Colwell's theory, according to which strains that did not produce any toxins and had never been identified in other contexts as the cause of severe cases and deadly epidemics could be the source of the outbreak in this case. The geographical location of the cases was also presented in a distorted fashion: the exclusion of the first clinical cases detected in Meille from the data analysis – as the UN did (because laboratory confirmation was not possible at this initial stage) – enabled the outbreak of the outbreak to be located downstream in Artebonite Department. This was tantamount to absolving the Nepalese peacekeepers, as the locations downstream of Meille appeared to have been hit by cholera before and not after the hamlet was affected. Finally, by arbitrarily dating the start of the outbreak to September and not October, the UN suggested that the outbreak was underway before the Nepalese peacekeepers arrived in Haiti.

### Public finger pointers

Many people publicly pointed the finger at the contingent of Nepalese peacekeepers for importing cholera to Haiti. Firstly, the Mayor of Mirebalais, then residents of Mirebalais and the village of Meille and more generally a significant proportion of Haiti's population.<sup>10</sup> Then there were the Haitian and Cuban healthcare workers based in Mirebalais and Lascahobas (another town in the Centre Department) and even Fidel Castro himself, who championed the observations of the Cuban medical mission in the area. The aforementioned journalists – Roberson Alphonse, Jonathan Katz and Sebastian Walker – were part of this movement to publicly expose the source of the outbreak, as were a team of scientists at Harvard, the Swedish ambassador,<sup>11</sup> Thierry Durand, MSF – France's Operations Director, and two former presidents of the organisation, Rony Brauman and Jean-Hervé Bradol, at the time directors of studies at MSF *Centre de réflexion sur l'action et les savoirs humanitaires* (Crash), who were in the minority in their institution, as we will see further on. Finally, there was also the French expert Renaud Piarroux, appointed by the Ministry of Foreign Affairs and the French embassy, who was on the ground from 7 November 2010. He supported the findings of the MSPP's investigation, explaining that the outbreak was not the result of environmental changes but rather had been caused by a bacterium imported by the Nepalese peacekeepers. In his view, the UN should have acknowledged its responsibility and mobilised resources to tackle the outbreak. The emergence of new cases could have been prevented by applying basic preventive measures bolstered by vaccination. Acknowledgement of responsibility was all the more necessary given that some of the furious population were looking for scapegoats, such as voodoo priests, forty-five of whom were lynched and killed after being accused of witchcraft and poisoning.<sup>12</sup>

### Behind-closed-doors critics

The MSPP's epidemiological investigators at the local and departmental levels, the relevant MSPP directors in Port-au-Prince, the minister of health and the president himself criticised the Nepalese peacekeepers behind closed doors. Some of them handed confidential ministry documents incriminating the Nepalese soldiers to Renaud Piarroux, while refraining from any public condemnation. The health and political authorities feared weakening the position of the peacekeepers by stating that they were the source of the deadly epidemic, at a time when they were a key part of the forces of law and order in a country where the State is so weak. The context was even more

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<sup>10</sup> Residents will be demonstrating in the streets, as they did in Cap-Haïtien in mid-November 2010, « Choléra : des heurts éclatent en Haïti entre casques bleus et manifestants », *Le Nouvelliste*, 15 novembre 2010.

<sup>11</sup> He was isolated among his fellow ambassadors and ended up in conflict with the Swedish International Development Cooperation Agency.

<sup>12</sup> « Haïti – Social : Lynchages, au moins 45 morts, choléra ou guerre de religion ? », *Haïti Libre*, 23 décembre 2010, <https://www.haitilibre.com/article-1975-haiti-social-lynchages-au-moins-45-morts-cholera-ou-guerre-de-religion.html>

sensitive as the first round of the general elections was scheduled to take place on 28 November 2010 with many of those standing for election calling for the elections to be postponed.

MSF belonged to this group who deemed discussions about the origins of the outbreak pointless in terms of organising the response, and even thought it dangerous given the sociopolitical context.

### **The debate within *Médecins Sans Frontières***

The January 2010 earthquake caused a very high death toll and left lots of survivors with injuries. This natural disaster was followed by an uncommon and remarkable humanitarian response: widespread media coverage, US military intervention and the influx of hundreds, if not thousands, of aid agencies. The earthquake happened during a period of tense relations between the UN – working at the time on the standardisation and specialisation of responses to emergency situations under the aegis of its agencies – and MSF, which was concerned about a complex and slow approach, an approach that also contradicted the principle of humanitarian organisation independence from states.

