

Zimbabwe experiences the worst epidemic of cholera in Africa

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Abstract

A severe outbreak of cholera has been reported in Zimbabwe since mid 2008, with so far over 92,000 cases and over 4,000 deaths. This outbreak has differed from previous outbreaks in being mainly urban and with a high case-fatality rate. Breakdown in the supply of clean water has been the main underlying cause but breakdown in health service delivery in Zimbabwe has also contributed to the magnitude and severity of the outbreak.

Keywords: cholera, epidemic, Zimbabwe

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Cholera is endemic in a number of countries in southern Africa, and minor outbreaks have been recorded in Zimbabwe many times in the past. These outbreaks have usually occurred in communities that border endemic regions, particularly in the provinces of Manicaland and Mashonaland East, on the border with Mozambique. Outbreaks have increased in frequency and severity in the past 15 years, and have become more difficult to control. The first large outbreak of cholera was reported in 1992, in Manicaland and Mabvuku/Tafara – suburbs on the eastern edge of Harare - with just over 2,000 cases and a mortality of 5%. The following year there were 5,385 cases and 381 (6%) deaths. The next outbreak in 1998 had more than 1,000 cases and 44 deaths, and the following year there were 5,637 cases with 385 deaths. Most of these cases were in Chipinge and Chiredzi, in the south-east of the country again close to the Mozambique border. During 2002, 3,125 cases were reported in Manicaland and Mashonaland East, including 192 fatalities. In October 2003, 304 cases with 11 deaths were reported in Kariba, on the border with Zambia, and a further 99 cases, 16 of them fatal, were reported from Binga, a small fishing community

on the shore of Lake Kariba. The Binga cases probably originated in Kariba, and the high mortality was probably related to the difficulty of communications – six people had already died before the outbreak came to the attention of the health care authorities. The common feature of all of these outbreaks was that they occurred in border communities and were therefore probably imported from endemic regions in surrounding countries. While they were serious outbreaks, they were contained within a short time because of an effective and efficient response by the health care system. Thus, while they were unwelcome incidents, they posed little threat to the wider communities of Zimbabwe.

During the past 5-10 years, the health system in Zimbabwe has been compromised by critical shortages of finance and declining infrastructure. Key health personnel have become demoralized by poor pay packages and their inability to practice their medical professions because of shortages of diagnostics, drugs and support systems. Many health professionals have left Zimbabwe, leading to a critical shortage of human resources especially in the

periphery. Many of the clinics established in rural areas during post-independence development are no longer functioning. Even in larger urban areas, health care has been dramatically compromised by the economic crisis in Zimbabwe. A number of District Hospitals have been closed in the past few months, and services at Referral Hospitals in major cities have been severely limited. The surveillance and monitoring of disease outbreaks depends to a great extent on having personnel in place at functional community health care clinics, so surveillance has also been severely compromised – to the extent that data completeness is estimated to be only 30%.

The current outbreak of cholera that began in mid-2008 is different from previous outbreaks in a number of ways. This is by far the largest and most extensive outbreak of cholera yet recorded in Zimbabwe and indeed in Africa. Unlike previous outbreaks, most cases have appeared in urban centres, far from the borders with endemic neighbouring countries. Indeed, there is much evidence that Zimbabwe is now a source of cholera infection for other countries in the region. Understanding the reasons for this dramatic shift in epidemiologic characteristics will need intensive research, but the current pressures are first to try to contain the epidemic and to reduce the high mortality, and there has been only limited investigation. In this report, I will present some of the epidemiological data; later we expect to have more information from microbiological studies

