Getting Serious about Cholera

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Deaths from cholera are again making news, this time in Angola. According to the World Health Organization (WHO), Angola had reported 46,758 cases of cholera, including 1893 deaths, as of June 19, 2006. The outbreak has affected 14 of 18 provinces, but nearly half the cases were reported in the coastal capital, Luanda, and another 17 percent in Benguela provinces. The overall case fatality rate is about 4 percent, although in some provinces, it has reached 30 percent. This outbreak represents another in a series of cholera epidemics in this country, which is among the poorest in the world and is still recovering from years of armed conflict. Several other African countries have also had recent outbreaks (see map), in the seventh pandemic of cholera caused by Vibrio cholerae O1 El Tor, which reached Africa in 1970.

In addition to the reported cases, many are either not reported or are labeled as “acute watery diarrhea.” Although 94 percent of the 101,383 cholera cases and 99 percent of the 2345 related deaths registered with the WHO in 2004 occurred in sub-Saharan Africa, these numbers present a misleading picture of the global cholera burden. V. cholerae infects persons in many developing countries, with the highest rates in Asia, but many Asian countries do not report their cases because of the effects on trade and travel, however unwarranted. The true burden is probably several million cases in Asia and Africa, with fewer cases in Latin America. Assuming a case fatality rate of 4 percent (on the basis of treated cases), annual mortality of at least 40,000 to 100,000 is probable, and even this may be an underestimation: since many patients die before reaching a health care facility, the true number of deaths may be much higher.

In the 21st century, we know a great deal about cholera — its ecology, transmission patterns through contaminated water, and pathophysiology. Simple, inexpensive rehydration treatment is nearly 100 percent successful, and safe oral vaccines can prevent most
cases. Yet cholera epidemics and deaths still occur. Strangely, the panic that frequently ensues does not seem to have prompted a sense of urgency among policymakers or funding agencies. How does one explain this disconnect?

First, cholera epidemics affect the poorest people in the poorest countries — those with no political voice. Second, therapy with intravenous and oral rehydration solution (ORS) plus antibiotics (e.g., doxycycline for sensitive strains) is inexpensive and highly effective, so there is little need for additional research funds to find a cure. Since cholera affects both adults and children, it generally escapes the attention of advocates for child survival. And many countries do not report their cases, nor do national authorities admit to having a problem or raise it as a priority. Finally, many policymakers have decided that improving water and sanitation is the intervention of choice, but such improvements have not reached the groups at highest risk and will not reach them anytime soon, especially in countries such as Angola, where civil strife has prevented infrastructure development.

So, is there hope for controlling cholera? Our experience in Bangladesh, where infection is common (the annual case rate exceeds 2 per 1000 population) but deaths from cholera are unusual, provides considerable reason for optimism.

Cholera is easily treatable with aggressive rehydration therapy to restore circulating blood volume and antibiotics to shorten the course of illness and reduce the volume of fluid loss from the stool. At the hospital of the International Centre for Diarrhoeal Disease Research, Bangladesh, we annually treat more than 110,000 patients who have diarrhea. In 2005, among the 2216 patients in our sample surveillance system, 682 (31 percent) were infected with \textit{V. cholerae} O1 or O139, but none of them died; we estimated that there were 34,100 patients with cholera that year. Sometimes, during the epidemic season, the treatment ward must be extended into the parking lot, with tents to accommodate more than 500 patients per day. Patients, many of whom are in shock, with no detectable blood pressure or pulse on arrival, are immediately rehydrated and later given antibiotics. Within one or two days, they leave the hospital recovered and return to full productivity. The average cost for this lifesaving treatment is less than $15 per patient.

In addition to the intravenous fluids used to rehydrate severely dehydrated patients, hydration is maintained with rice-based ORS to offset ongoing stool losses. Less severely dehydrated patients are rehydrated and treated with the same ORS, which was found to reduce purging by about 30 percent, as compared with glucose solutions. About 15 to 20 percent of our patients had severe, life-threatening dehydration and were likely to die from hypovolemic shock without treatment. Treatment for severe dehydration must be one of the most cost-effective health interventions available. Thanks to the training and deployment of government and non-governmental providers, case management for diarrhea is available throughout most of Bangladesh.

Effective management of cholera outbreaks requires anticipation of the natural seasonality of cholera and the resulting epidemic curve, which are largely determined by ecologic and climatic factors. Tracking cholera’s seasonality with sentinel surveillance allows the
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Dr. David Sack reports holding a patent, with Cera Products, for an oral rehydration solution.