Editorial Committee Introduction

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The current supplement presents an overview of cholera disease burden and critical issues for the diagnosis, detection, prevention, and control of cholera in Africa. In 2013, the seventh cholera pandemic reached its 43rd year in Africa, with no evidence that it will end soon. More than 20 African countries have reported cholera to the World Health Organization (WHO) every year between 2007 and 2012, including large recent epidemics in the Democratic Republic of Congo (DRC), Sierra Leone, Uganda, Ghana, Niger, and Guinea [1].

In the current supplement, articles from individual countries highlight the human toll of cholera, including more than 200,000 cases and 7000 deaths in DRC from 2000 through 2008 [2]; 68,000 cases and 2600 deaths in Kenya from 1998 through 2010 [3]; 28,000 cases and 1300 deaths in Cameroon from 2010 through 2011 [4]; 25,000 cases and 220 deaths in Mozambique from 2009 through 2011 [5]; and more than 12,000 cases and 500 deaths in Togo from 1996 through 2010 [6]. Two patterns emerge from these reports. The first is endemic, as in DRC, where cholera has occurred continuously in specific regions with an increase in the number of outbreaks during the rainy season. The second pattern is epidemic or outbreak driven, as in Mozambique, where many districts have been affected over relatively short periods, separated by prolonged quiescent periods. Although factors such as climate might increase outbreak risk, in these settings it remains difficult to predict the specific districts or communities that will be affected during any given year.

Difficulties in interpreting country-level data exist. Most African countries currently rely on reporting of aggregate data from the district level, whose completeness remains unknown. This could lead to serious underestimation of cholera burden that is likely to vary by geographic area, age group, or other risk factors. A reliance on aggregate data that are limited to case counts and deaths prevents evaluation by basic demographic features such as age, gender, and town of residence, making identification and targeting of high-risk groups difficult. Additionally, in most circumstances, countries have collected data on suspected cholera cases based on clinical symptoms rather than laboratory confirmation. Although this has the distinct advantage of conserving laboratory resources and, practically, might be justified during large outbreaks, to the extent that other acute diarrheal illnesses occur simultaneously with cholera, it might lead to overestimation of cholera burden. Complicating this situation are changes in cholera case definitions, such as those that occurred in Cameroon [4].

In 2 articles, Rebaudet and colleagues distinguish between coastal [7] and inland [8] cholera, arguing that unlike in Bangladesh, cholera in Africa is not driven primarily by the impact of climate on coastal aquatic reservoirs. Instead, the majority of African epidemics have occurred inland, in areas such as the Great Lakes Region, Lake Chad Basin, and the Sahelian belt. Nevertheless, water does play a critical role in cholera transmission and amplification in Africa. In coastal areas, most outbreaks occur near estuaries, lagoons, mangrove forests, and on islands, while inland cholera epidemics most often have their “roots” and “branches” along rivers and lakes. In all settings, climatic disruptions in water supply—either droughts or floods—are likely to increase cholera incidence by altering access to and safety of drinking water supplies and the ability to maintain proper sanitation.

So what can be done? Fortunately, large strides have been made. In all settings reported in this supplement, cholera case fatality ratios have decreased dramatically, at least at the country level, even if not within all regions or

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This likely has occurred due to improvements in outbreak response activities by ministries of health (such as those developed in collaboration with the WHO African Regional Office [9]), the availability of trained healthcare staff, and improvements in clinical management strategies. Second, some countries, for example, Kenya, have achieved reductions to near zero in the number of reported cases. However, it remains unknown if this resulted from the substantial efforts implemented to control cholera, a lull period brought about by temporary increases in population immunity, changes in environmental risk factors, or a combination of these factors.

In the short term, improvements in case management should extend to all affected areas. Over the long term, the critical interplay between environmental waters, drinking water supplies, and sanitation makes a strong argument for investments in infrastructure to expand access to improved water sources and sanitation in those areas at greatest risk for epidemic cholera. However, it will take time to mobilize and achieve success from these investments, even if economic growth and public health investments on the continent continue to increase.