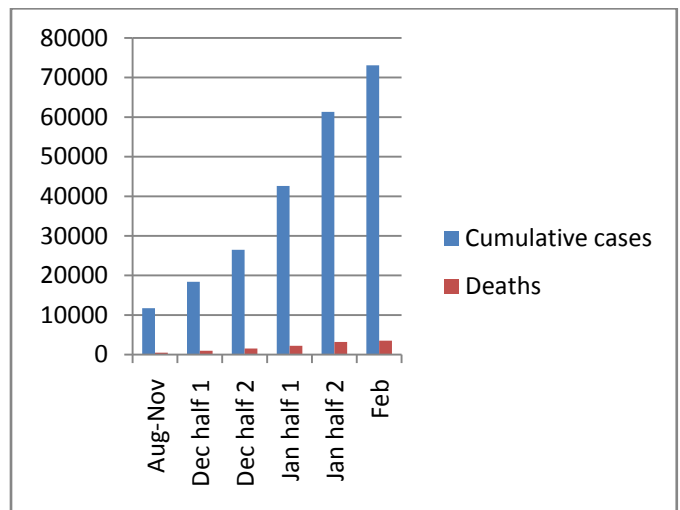
Initial outbreak

The present outbreak started in mid-2008 with the first cases, reported on 20 August, from St. Mary’s and Zengeza wards of Chitungwiza, a large urban centre on the outskirts of Harare. This outbreak, with 118 cases, was well managed and quickly brought under control through effective diagnosis and treatment. Although most cases were diagnosed clinically, *Vibrio cholerae* was isolated from 18 (30%) of 59 specimens submitted for examination, thus supporting the clinical evidence for an outbreak of cholera. Following this initial outbreak, a second wave of infections was reported a few months later. This outbreak occurred more widely within Chitungwiza, with numerous wards being affected. By 20 December there were over 600 cases and 104 deaths in the city. The case fatality ratio in this outbreak was extremely high at 15%, a situation attributed to the breakdown of health

services in urban areas as result of the economic crisis in Zimbabwe, and rapid transmission of infections to people who were already under stress from hunger.

Both of these outbreaks occurred in urban areas, with no obvious direct connections to countries where cholera was endemic, though the initial import into the community may well have been from a visitor or recent traveler.

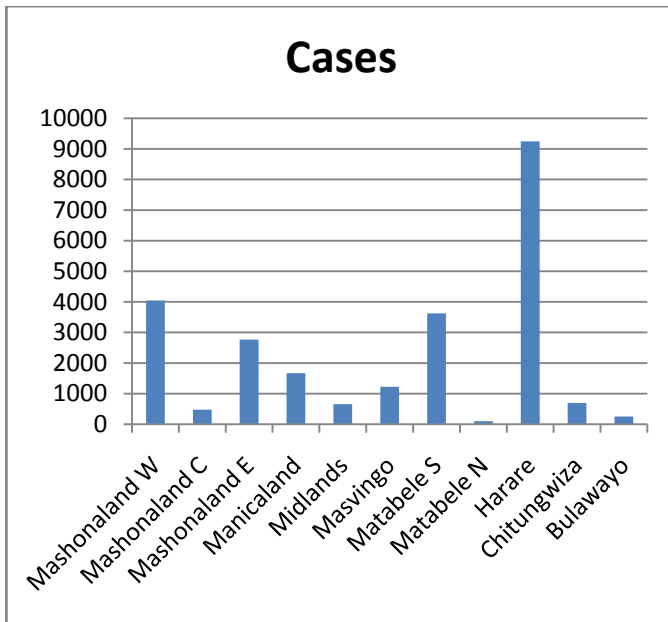
Fig 1. Emergence of cholera in Zimbabwe: Cumulative cases August 2008-February 2009



Spread through Zimbabwe

Following these urban outbreaks, new cases were reported with increasing frequency from rural communities in different provinces. Large outbreaks were recorded in Beitbridge, on the border with South Africa, during November 2008 and in Norton, a small town west of Harare in December 2008. Cases were, however, appearing countrywide, and by the end of December 2008, cholera had been reported from all 10 provinces in the country. As noted above, spread to South Africa, Mozambique, Botswana and Zambia is also suspected to have occurred – all four countries have reported cases of cholera and cholera deaths in districts that border Zimbabwe. The data from the provinces are shown below; the importance of large outbreaks in urban areas of Harare is quite clear.

Fig 2. Cases of cholera reported in different provinces August- December 2008



Transmission

Cholera is transmitted mainly through contaminated water and food, and the breakdown in water supply and sewerage disposal in urban areas is believed to be the underlying cause for the rapid emergence of cholera in the cities. The transfer of responsibility for water supply and sewerage disposal from City Councils to the Zimbabwe National Water Authority (ZINWA) has been closely linked to the current outbreak. Since the transfer of responsibility, parts of Harare and Chitungwiza have been without running water for more than 2 years. People have become dependent on shallow wells that may become readily contaminated because of the lack of sewage disposal. Although ZINWA has promised on many occasions to correct the supply problems, lack of finance from central government (and possibly other factors concerning management shortcomings) has limited their ability to do this. At present, international donor agencies are providing support to try to improve the water supply situation. In the long run, these measures may be able to control the epidemic.

Vibrio cholerae has been isolated from more than half of the suspect cases tested, with at least two serotypes involved in the outbreak. Serotype *Ogawa* has been described in isolates from Harare and Beitbridge (Matabeleland south), while both *Ogawa*

and *Inaba* serotypes have been found in Mashonaland West (Chegutu and Makondi districts). Molecular studies are expected to add to our understanding of epidemiological patterns and virulence factors in the outbreaks in different parts of the country, and we hope that such studies can be undertaken soon, using isolates collected during the outbreak.

