

## Let's Make Cholera ConGO Away!

The populations most affected by climate change often feel as though they are at the bottom of a basin, unable to change the course of the river but constantly filled up and oppressed by its flow. The residents of the Democratic Republic of the Congo make up a significant part of this vulnerable population, and for those living in the areas bordering the lake on the Congo Basin, this feeling is literal. Increased temperatures caused by climate change are correlated to the severity of flooding in fluvial areas, and with increased flooding comes a seriously increased prevalence of waterborne diarrheal diseases like cholera. Cholera thrives in humid environments, and since trade and fishing on the Congo River are the DRC's main sources of income, Basin populations are at an even higher risk. While the DRC only produces .0308 tonnes of CO<sub>2</sub> per person compared to America's 18.5 tonnes, rural Congolese populations are by far the most negatively affected by climate change (Gapminder). In 2017 there were 55,000 cases of cholera in the Congo, with a total of 1,190 deaths. Twenty-five percent of these cases were in children under five, and 15% of the deaths were in this same population of young children (Gapminder). Twenty-four of the thirty-five health zones in the entire country of 60.6 million people were badly affected during this same year, so the problem is not one to be ignored by the countries most to blame for the increasing CO<sub>2</sub> levels (WHO Africa). Though it is often overlooked since diarrheal diseases are a secondary result of climate change, cholera must be addressed in rural areas of the Congo, especially when it is so easy to cure and prevent.

According to the American Clinical and Climatological Association, "changes in the density of [cholera's] reservoir may result in modification of the bacterial population size in the environment." Flooding provides a greater space for cholera to spread, and it especially becomes an issue when Congolese people eat contaminated aquatic plants or crustaceans. "Sunlight, temperature, and nutrients, in addition to affecting growth of *V. cholerae*, influence growth of

phytoplankton and aquatic plants,” and people in areas bordering reservoirs of water are affected by cholera when they ingest the contaminated organisms (ACACA). With increasing floodwaters, bacteria from villagers defecating in the open water travels even farther, affecting a greater population than it would if the river stayed its course. Diarrheal disease, though easily preventable, can result in death for children in a few hours (CDC Responds to Cholera in Haiti). A person with cholera can lose up to six liters of water an hour due to the bacteria’s ability to permanently switch the liquid release mechanism in the body on, and without care the victim can die within a few hours.

My solution addresses the Congo River Basin, focusing on a thriving cholera bacterium reservoir in the lakes of the Rift Valley (Muyembe). The highest level of cases all year occur in lake bordering areas, and since the Congo River is the central source of transportation for the DRC, local migrating fisherman and merchants are likely to spread cholera while trading up and down the river (Muyembe). While cholera is difficult to prevent, it is fairly easy to resolve using oral rehydration therapies which restore fluids and salts lost by the victim. To address the endemic, I would supply sanitized cloth, salt, and sugar to key community health hubs in the lake bordering village so that Congolese can obtain their own materials and make the solutions for themselves. According to the CDC, ORT’s are simple to make: Filter at least one liter of water through a clean cloth, boil the filtered water for one minute, and then stir a half teaspoon of salt and six teaspoons of sugar into one liter of the water. The filtering problem is especially relevant in waterfront areas because parasitic copepods found in the river are easily contaminated by *Vibrio cholerae*. A study in Bangladesh found that when “the water was filtered through several layers of the sheer but finely woven cloth of the traditional sari clothing worn by women of the region . . . cholera was reduced by about half” (ACACA). In a similar approach, educating the Congolese on how to filter their water through the provided cloth will greatly reduce the

