

Notes from the Field

Ongoing Cholera Outbreak — Kenya, 2014–2016

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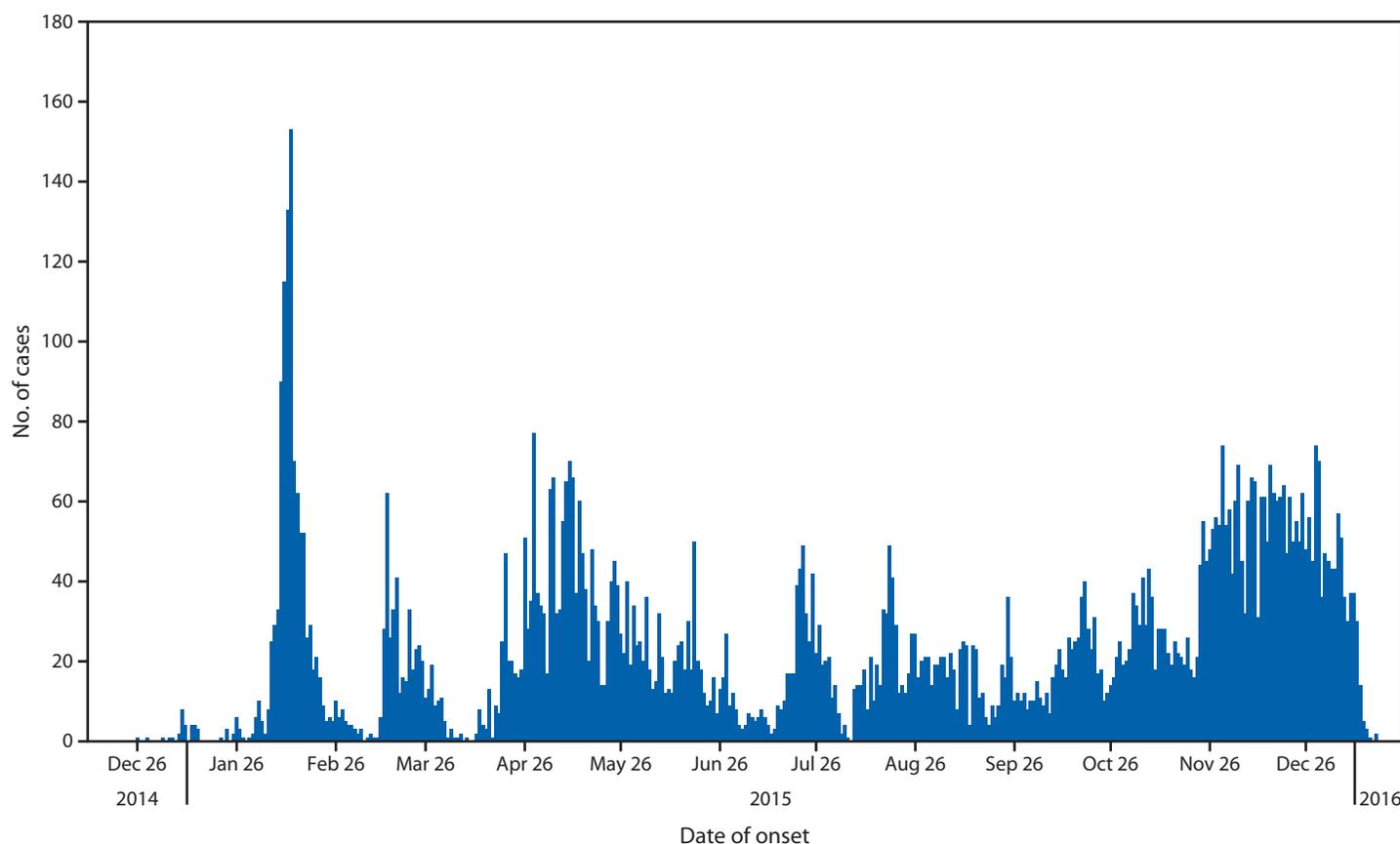
On January 6, 2015, a man aged 40 years was admitted to Kenyatta National Hospital in Nairobi, Kenya, with acute watery diarrhea. The patient was found to be infected with toxigenic *Vibrio cholerae* serogroup O1, serotype Inaba. A subsequent review of surveillance reports identified four patients in Nairobi County during the preceding month who met either of the Kenya Ministry of Health suspected cholera case definitions: 1) severe dehydration or death from acute watery diarrhea (more than four episodes in 12 hours) in a patient aged ≥ 5 years, or 2) acute watery diarrhea in a patient aged ≥ 2 years in an area where there was an outbreak of cholera. An outbreak investigation was immediately initiated. A

confirmed cholera case was defined as isolation of *V. cholerae* O1 or O139 from the stool of a patient with suspected cholera or a suspected cholera case that was epidemiologically linked to a confirmed case. By January 15, 2016, a total of 11,033 suspected or confirmed cases had been reported from 22 of Kenya's 47 counties (Table). The outbreak is ongoing.