Cholera fatalities

Case fatality ratios (CFR) in most districts exceed 5%, based on cases recorded at health clinics. Outside of the clinics, community fatality ratios are estimated by WHO to be 22-48%. In most provinces about 40% of all cholera deaths occur in the community, and the figures on case fatality may need to be adjusted accordingly. The CFR in most outbreaks around the world is about 1%. A number of factors have been put forward as possibly contributing to such high CFR, including bacterial virulence factors, poor nutrition and poor immunity of infected persons, delays in diagnosis, and difficulties of accessing appropriate treatment.

Death from cholera is usually a result of dehydration, and fatalities can often be prevented by the use of oral rehydration salts (ORS). The main problem facing infected people in Zimbabwe is lack of access to ORS – whether at the clinic or at home. The economic collapse in the country has meant that clinics and hospitals are no longer able to acquire and stock even basic medicines and materials to provide health care. Even though basic ORS packs would be relatively inexpensive, they are not available. Many of the clinics in rural areas are closed, because there are no staff, so patients have to travel to clinics in urban areas for treatment. The cost of transport is often beyond the means of the rural poor, leading to delays in accessing health care. The alternative is to use home-based ORS. In the past, many health education programs highlighted the way to prepare ORS at home, mainly to support home-based management of diarrhea in children. Sadly, the costs of the simple basic ingredients of ORS – salt, sugar and clean water – are also beyond the means of many in the current economic situation.

The future

Understanding why this situation happened may help in making decisions about how to control and prevent further epidemics. Outbreaks of cholera have been reported many times in the past in Zimbabwe, but until now all have been focal outbreaks and have

been contained quickly. The current outbreak has been continuing for at least six months and so far shows no sign of abating, with hundreds of new cases and many fatalities reported daily. The loss of life – over 3,500 people have died so far – has reminded all involved in health care that even those diseases that we thought we could control may return with a vengeance, if circumstances permit it.

- The breakdown in water supply and sewerage disposal in high density urban areas was undoubtedly a main factor in the emergence and rapid spread of infections. While economic factors may be important contributors to this breakdown, there is also the inability of ZINWA to deliver the service with which they were entrusted – the supply of safe water to residents of major towns and cities. An investigation into the operations of ZINWA is needed to identify failures and ensure that such failures do not recur. The decision by central government to remove responsibility for urban water supply from ZINWA and return responsibility to city councils is a step in the right direction.
- The breakdown in health service facilities, with shortages of clinic staff, was a major factor in delaying detection and management of cases, and contributes to the high case-fatality ratio experienced in this epidemic. Attempts are currently being made to provide more realistic pay and conditions of service for health care personnel, to retain the staff who remain. Assistance from international agencies, particularly UNICEF, has been pledged for this program.
- The lack of diagnostic services has meant that clinical indications of infection have only rarely been confirmed by laboratory isolations and characterizations of infections. While clinical diagnosis is effective in outbreak situations, laboratories do have a role to play in detecting and identifying pathogens, and the powerful technologies of molecular epidemiology can make significant contributions to implementing effective control measures. Capacity building, to ensure that personnel can detect pathogens in both clinical and environmental specimens, is an important component of a good control strategy.
- Failure of primary care facilities to provide even simple conditions for case management has

contributed to the high CFR. The provision of ORS at all primary care clinics would have done much to reduce the mortality in this epidemic. Support from international donor agencies to ensure adequate stocks of ORS should help to reduce CFR in the immediate future, but long term commitment by government for financial support for health services is needed.

- Finally, the general economic crisis of Zimbabwe, where unemployment is at 94% and where there are critical shortages of food and basic commodities, has contributed to an increasingly vulnerable population. It is perhaps difficult to imagine that people do not have resources to buy salt and sugar, but that is the reality of Zimbabwe. Most shops now sell goods only for foreign currency, and the source of such currency is only through the “black market” which is beyond the reach of the majority of the population. Add to this the high cost of transport to health care centres for those who require rehydration, and the reasons for the high mortality in this epidemic can be appreciated.

Now is the time for a recognition of the need for vigilance in recognizing disease outbreaks at an early stage, and while we are currently dealing with the crisis of cholera, there are many other infectious diseases that are waiting to emerge – anthrax, typhus and typhoid being only a few. Collaboration between Zimbabwe and international partners is essential for effective surveillance and response programs, and with ongoing changes in the political situation we have to hope that such international collaborations can again thrive.

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Note in proof: The total number of cases of cholera as of 23 March 2009 was 92,432 with 4,072 deaths (CFR 4.4%). The indications are that control measures are starting to have an effect, and the numbers of new cases reported on a daily basis have been declining.