Rony Brauman published an opinion column in *Le Monde* on 23 November 2010 with the aim of helping to prompt a swifter and bigger emergency response to Haiti's cholera outbreak.<sup>13</sup> In his view, the issues worth highlighting were the underwhelming response by aid agencies to the outbreak, violence during protests against the UN peacekeepers tasked with “stabilising” Haiti who the people suspected of having imported the disease, the need to treat cholera cases using simple and effective rehydration protocols and the rollout of prevention measures targeting water sources and food that might be contaminated. With regard to the origin of the outbreak, in his opinion piece published in *Le Monde*, Brauman championed the environmental hypothesis.

Shortly afterwards, Rony Brauman received a copy of a French diplomatic service telegram listing Renaud Piarroux's conclusions; the telegram ended with a firm instruction not to disclose the information. At the same time, Piarroux learned the opinion of the former MSF president, espousing the environmental hypothesis, from reading *Le Monde*. As Piarroux knew Brauman, he wrote to him and once back in Paris, visited MSF's headquarters, where he met with Marie-Pierre Allié, the president, Thierry Durand, Operations Director, Rony Brauman and Jean-Hervé Bradol. Renaud Piarroux handed over a copy of his report and was not in any doubt about the matter: the people at the top of MSF had been deceived by the UN misinformation campaign.

From then on, Rony Brauman and Jean-Hervé Bradol were convinced that the peacekeepers were the source of Haiti's outbreak. However, within MSF, those in favour of public communication highlighting the issue of the outbreak's origin remained isolated. The president of MSF's French section and Unni Karunakara, the president of MSF International, said that seeking the origin of an outbreak was part of the data needed for analysis to plan the response, but in this case they were unsure about the source of the outbreak. The hypothesis that the Nepalese contingent of UN peacekeepers could be the source of the outbreak caused consternation at MSF, as borne out by the way in which the satirical in-house journal, *Dazibao*, reported on the discussion in the association:

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<sup>13</sup> Rony Brauman, « Faiblesses du dispositif anti-choléra à Haïti. Il faut soigner par la réhydratation intensive », *Le Monde*, 23 novembre 2010, [https://www.lemonde.fr/idees/article/2010/11/23/faiblesses-du-dispositif-anti-cholera-a-haiti\\_1443887\\_3232.html](https://www.lemonde.fr/idees/article/2010/11/23/faiblesses-du-dispositif-anti-cholera-a-haiti_1443887_3232.html)

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“At a time when the population is dying of cholera against the backdrop of the indifference of non-governmental organisations paralysed by the bureaucratic nature of the aid system... the intellectuals at Crash can find nothing better to do than start a futile debate at MSF about the origins of the outbreak... triggering unbridled and gratuitous conflict between the organisation’s members... while also playing a part in fuelling the masses’ animosity towards the brave peacekeepers whose only means of defending themselves are innocuous toilet rolls.”<sup>14</sup>

This opinion was shared by many MSF executives who felt that efforts to ascertain the origin of the outbreak were futile and a waste of time because of the lack of repercussions on patient treatment and on the epidemic dynamics.

The general managers of the various MSF sections held a meeting on 13 December 2010. They agreed on public communication about the origin of Haiti’s cholera cases. Going against the opinion of the general manager of the French section, the four other operational centres decided not to mention the origin of the outbreak.<sup>15</sup> Renaud Piarroux’s work was deemed too flimsy by MSF to be used in its communication. The MSF executives opted to stress the failure of the aid system’s response and launch an appeal for open access to reports and epidemiological investigations, expressing a wish for the latter to be developed.

### The end of the outbreak

Following the dual genetic sequencing of the Haitian and Nepalese strains and their comparison in 2014, the UN’s denial that it was their Nepalese peacekeepers who imported cholera into Haiti was no longer credible from a scientific perspective. While no investigation has been conducted to find out the opinion of the Haitian population, the qualitative data available suggests that few stakeholders and observers had any reservations about the responsibility of the Nepalese peacekeepers as of late 2010.

The UN sought to justify its attitude by alluding to a major security and political risk: rioting, lethal violence against the peacekeepers, cancelled elections and a failure of the UN stabilisation mission. The overestimation of the threat to public order may have been based on a certain degree of mistrust of the Haitian population, thought to be immature and dangerous.

Finally, in 2016, Ban Ki-moon, the UN secretary-general, acknowledged his organisation’s responsibility.<sup>16</sup> In the meantime, legal action attempted by some of those with cholera and families of those who died came to nothing because of the UN’s legal immunity. The controversy about the outbreak’s origin ultimately contributed to a mobilisation that led to the disease being eradicated in 2019, following years of intense effort.

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<sup>14</sup> Dazibao: *Médecins Sans Frontières*’ in-house discussion magazine, autumn 2010.

<sup>15</sup> MSF has five operational centres: Paris, Brussels, Geneva, Amsterdam and Barcelona.

