National Surveillance Data on the Epidemiology of Cholera in Togo

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Background. Togo is a cholera-endemic country bordered by other countries where this disease is endemic. We describe the epidemiology of cholera in Togo, using national surveillance data.

Methods. We reviewed national surveillance data housed in the National Ministry of Health. Districts submitted reports of summary weekly case counts and deaths at the national level. Data were available at the district level during 2008–2010 and at the national level from 1996 onward. Microbiological confirmation usually was not performed, and case identification was based on clinical suspicion.

Results. From 1996 through 2010, Togo had 12,676 reported cholera cases and 554 deaths. Annual national cholera incidence varied from 0.9 to 66 cases per 100,000 population, with little variation except for 2 large epidemics during 1998 and 2001. The case-fatality ratio declined from 12%–17% during 1996–1997 to <1% during 2008–2010. During 2008–2010, 85% of 26 district-level outbreaks occurred in the capital Lomé or the coastal Maritime Region. The average outbreak duration was 6 weeks, and only 2 lasted >15 weeks.

Discussion. While cholera control remains elusive in Togo, reductions in case-fatality ratios have occurred, possibly due to improvements in case management. The short duration of outbreaks may preclude reactive vaccination; however, the restricted geographic location may make preventive immunization attractive.

Keywords. Africa; cholera; epidemiology; surveillance; Togo; Vibrio cholerae.
average rainfall level of 600 mm per year, with a single rainy season from June to September.

Risk factors for cholera include poor water quality and sanitation standards, as well as malnutrition. During 2008, 87% of the urban population, 41% of the rural population, and 60% of the total population were using improved drinking-water sources; during the same year, 24% of the urban population, 3% of the rural population, and 12% of the total population were using improved sanitation facilities [11a]. During 2006–2010, substantial percentages of children aged <5 years were moderately to severely underweight (17%), wasted (5%), or stunted (30%) [11a]. These values were approximately the same as those for the neighboring countries of Benin, Burkina Faso, and Ghana [11a].

The Epidemiology Division of the Ministry of Health within the National Institute of Hygiene conducts cholera surveillance in Togo with support from the National Reference Laboratory. Each week, health district personnel compile data on cholera collected by peripheral health centers, using a standard data collection form, which is then transmitted to the district health center. On a weekly basis, the district health officer compiles data and forwards summary statistics to the regional health center, which are then further summarized and then forwarded to the National Division of Epidemiology. At the national level, only summary statistics, rather than individual-level case reports, are available.

For surveillance purposes, suspected cholera is defined as acute watery diarrhea in a person aged ≥5 years, concomitant with severe dehydration or death. Once a cholera outbreak has been confirmed, all persons aged ≥5 years with acute watery diarrhea are considered to have suspected cholera. Confirmed cases are those in whom *Vibrio cholerae* O1 or O139 has been isolated from stool. Microbiological confirmation is pursued rigorously only to confirm an outbreak; usually, when *V. cholerae* is identified from 5 stool samples collected from the same area (such as a neighborhood or town), further samples are not collected. Additionally, the tools available at different healthcare levels limit the extent of laboratory analysis. For example, microscopy of stool and Gram staining are performed at all district laboratories. Culture is performed at national and regional laboratories, whereas serotyping is performed only at national laboratories. Although microbiological testing for *V. cholerae* is relatively infrequent and done only to confirm outbreaks, even this limited information is not incorporated into the national surveillance system. Consequently, all cholera cases within this system—and thus all cases reported in the Results section below, except those specifically described in the “Laboratory data” subsection—are suspected rather than confirmed.

In the capital city of Lomé, clinical care for patients with suspected cholera is provided at cholera treatment centers located at 3 hospitals. Outside of Lomé, cholera treatment is provided at regional and district hospitals. It is the official policy in Togo to provide cholera treatment free of charge.

For the current analysis, we used data provided by the National Division of Epidemiology. Data were available by district for 2008–2010; by region, starting in 2005; and at the national level, from 1996 onward. No individual-level data were available, and consequently we do not provide data on age or sex distribution. For assessment of the number of outbreaks occurring at the district level, the start of an outbreak was defined as the first week during which ≥1 case was reported, while the end of an outbreak was defined as the last week during which a case was reported that was followed by at least 4 consecutive weeks with no reported cases. The Togolese Ministry of Health provided population data based on the 1980 census and the assumption of a 1.3% annual population growth across all geographic divisions (a census was conducted during 2010, but results were not available at the time of writing). The CFR was defined as the number of deaths among persons identified with suspected cholera divided by the number of persons identified with suspected cholera, as identified in the weekly summary reports provided from the district health offices to the National Ministry of Health.

