STOP CHOLERA

Work Together. Stop Transmission. End Deaths.

An Updated Estimate of the Global Burden of Cholera in Endemic Countries

Estimated Annual Number of Cholera Cases in Endemic Countries

Source: Ali M, Nelson AR, Lopez AL, Sack DA. Updated Global Burden of Cholera in Endemic Countries. Under review (2015).

Global Burden of Cholera

The global burden of cholera is not precisely known. Estimates of the number of cholera cases and deaths rely on available reports, such as those sent by countries to the World Health Organization (WHO), which must then be adjusted for data gaps and inconsistencies. The lack of accurate reports is due to limited capacity for disease surveillance in cholera-affected countries, as well as social, political, and economic disincentives for reporting cholera. For example, countries that export food or have a tourism industry may be reluctant to report cholera.

A publication from 2012 using data from 2000 to 2008 estimated that there were 2.8 million cholera cases and 91,000 cholera deaths annually occurring in 51 endemic countries.[1] This fact sheet provides a revised estimate of the cholera disease burden based on more recent data (from 2008 to 2012) and newer estimation methods.

Data Sources

A systematic search of publicly available data was conducted using the search terms "cholera" and "acute watery diarrhea." Major data sources included the annual cholera reports published in the WHO Weekly Epidemiological Record, the Gideon database, and ProMED. All figures were aggregated at the country-level, with the exception of India, China, and Indonesia, for which figures are available at sub-national levels.

Identifying Cholera-Endemic Countries

The first step was to draw up a list of all counties where cholera is endemic. Because many countries do not report cholera to the WHO, for each country, we used a spatial lag regression model that takes into account the cholera risk in its neighboring countries, as well as available data from the country itself. The model predicts the probability of a country experiencing cholera cases in a specific year. If the model's predicted incidence rate in a particular country exceeded the threshold of 0.01 cases per 100,000 population for a given year, that country was deemed to have cholera cases in that year. If cholera cases were predicted in at least three of the five years included in the study (2008-2012), the country was considered to be endemic; this follows the WHO definition of a cholera-endemic country.[2] The model considers cholera cases as the dependent variable and access to improved water and sanitation as the independent variables. Using this method, 69 countries were found to be cholera-endemic.

Estimating the Population at Risk

The next step was to estimate the number of people at risk for cholera in each endemic country. Population figures were collected from the United Nations Development Program (UNDP) *World Population Prospects: The 2012 Revision*.[3] The proportion of the population at risk was based on the percent of the population without access to improved sanitation facilities according to UNICEF's State of the World's Children Report 2013.[4]

Classifying Countries by Cholera Risk

Countries were then grouped by the "WHO mortality strata," which are defined by WHO region and level of mortality. According to the WHO mortality strata, countries were classified as either: (A) very low child and low adult mortality; (B) low child and low adult mortality; (C) low child and high adult mortality; (D) high child and high adult mortality; or, (E) high child and very high adult mortality.[5]

Estimating Country-Specific Incidence Rates

Since cholera incidence rates are not known for most endemic countries, we used data from population-based passive cholera surveillance studies conducted in the early to mid-2000s in three sites in Asia and Africa – Beira, Mozambique; Kolkata, India; and Jakarta, Indonesia – and applied these rates to other countries in the same mortality stratum in their respective regions.[6] Thus, the incidence rate from Beira, Mozambique was applied to the at-risk populations of African E countries, the rate from Kolkata, India was applied to the at-risk populations of Asian D countries, and the rate from Jakarta, Indonesia was used for at-risk populations of Asian B countries. For Haiti and the Dominican Republic, we used the average incidence rates reported to WHO by each country from 2010-2012.

Estimating Cholera Deaths

Case fatality rates (CFRs) were calculated using variance-weighted average CFRs by WHO mortality stratum.[1] CFRs for Haiti and the Dominican Republic were averages of the rates reported to WHO.

Results

Using these methods, we estimated that there are about 2.86 million cholera cases resulting in approximately 95,000 deaths in 69 endemic countries per year. Countries with estimates of more than 100,000 cases per year are:

- India
- Ethiopia
- Nigeria
- Haiti
- Democratic Republic of the Congo (DRC)
- Tanzania
- Kenya
- Bangladesh

Conclusion

Cholera remains an important public health problem in more than one-third of the world's countries, and disproportionately affects disadvantaged groups. Continued global efforts are needed to improve cholera surveillance and reduce the burden of this disease through a combination of improvements in water and sanitation systems, cholera vaccination, and improved access to good quality health care.

References

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