



## What is Cholera?

Cholera is a disease caused by the aquatic bacterium ***Vibrio cholerae***. The bacterium produces an exotoxin that **blocks sodium reabsorption in the intestines**. This causes water to flood the intestines in an attempt to balance the ion concentration.<sup>1</sup> Symptoms of the disease include:



Figure 1: *Vibrio cholerae*, a Gram-negative curved rod-shaped bacteria. Courtesy of the CDC.

- Diarrhea
- Vomiting
- Low blood pressure
- Severe dehydration
- Leg cramps
- Shock and subsequent death without treatment.<sup>1</sup>

*Vibrio cholerae* is most commonly found in water sources that have been contaminated by feces from a person who was infected with cholera. This generally occurs in places **without adequate sanitation and sewage treatment systems**. People contract the disease by drinking this contaminated water.



Figure 2. Treating patients on cholera cots in Haiti. Courtesy of the CDC.

## The Fight Against Cholera

- Cholera was first shown to be water-borne by Jon Snow in 1854.<sup>4</sup>
- Cholera has a variety of prevention mechanisms, all of them related to using clean, safe water. These include drinking and using clean water, using soap often, and keeping feces separate from all waterbodies.<sup>1</sup>
- Vaxchora is a preventative vaccine recently approved by the FDA.<sup>1</sup>
- Once infected, rehydration and antibiotics are used for treatment.<sup>1</sup>

## Epidemiology of Cholera

- **Prevalence:** Every year, cholera impacts approximately 3-5 million people worldwide. This number is estimated because many cases are not reported due to limitations in health-care and surveillance systems.<sup>3</sup>
- **Mortality rate:** Cholera causes approximately 100,000 to 120,000 deaths each year.<sup>3</sup>