transmission by copepods. Antibiotic treatments would be allotted to the villages for individual, severe cases that the salts could not resolve. As far as preventative measures go, I would make a proposal to the Global Fund for a grant to purchase chlorine drops, because adding a few drops to a bucket of water and waiting thirty minutes makes the water safe to drink (CDC). To make the chlorine solution sustainable, I would use some of the grant to buy SE200 Community Chlorine Makers, a mechanism produced by Cascade Designs in Seattle which only requires water, salt, and a motorcycle battery to produce enough chlorine bleach to sanitize two-hundred liters of water (MSR Gear). These would be distributed first in Kinsasha, the capital city situated on the Congo River, and the effectiveness of the chlorine solution would be observed to determine how many cleaners would be necessary for the other basin villages. Additionally, the money would be used to educate people in remote areas of the Congo on the importance of keeping their water clean, washing their hands, and protecting food from flies, commissioning Community Health Workers to hold the village accountable and provide the resources necessary to maintain safe drinking sources. Unfortunately, previous attempts to encourage the Congolese in swampy savannas to boil water have failed, because wood and coal are so expensive and used solely for cooking (Muyembe). The introduction of the SE200 would address this cultural disinclination, because it does not require the burning of natural resources which would add to the issue of climate change and will produce minimal costs. It is time to act on behalf of the vulnerable population in the basin, beginning with cholera in the Congo.

## Works Cited

- (n.d.). Retrieved from <https://www.gapminder.org/>
- Britannica, T. E. (2018, March 21). Congo basin. Retrieved from <https://www.britannica.com/place/Congo-Basin>
- Centers for Disease Control and Prevention (CDC). (2011, April 29). CDC Responds to Cholera in Haiti. Retrieved from [https://www.youtube.com/watch?v=0vcce\\_VBshM](https://www.youtube.com/watch?v=0vcce_VBshM)
- Cholera - Vibrio cholerae infection. (2017, May 24). Retrieved from <https://www.cdc.gov/cholera/videos.html>
- Cholera - Vibrio cholerae infection. (2018, May 21). Retrieved from <https://www.cdc.gov/cholera/treatment/index.html>
- Constantin de Magny, G., & Colwell, R. R. (2009). Cholera and climate: a demonstrated relationship. *Transactions of the American Clinical and Climatological Association*, 120, 119-28.
- Democratic Republic of Congo. (n.d.). Retrieved from <https://www.afro.who.int/fr/countries/democratic-republic-congo>
- Democratic Republic of Congo (DRC). (n.d.). *Geological Atlas of Africa*, 74-79. doi:10.1007/3-540-29145-8\_16
- DEMOCRATIC REPUBLIC OF CONGO - climatelinks.org. (n.d.). Retrieved from [https://www.climatelinks.org/sites/default/files/asset/document/20180716\\_USAID-ATLAS\\_Climate-Risk-Profile\\_DRC.pdf](https://www.climatelinks.org/sites/default/files/asset/document/20180716_USAID-ATLAS_Climate-Risk-Profile_DRC.pdf)
- Lemarchand, R., Payanzo, N., Wiese, B. M., & Cordell, D. D. (2019, January 24). Democratic Republic of the Congo. Retrieved from <https://www.britannica.com/place/Democratic-Republic-of-the-Congo>

- Munyuli, M. T., Kavuvu, J. M., Mulinganya, G., & Bwinja, G. M. (2013). The Potential Financial Costs of Climate Change on Health of Urban and Rural Citizens: A Case Study of *Vibrio cholerae* Infections at Bukavu Town, South Kivu Province, Eastern of Democratic Republic of Congo. *Iranian journal of public health*, 42(7), 707-25.
- Muyembe, Jean Jacques, Didier Bompangue, Guy Mutombo, Laurent Akilimali, Annie Mutombo, Berthe Miwanda, Jean de Dieu Mpuruta, Kabunga Kambale Deka, Fataki Bitakyerwa, Jaime Mufitini Saidi, Armand Luhembwe Mutadi, Raphael Senga Kakongo, Freddy Birembano, Martin Mengel, Bradford D. Gessner, Benoît Kebela Ilunga; Elimination of Cholera in the Democratic Republic of the Congo: The New National Policy, *The Journal of Infectious Diseases*, Volume 208, Issue suppl\_1, 1 November 2013, Pages S86–S91, <https://doi.org/10.1093/infdis/jit204>
- SE200™ Community Chlorine Maker. (n.d.). Retrieved from <https://www.msrgear.com/se200>
- The American Museum Congo Expedition collection of bats. *Bulletin of the AMNH* ; v. 37, article 18. (1917). doi:10.5962/bhl.title.89200
- World Report 2011: Rights Trends in World Report 2011: Democratic Republic of Congo. (2015, April 16). Retrieved from <https://www.hrw.org/world-report/2011/country-chapters/democratic-republic-congo>