The current evaluation used only aggregated public health surveillance data. Consequently, no institutional review board approval was sought or obtained.

**RESULTS**

**National Data**

From 1996 through 2010, Togo had 12,676 reported suspected cholera cases and 554 deaths. The annual number of cases ranged from a low of 42, during 1997, to a high of 3217, during 1998, with an average of 845; outside of major epidemics that occurred during 1998 and 2001, suspected cholera case counts have not shown any particular trend (Figure 1). Reported annual national suspected cholera incidence varied from 0.9 to 66 cases per 100,000 population.

The annual number of deaths from suspected cholera ranged from a low of 1 (in 2007 and 2009) to a high of 221 (in 1998), with an average yearly count of 37. The national CFR decreased from 12%–17% during 1996–1997 to 5%–7% during 1998–2003, 1%–3% during 2004–2007, and <1% during 2008–2010 (Figure 2).

**Regional Data**

Of the 4003 suspected cholera cases reported during 2005–2010, 72% (2884) occurred in Lomé Region, 16% (650) in Maritime Region, 11% (432) in Plateaux Region, 1% (34) in Centrale Region, 3% (<1%) in Kara Region, and none in Savanes Region. Incidences of suspected cholera in the 6 regions were 48.1, 7.6, 5.7, 1.1, 0.1, and 0 cases, respectively, per 100,000 population per year. The peak annual reported suspected cholera incidence for any region was 100 cases per 100,000 population for Lomé during 2006.
Of the 51 total reported suspected cholera deaths during 2005–2010, 43% (22) occurred in Lomé Region, 24% (12) in Maritime Region, 29% (15) in Plateaux Region, 4% (2) in Centrale Region, and none in the 2 northernmost regions. CFRs in the first 4 regions were, respectively, 0.8%, 1.8%, 3.5%, and 5.9%. The CFR exceeded 2% for only 4 combinations of region and year and only twice when >100 cases were involved (in Maritime and Plateaux regions, both during 2006).

**District Data**

Togo has 35 health districts. During 2008–2010, when the national reported suspected cholera incidence was 4.0 cases per 100 000 population per year, the 5 districts in Lomé Region all had incidences of at least 10 cases per 100 000 per year (range, 10–36 cases per 100 000 per year). There were 26 outbreaks, of which 62% (16) occurred in districts in Lomé Region, 23% (6) in districts located in Maritime Region, and 15% (4) in districts in the remaining regions (except Savannes Region, which experienced no outbreaks). The average outbreak duration was 6.1 weeks (range, 1–24 weeks), with 2 outbreaks lasting ≥15 weeks. The average outbreak size was 27 cases (range, 1–161 cases), with 3 outbreaks consisting of at least 100 cases. Cases occurred almost exclusively during August–February. The peak season varied by year but for any particular year was similar for all districts, as illustrated by data from the 5 districts in Lomé Region (Figure 3).

**Laboratory Data**

The National Institute of Health Laboratory in Lomé received 173 stool specimens during 2008–2011 and identified *V. cholerae* in 58 (33%), all of which were serotyped as O1 El Tor Ogawa (Table 1). Isolates were usually but not uniformly susceptible to tetracycline and ciprofloxacin and resistant to ampicillin and erythromycin.

**DISCUSSION**

The data presented here demonstrate that cholera is endemic in Togo, with suspected cases reported each year and occasionally large outbreaks involving thousands of cases. The overall national incidence is relatively low; however, cases tend to aggregate along the relatively small coastal area of the country, so that district-level incidences may be 9–10-fold greater than national incidences.

Several potential explanations exist for the presence of cholera in the area around the capital of Lomé. First, Lomé has several lakes and is located near small lagoons on the Atlantic Ocean. Many residents use water from wells, and these are frequently open and shallow. As with other areas of Togo, sanitation may be poor. In theory, autopsy practices can contribute to transmission of disease. However, Togo seeks to adhere to World Health Organization guidelines, including handling of corpses by health professionals, disinfection of houses and medical facilities, and use of quicklime during the burial process.

While cholera cases continue to occur at a relatively constant rate (outside of major epidemics), CFRs have decreased dramatically. This finding is consistent with data from other countries [12, 13]. Togo has adapted World Health Organization recommendations for cholera case management (available at: http://www.who.int/cholera/technical/prevention/control/en/index4.html; accessed 4 June 2012). Additionally, Togo reports data on antibiotic susceptibility to clinicians, who then adapt their treatment accordingly. These activities and the improved timeliness of interventions may have led to the declines in CFR, although this hypothesis is difficult to test. Regardless, Togo has achieved its target of reducing the cholera CFR to <1%.