Reference laboratory confirmation of selected isolates from several counties indicated that the predominant outbreak strain was toxigenic *V. cholerae* serogroup O1, serotype Ogawa, biotype El Tor, susceptible to tetracycline, a proxy for doxycycline, which is used for treatment of severely ill cholera patients in conjunction with hydration. The majority of isolates subtyped shared an indistinguishable pulsed-field gel electrophoresis profile. Although the first identified case was documented as serotype Inaba, only a small number of the many isolates tested were subsequently confirmed as the Inaba strain.

The outbreak has been characterized by multiple peaks of varying size as cholera has spread from county to county, with the largest peak occurring in February 2015 (Figure). More than half of all cases have been reported from three

FIGURE. Number of reported cholera cases by date of onset — Kenya, December 26, 2014–January 15, 2016



counties: Wajir (2,426; 22.0%), Nairobi (1,824; 16.5%) and Migori (1,521 cases; 13.8%). Overall, 178 cholera-related deaths have been reported (case fatality rate = 1.6%) (Table). The national case fatality rate has consistently ranged between 1.6% and 2.0% throughout the outbreak. With appropriate case management (administration of oral rehydration salts in most cases), the case fatality rate from cholera should remain below 1%. By county, case fatality rates have ranged from zero (0 of 22 cases in Narok, 0 of 46 in Turkana, and 0 of 26 in Marsabit counties) to 13.0% (3 of 23) in Trans-Nzoia County. As of January 15, 2016, the Kenya Ministry of Health determined that 16 of 22 affected counties had controlled the outbreak, which was defined as reporting zero cases during the preceding 10 days.

To identify risk factors for acquiring cholera during the current outbreak, the Ministry of Health Field Epidemiology and Laboratory Training Program conducted case-control studies in four counties (Homa Bay, Migori, Nairobi, and Nakuru). In each county, 52 case-patients and 104 age- and residence-matched controls were enrolled. Compared with controls, cholera case-patients in all counties were more commonly found to have 1) lack of health education regarding cholera and diarrheal diseases, 2) lack of access to safe water and hygienic sanitation services, 3) inadequate hand washing practices, and 4) eaten food outside the home. The findings were disseminated to county leaders to aid in targeting cholera prevention measures, including public health education and water and sanitation interventions.

In three counties (Nairobi, Homa Bay, and Mombasa), knowledge, attitudes, and practices surveys were conducted to evaluate

response efforts among 1,418 community members, 61 health care workers, 44 health facilities, and 51 community health extension workers. The survey results indicated that the communities had high cholera awareness, but cholera prevention knowledge was inadequate, as was access to safe water and appropriate sanitation facilities. In addition, health care workers had inadequate knowledge of critical signs of severe dehydration and appropriate use of antibiotics for cholera, and health facilities often lacked adequate lifesaving supplies, particularly intravenous fluids.

Community health extension workers were integral to the promotion of prevention messaging and distribution of supplies. In addition to scaling up preparedness, continued active surveillance, laboratory confirmation of cases, and implementation of recommended interventions continue to be critical (1). Such efforts are especially important given that heavy El Niño rains in Kenya continued into 2016 in some areas* and that cholera outbreaks are ongoing in neighboring and nearby countries including Tanzania, South Sudan, and the Democratic Republic of the Congo (2). This nationwide outbreak is one example of a public health emergency to which a proposed national public health institute could help respond (3).

* <http://www.meteo.go.ke/>.

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TABLE. Number (N = 11,033) and percentage of reported cholera cases, number of deaths, and case fatality rate — 22 counties, Kenya, December 26, 2014–January 15, 2016

County	No. of cases (%)	No. of deaths	Case fatality rate
Wajir	2,426 (22.0)	35	1.4
Nairobi	1,824 (16.5)	32	1.8
Migori	1,521 (13.8)	25	1.6
Garissa	1,388 (12.6)	11	0.8
Muranga	745 (6.8)	5	0.7
Homabay	489 (4.4)	6	1.2
Kirinyaga	443 (4.0)	3	0.7
Nakuru	392 (3.6)	17	4.3
Mombasa	300 (2.7)	11	3.7
Bomet	272 (2.5)	2	0.7
Embu	234 (2.1)	3	1.3
Baringo	209 (1.9)	1	0.5
Kiambu	154 (1.4)	7	4.5
Siaya	146 (1.3)	8	5.5
Kisumu	125 (1.1)	2	1.6
Kilifi	100 (0.9)	1	1.0
Marsabit	86 (0.8)	0	0
Machakos	80 (0.7)	5	6.3
Turkana	46 (0.4)	0	0
Trans-Nzoia	23 (0.2)	3	13.0
Narok	22 (0.2)	0	0
Isiolo	8 (0.1)	1	12.5
Total	11,033 (100.0)	178	1.6