<sup>16</sup> Martine Valo, « L’ONU admet sa responsabilité dans l’épidémie de choléra en Haïti », *Le Monde*, 19 août 2016, [https://www.lemonde.fr/planete/article/2016/08/19/l-onu-admet-sa-responsabilite-dans-l-epidemie-de-cholera-en-haiti\\_4985249\\_3244.html#:~:text=Du%20bout%20des%20%C3%A8vres%2C%20les,rendu%20malades%20800%20000%20personnes](https://www.lemonde.fr/planete/article/2016/08/19/l-onu-admet-sa-responsabilite-dans-l-epidemie-de-cholera-en-haiti_4985249_3244.html#:~:text=Du%20bout%20des%20%C3%A8vres%2C%20les,rendu%20malades%20800%20000%20personnes)

### **The origin of outbreaks – a crucial question**

The political and health authorities shoulder the responsibility for the response to outbreaks. This complex task requires them to be both politically and scientifically legitimate. To achieve this, their communication must be based on some knowledge of the epidemiological situation, with the question of the outbreak's origin being a key part of that. How can the authorities provide an appropriate response or prevent a pathological, even deadly, phenomenon, if they are unaware of its origin? Even though it is not always easy to determine the origin of outbreaks, if the authorities leave this question unanswered, they run the risk of weakening their credibility in the affected societies.

Furthermore, if communication about the origin of an outbreak does not gain a firm foothold, alternatives to the official authorities' messaging may take root in the political arena. The political authorities can be undermined as a result. The theories doing the rounds, even if their veracity has not yet been established, can turn into accusations and lead to consequences ranging from contempt to social violence.

There are several situations in which those in power or those working in public health and healthcare have been responsible for the emergence of outbreaks, including iatrogenic transmission by healthcare facilities,<sup>17</sup> laboratory leaks,<sup>18</sup> biological research programmes for military purposes<sup>19</sup> and representatives of the authorities themselves passively carrying and passing on diseases, as in the Haitian case. Knowledge of these examples emphasises the need for health stakeholders to consider the issue of the origin of outbreaks and design their practices as a means of providing solutions but also raising issues.

*Translated from the French by Gillian Eaton*

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### **Biographies**

**Emmanuel Baron** • A doctor and the holder of an MSc in epidemiology from the London School of Hygiene & Tropical Medicine. Emmanuel Baron worked for *Médecins Sans Frontières* (MSF) on various emergency programmes helping vulnerable populations and tackling infectious diseases. He then held the post of medical director in Paris before joining Epicentre MSF, a research, epidemiology and training group embedded in MSF, as general manager.

**Jean-Hervé Bradol** • A director of studies at *Médecins Sans Frontières* (MSF) *Centre de réflexion sur l'action et les savoirs humanitaires* (Crash). Jean-Hervé Bradol is a doctor and specialises in tropical medicine, emergency medicine and epidemiology. He went on his first MSF mission in 1989, undertaking long-term assignments in Uganda, Somalia and Thailand. He returned to the organisation's Paris headquarters as head of programmes in 1994. He served as the communications director and then operations director from 1996 to 2000. He was

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<sup>17</sup> HIV and Hepatitis C are examples of diseases for which transmission in healthcare settings played a big role in epidemic dynamics.

<sup>18</sup> To date, there is thought to be one recorded example of a major epidemic caused by a laboratory leak: in 1977 an epidemic of the H1N1 flu strain, thought to have come from a Chinese laboratory, spread to the neighbouring USSR and around the world.

<sup>19</sup> Such as those conducted by Unit 731 of the Japanese army (1936-1945). The unit deliberately injected Chinese villagers with biological agents, including plague and cholera, causing the deaths of 400,000 people.

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president of the French MSF section from May 2000 to June 2008. Jean-Hervé Bradol is the author of several publications, including *Medical Innovations in Humanitarian Situations: The Work of Médecins Sans Frontières* (ed., with Claudine Vidal, CreateSpace Independent Publis, 2011) and *Humanitarian aid, genocide and mass killings. Médecins Sans Frontières, the Rwandan experience, 1982-97* (with Marc Le Pape, Manchester University Press, 2017).

Elba Rahmouni • Elba Rahmouni has been in charge of dissemination at *Médecins Sans Frontières (MSF) Centre de réflexion sur l'action et les savoirs humanitaires (Crash)* since April 2018. She is the holder of a Master's degree in history of classical philosophy and a Master's degree in editorial consulting and digital knowledge management. During her studies, she worked on moral philosophy issues and was particularly interested in the practical necessity and the moral, legal and political prohibition of lying in Kant's philosophy.

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