![Figure 1. National reported cholera case counts and annual incidence, Togo, 1996–2010.](image1)

![Figure 2. National reported cholera deaths and case-fatality ratios, Togo, 1996–2010.](image2)
Even with this lower CFR, cholera epidemics may have effects beyond their clinical impact. For example, the 2008 epidemic affected agricultural trade because of quarantine measures on the movement of goods. Additionally, cholera epidemics require mobilization of workers in an already understaffed health system, which then affects activities for other priority issues.

As with all cholera-endemic countries, the best long-term public health control strategy is improvements in water and sanitation infrastructure, decreased human exposure to the environment that supports the transmission cycle, and enhanced case management capacity at the health facilities level.\(^*\)

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**Figure 3.** Reported cholera case counts by week and year in the 5 health districts of Lomé Region, Togo, 2008–2010.

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**Table 1.** Results of Analyses of Stool Specimens Collected in Togo During 2008–2011

<table>
<thead>
<tr>
<th>Year</th>
<th>Analyzed at National Laboratory</th>
<th>Positive for <em>V. cholerae</em></th>
<th>Underwent Antibiotic Resistance Testing</th>
<th>Results of Resistance Testing, by Antibiotic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>AMP</td>
</tr>
<tr>
<td>2008</td>
<td>16</td>
<td>12 (75)</td>
<td>12</td>
<td>ND</td>
</tr>
<tr>
<td>2009</td>
<td>25</td>
<td>11 (44)</td>
<td>5</td>
<td>ND</td>
</tr>
<tr>
<td>2010</td>
<td>51</td>
<td>24 (47)</td>
<td>1</td>
<td>R</td>
</tr>
<tr>
<td>2011</td>
<td>81</td>
<td>11 (14)</td>
<td>11</td>
<td>R, 11</td>
</tr>
</tbody>
</table>

Data are no. or no. (%) of stool specimens. Note that all isolates were serotyped as O1 El Tor Ogawa.

Abbreviations: AMP, ampicillin; CHL, chloramphenicol; CIP, ciprofloxacin; ERY, erythromycin; NAL, nalidixic acid; ND, not done; R, resistant; S, susceptible; SXT, trimethoprim-sulfamethoxazole; TET, tetracycline.
sanitation. However, the ongoing presence of cholera indicates that this strategy, as currently implemented in Togo, has not been sufficient. In theory, an additional strategy involves reactive cholera vaccination in districts experiencing outbreaks. The World Health Organization recently recommended that countries consider use of cholera vaccines [14]. Two vaccines, Dukoral and Shanchol, are prequalified by the World Health Organization [15]. However, cholera outbreaks at the district level in Togo tend to be of relatively short duration, with only 2 outbreaks lasting ≥15 weeks. Thus, by the time a country identifies an outbreak, notifies the World Health Organization of vaccine needs, receives vaccines, and distributes vaccines to affected areas, the outbreak, in most cases, will be over. Moreover, existing data support the use of 2 vaccine doses for protection, which will be difficult to deliver in an outbreak setting. Consequently, the cholera epidemiology in Togo and the current indications for cholera vaccines are evidence against use of reactive cholera vaccination campaigns.

In contrast to a reactive vaccination strategy, the highly localized coastal area at risk indicate that Togo would be an appropriate candidate for preventive vaccination. Before this can occur, at-risk populations should be clearly defined. Togo is currently participating in the Africhol project, in part to achieve this objective.

The current study had several limitations. Most cases were not confirmed microbiologically, and the completeness of case ascertainment is unknown. For example, some cases could have been missed among persons who self-medicated, sought out traditional healers, or did not present for any care; it is possible that some persons presented but were not recorded in registers for reports to the national level; and the capital city of Lomé may have had better reporting than other areas, possibly accounting for some of the observed higher rates of cholera in the surrounding area. Consequently, incidence estimates may not be accurate and may either overestimate or underestimate true incidences. Moreover, inaccuracies may not be consistent either over time or between districts. We also were limited in the amount of data collected at the national level and so could not evaluate most features of cholera epidemiology.

Cholera is endemic in Togo, as well as in bordering countries. The Ministry of Health has adopted a multifaceted strategy that includes improving water and sanitation, improving the timeliness and quality of case management, and participating in projects such as Africhol to assess the usefulness of other interventions including vaccination. The long-term goal is to eliminate cholera as a public health problem. Africhol will assist in this effort by providing more robust data on risk groups, disease burden, environmental factors, and social circumstances that contribute to the cholera burden and by providing the capacity to generate improved microbiological data, including culture, serotyping, and genotyping findings.

Notes

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All authors have submitted the ICMJE Form for Disclosure of Potential Conflicts of Interest. Conflicts that the editors consider relevant to the content of the manuscript have been disclosed.

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