

Cholera control and AMR in Nigeria

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In the late 1960s, the seventh pandemic of cholera berthed on the West African coastline, resulting in 22,931 cases in Nigeria and 2,945 deaths, with a case fatality rate of 12.8 per cent during 1971. Cholera has come and gone frequently since then but Nigeria, as well as many other African countries, has seen a significant resurgence in the number of cholera cases in the current millennium. Case fatality rates for this highly preventable and treatable, but deadly, disease have also been untenably high. This article discusses noteworthy features of recent cholera outbreaks in Nigeria and the need for cholera-specific and general interventions to control the disease.

Cases and case fatalities

Between 2010 and 2013, Nigeria reported over 70,000 cases and almost 3,000 deaths from presumptive or confirmed cholera. The focus of outbreaks in recent years has been northern Nigeria and, in particular, the Chad basin, around which cases have occurred in Nigeria, Cameroon, Niger and Chad (see Figure 1). Migrants, travelers and individuals attempting to flee outbreaks in the north typically seed new outbreaks in other parts of the country, as far as the south-west. The caseloads and scope of these outbreaks peaked in 2009–10 but, as the data in Figure 1 indicates, cholera continues to contribute a worrisome burden to Nigeria. Case



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Outbreaks need to be better and more quickly mapped. In Nigeria, the north in particular has poor access to potable water

fatalities in these outbreaks exceed one per cent, typically ranging between three and 24 per cent, which points to problems with case management and outbreak control (Adagbada et al., 2012; Piarroux and Faucher, 2012; WHO, 2012).

Drug resistance and antimicrobials

Very little microbiological surveillance has occurred in Nigeria, but virtually all recently isolated *V. cholerae* O1 strains show resistance to trimethoprim-sulphamethoxazole and most to tetracycline. The latter was the mainstay for managing cholera infections prior to the 1990s and the former was recommended after that following widespread plasmid-borne tetracycline resistance. Nigeria's essential drug list still recommends that tetracyclines, erythromycin or trimethoprim-sulphamethoxazole are used for cholera. Continued use of antibacterials to which *V. cholerae* is typically resistant means that antimicrobial use is unlikely to curtail transmission and instead provides selective pressure for resistance in other organisms. Tetracycline use can only be justified if isolates are routinely tested for susceptibility – which, in Nigeria, they rarely are. In contrast to tetracycline resistance, which is typically plasmid borne and sometimes lost when the drug is withdrawn, *V. cholerae* strains from Nigeria and elsewhere in Africa often carry multiple and/or chromosomal trimethoprim-resistant genes, so susceptibility is unlikely to return if the drug is temporarily discontinued (Marin et al., 2013; Opintan et al., 2008). Thus trimethoprim-sulphamethoxazole has no useful application in cholera outbreaks today.

V. cholerae showing reduced susceptibility to the quinolones have been isolated in the most recent outbreaks (Quilici et al., 2010), making a shift from trimethoprim-sulphamethoxazole to ciprofloxacin (the change made by nearby Ghana in response to resistance; Marin et al., 2013) undesirable. There are few other antimicrobial alternatives and all of them are prone to rapid selection of resistance, as has been seen with tetracycline, trimethoprim and ciprofloxacin. Overall, recent trends point to a declining value of antimicrobials in slowing transmission and the selective pressure posed by them, when used in cholera outbreaks, results in additional future health burdens. Vaccines offer better promise in this regard and could protect at-risk populations for several years, something that antimicrobials were never able to do. Recent research and development has yielded affordable, orally administrable vaccines and Nigeria, most certainly in the north-eastern states near Lake Chad, is one place that they should be applied.

Managing cholera cases: Rehydration

The use of oral rehydration therapy (ORT) has revolutionised the clinical management of diarrhoeal diseases, including cholera. ORT brings about significant reduction in morbidity and mortality from diarrhoea. The introduction of low osmolar oral rehydration solution has further increased the effectiveness of ORT. Although better promoted in Nigeria for the management of childhood diarrhoea, ORT is equally effective in the management of cholera, and its widespread and prompt use for cholera cases can reduce case-fatality rates to below one per cent. The high case fatality rates in recent Nigerian outbreaks suggest that more attention needs to be given to ORT use in particular and patient care in general.

Managing cholera epidemics: Surveillance

Microbiological and genomic analyses have shown that, while majority of Chad Basin isolates are related, the handful of *V. cholerae* O1 from Nigeria that have been subjected to molecular phylogenetics do not represent a single lineage (Marin et al., 2013; Quilici et al., 2010). More isolates need to be evaluated and outbreaks need to be better and more quickly mapped in order to better target response (Adagbada et al., 2012). World Health Assembly resolution 64.15¹ calls on the World Health Organization Director-General to assist countries in strengthening surveillance and to implement effective interventions including sanitation, water and vaccines.

Conclusion

While vaccines and proper treatment offer ways to ameliorate the devastation from cholera, recent resurgence of cholera in Africa, and in northern Nigeria in particular, is reflective of poor access to potable water and inadequate sanitation. Addressing these problems is likely to bring the most impact to cholera control and will have a significant beneficial effect on infectious diseases in general.

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Figure 1 Cholera cases and deaths in Nigeria 2010–13

Year	No. of states involved	No. Of LGAs involved	Cases (laboratory confirmed)	Deaths	CFR (%)
2010	18	222	4,1787	1,716	4.1
2011	26	203	23,377	742	3.17
2012	11	29	597	18	3.02
2013	20	94	6,600 (146)	229	3.47

* Cases are suspected
Source: Data collated from Weekly Epidemiological Records Archives (World Health Organization)

Endnotes

1 See: *Cholera: mechanism for control and prevention*. Available at: http://apps.who.int/gb/ebwha/pdf_files/WHA64/A64_R15-en.pdf.

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