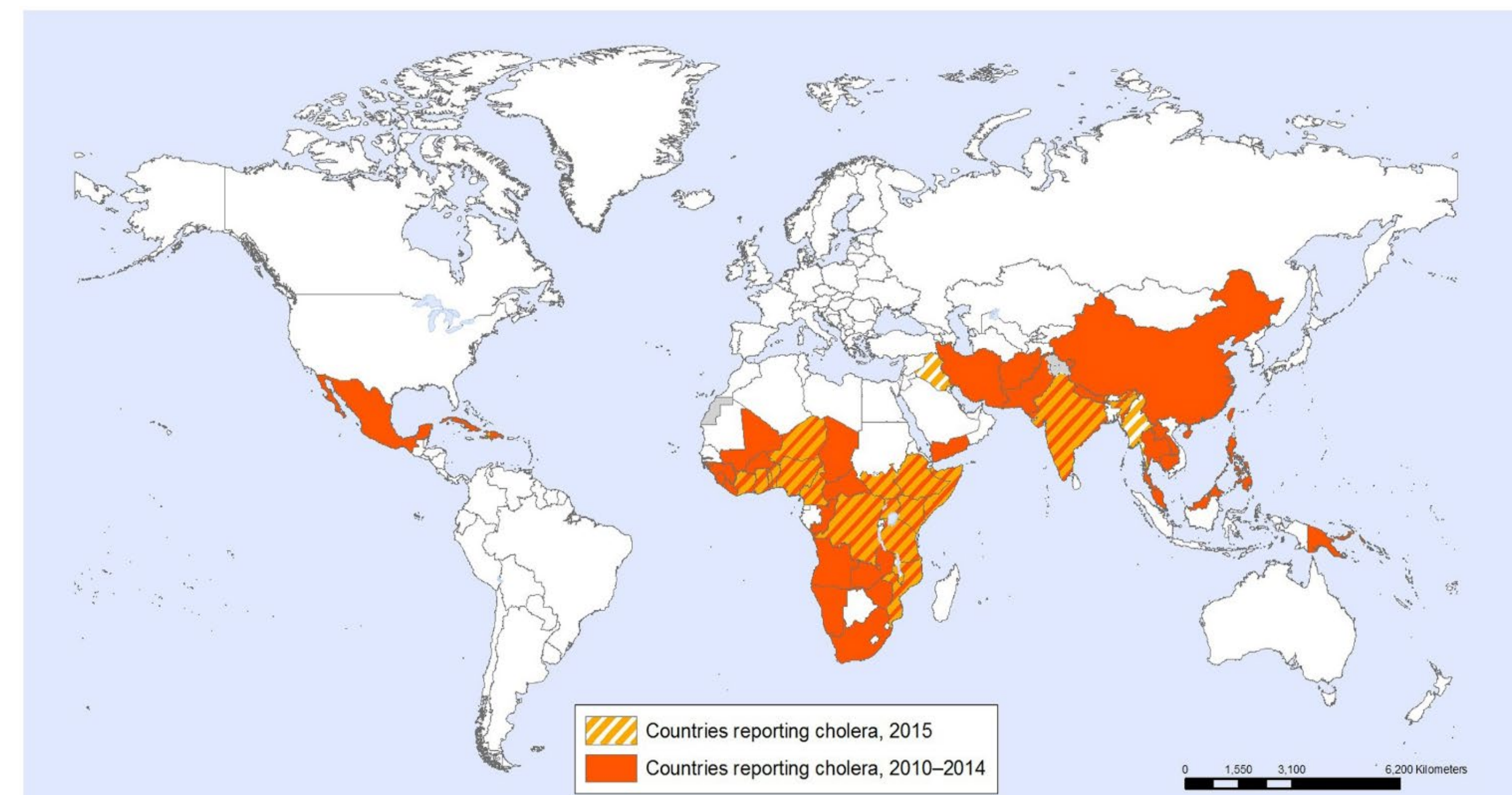


Figure 3. Global Distribution of Cholera, 2010-2015. Courtesy of WHO.

- **Geographic distribution:** Cholera is most commonly found in central and southern Africa and south and southeastern Asia. Haiti experienced a devastating cholera epidemic in 2010 after a catastrophic earthquake.<sup>2</sup>
- **Age and gender distribution:** In regions where cholera is endemic, the majority of cases occur among **children less than 5 years old** and in **women of reproductive age**. However, in epidemics, the young and old are generally affected the most and both genders are affected equally.
- **Status distribution:** Those with lower socioeconomic status have a higher incidence of disease. Malnourished children and those with compromised immune systems are more likely to die from the disease.<sup>3</sup>

## Cholera & Clean Water

- A clear correlation exists between the geographic distribution of cholera (Fig. 3) and unimproved drinking water sources (Fig. 4).
- Even as water quality and prevention and treatment methods of cholera generally improves around the world with modernization of facilities, the case fatality rate has more than doubled in recent years, from 0.8% in 2015 to 1.8% in 2016.<sup>2</sup>