A promising additional intervention is oral cholera vaccine, which is now available in 2 formulations that have been prequalified by WHO. Von Seidlein et al make the case that the use of oral cholera vaccine to prevent or at least mitigate cholera outbreaks is a necessity, even an obligation, of the global community in the face of the devastating effects of such outbreaks [10]. As described by Maskery et al, a global effort to establish a cholera vaccine stockpile is near realization [11, 12]. The immediate goal is to have an international stock of vaccines available for epidemic responses based on national requests. A secondary goal is to increase demand so that the global supply of vaccine will increase, potentially lowering unit costs and secondary goal is to increase demand so that the global supply of vaccine will increase, potentially lowering unit costs and making preventive campaigns possible. Major challenges remain, however. As the data from Mozambique indicate, cholera outbreaks at the local level are difficult to predict and often end before vaccine realistically could reach target communities. The most efficient use of vaccine is unknown because the highest-risk groups during African outbreaks remain poorly described. Both prequalified vaccines require 2 doses separated by 2 weeks and an additional week until protective immunity is engendered. Finally, researchers have not yet documented the duration of protective immunity among vaccinees, and it may be as short as 3 years.

Advances have been made in cholera diagnostics [13], including standardization of transport of specimens and microbiological analyses, rapid diagnostic tests, and common use of molecular subtyping to track outbreaks. In addition to field-based laboratory diagnostics, molecular biology holds the promise of greatly increasing our understanding of cholera dynamics [14]. For example, tracking specific strains of *Vibrio cholerae* could help to explain their spread across the African continent and confirm the origin of transregional outbreaks. This also could help identify specific populations in which cholera arises and from which it spreads to other communities, for example, fishermen catching and selling fish along the African coast.

The seventh pandemic continues to disrupt the lives of African populations and the healthcare systems and economies of African nations at a relentless pace. However, recent advances in technology, improvements in funding, availability of new interventions such as vaccines, and increased emphasis on cholera among African ministries of health and the international community provide an opportunity over the midterm to dramatically reduce cholera’s burden in Africa. For example, the Africhol project (www.africhol.org), which supported the current supplement, has as its primary goals to more accurately describe cholera epidemiology, including confirmed disease burden and risk groups; construct a network of African and international organizations that will work together on cholera control; and provide platforms for the evaluation of public health cholera vaccine use.

In addition to Africhol, Medecins Sans Frontieres (MSF) recently has responded more broadly to cholera outbreaks, in addition to their traditional focus on clinical case management. As an example, during 2012, MSF and the Guinean Ministry of Health jointly implemented the first-ever reactive use of cholera vaccine during an ongoing outbreak (http://www.nature.com/news/cholera-vaccine-deployed-to-control-african-outbreak-1.10801, last accessed 29 January 2013). Global initiatives such as the Coalition for Cholera Prevention and Control (http://www.taskforce.org/press-room/press-releases/coalition-cholera-prevention-and-control-meeting, last accessed 29 January 2013), the Initiative Against Diarrheal and Enteric Diseases in Africa (http://idea-africa.info/, last accessed 29 January 2013), the Initiative Against Diarrheal and Enteric Diseases in Asia (http://www.idea-asia.info/, last accessed 29 January 2013), and the Global Alliance Against Cholera (http://www.choleraalliance.org/, last accessed 29 January 2013) demonstrate the new global interest and momentum in addressing the cholera problem globally, particularly in Africa. The Bill & Melinda Gates Foundation deserves particular praise for their efforts on behalf of cholera control, including support for the Africhol Project, the Coalition for Cholera Prevention and Control, the Diseases of the Most Impoverished Project, cholera vaccine demonstration projects, cholera vaccine modeling projects, and efforts to develop better sanitation systems in resource-poor settings. Through sustained, concerted global efforts such as these, significant protection from cholera is attainable across the African continent and worldwide.

### Notes

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