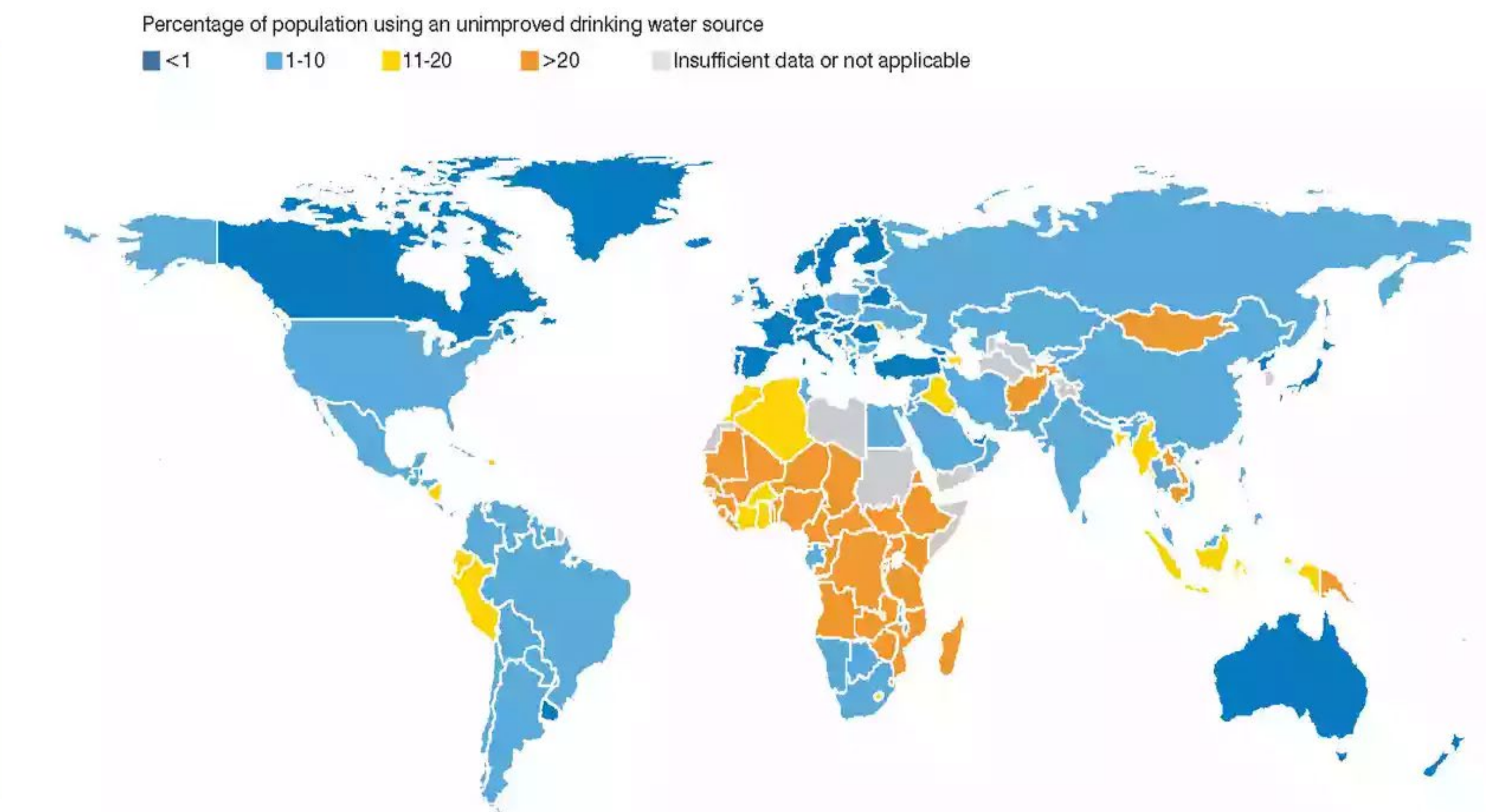


Figure 4. Geographic distribution of unimproved drinking water sources. Data from 2017. Courtesy of The Guardian.

There are global initiatives currently in progress to lessen the mortality of cholera, led by the partners of the **Global Task Force on Cholera Control (GTFCC)**. GTFCC's "**Global Roadmap To 2030**" aims to **eliminate cholera transmission in at least 20 countries by 2030, producing a 90% reduction in deaths overall**. This includes long-term, sustainable water, sanitation and hygiene measures as the first of 6 multi-sectoral interventions.<sup>2</sup>

## References

1. "Cholera - *Vibrio Cholerae* Infection." (2018). *Centers for Disease Control and Prevention*, [www.cdc.gov/cholera/general/index.html](http://www.cdc.gov/cholera/general/index.html).
2. "Cholera." (2017). *World Health Organization*, [www.who.int/gho/epidemic\\_diseases/cholera/en/](http://www.who.int/gho/epidemic_diseases/cholera/en/).
3. Jahan, S. "Cholera – Epidemiology, prevention, and control". *IntechOpen*. 2016.
4. Snow, J. "On the mode of communication of cholera". London. 1854.