

## Cholera in Yemen

With a fragile health-care system, war-torn Yemen now faces a second wave of cholera amid famine and lack of access to clean water and sanitation. Vijay Shankar Balakrishnan reports.

Yemen, backed by a Saudi Arabia-led coalition, has been fighting al-Houthi rebels for more than 2 years. There are also attacks by jihadist militants of al-Qaeda in the Arabian Peninsula. As *The Lancet Infectious Diseases* went to press, heavy fighting continues. About 7800 people have been killed and 44 000 injured. After years of war, Yemen's health-care system is in a fragile state.

Yemen is one of the poorest Arab countries. According to the UN Office for the Coordination of Humanitarian Affairs and WHO, more than 19 million people—from a total population of 27.4 million—are in dire need of humanitarian aid and nearly 15 million do not have access to safe drinking water, sanitation, and hygiene services. About 14.5 million people are in need of health aid. 274 health facilities have been destroyed or damaged, leaving less than 45% of all health facilities fully functional, since 49 districts have no qualified doctors. With an ongoing famine, about 462 000 children have severe acute malnutrition. There has been no government health budget since March 26, 2015. In October, 2016, the first wave of cholera broke out.

By the end of December, 2016, the outbreak had spread to nearly 165 districts in 16 governorates. However, the outbreak tailed off, with only 25 districts reporting suspected cholera from January to March, 2017. Overall, 24 504 suspected cases, including 143 deaths, were reported by the end of March, 2017.

During the last week of April, a second, much larger, outbreak began. At the time of writing, about 65 000 cases had been reported with more than 570 deaths, of which 40% were children. Amanat Al Asimah, Amran, Hajjah, and Sana'a are the four most affected governorates, accounting for more than 57% of the cases since late April. Al Mahwit governorate still had the highest attack rate (47.2 per 10 000 people), followed by Sana'a (43 per 10 000 people). Since late April, more than three-quarters of all districts have been affected, with a case-fatality rate of 0.9%. "I call it a cholera earthquake", says Abdulhakim Alkohlani, the spokesperson for the Yemen's Ministry of Public Health & Population (MoPHP) from the Sana'a side.

In October, 2016, WHO and UNICEF appealed for US\$22 million in relief funds, of which they received less than 15% to contain the first cholera outbreak. "If the response was better in that wave, it could have prevented the country from this severe and serious [second] wave", Alkohlani said. WHO requires \$126 million for its health response in Yemen; however, only 3.4% of it has been funded.

Yemen's health-care system is in disarray with more than 30 000 health staff having worked without a salary for the past 8 months. UNICEF's Fouzia Shafique has heard stories of health-care workers selling their belongings

and pawning valuables to pay for food. There is a shortage of drugs and medical supplies including oral rehydration salts, intravenous bags, and even gloves. The government and organisations including UNICEF, WHO, and Oxfam are trying to address the humanitarian and health needs by importing drugs, equipment, and the WHO-approved Interagency Diarrhoeal Disease Kits for Health.

"If an earthquake happens in a country in the world, airplanes full of drugs and medical supplies start to arrive to that country within few hours to save lives", says Alkohlani. But in Yemen, the Saudi-led coalition only allowed the first plane to land in Sana'a airport 4 weeks after the beginning of the second outbreak.

In May, two cargo planes each with 40 tonnes of medical supplies landed in Sana'a and Djibouti, one for Sana'a in the north and the other for Aden in the south of Yemen. The cargo included ten full cholera kits, 42 basic diarrhoea kits, and 124 000 units of Ringer's lactate solution (500 mL), which were sufficient to treat only 10 000 patients. According to WHO's logistics team, a further 13 tonnes of supplies are to be brought to Aden by ship by June 7, 2017.

The Water, Sanitation and Hygiene (WASH) department of UNICEF is trying to improve access to clean water and sanitation. "Across the 19 governorates where we had outbreaks, we are chlorinating water storage tanks", said UNICEF's Rajat Madhok. "Just in Sana'a, we have reached over 1 million people with chlorinated water." More than 7000 health volunteers managed by the government and several non-governmental organisations visit households to ensure that stored water is disinfected. UNICEF



also checks whether public water treatment plants follow hygiene standards and provide safe water.

"Yemen has [also] a huge solid waste management issue, and access to sanitation varies dependent on location, source of income, etc", said Manzoor Ahmed (Oxfam, London, UK). "With the seasonal rains, this has exacerbated the public health risks given the poor access to water, health facilities, sanitation and poor solid waste [management]."

There is no consensus about when and how to deploy the small stockpile of the cholera vaccines Euvichol and Shanchol. "We just finished the risk assessment and we need to discuss this with the local authorities, because during the first wave of the epidemic they didn't consider it", said Nevio Zagaria, WHO's representative for Yemen. "We will propose this to them, but I don't know if they will accept it or not."

Aside from cholera, there are risks of other preventable and communicable diseases spreading, given the alarming state of health and nutrition in Yemen. "Malaria, dengue, measles, other forms of diarrhoea are all the diseases we

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worry about and since the beginning of the conflict we have seen outbreaks of all except malaria", said UNICEF's Shafique. Cutaneous leishmaniasis and other neglected tropical diseases are also spreading, according to Zagaria. "We are not sure if these are spreading out of control, but we are doing our best to map the spread of these diseases and control them."

"There is also some evidence of increases in caseload of upper and lower respiratory tract infection; and huge difficulties in maintaining vaccination coverage", said Sharif Ismail (London School of Hygiene and Tropical Medicine, London, UK). "It is a scandal that the situation has been allowed to deteriorate to the extent that it has", he said, referring to the conflict and the actions of warring parties on all sides, targeting health facilities, attacking vital infrastructure, and making access to supplies exceptionally difficult.

The number of suspected cholera cases is expected to reach 130 000 by the end of June. For as long as the medical and other supplies do not meet demand, and humanitarian and economic conditions in Yemen worsen, the chances of alleviating the crisis soon are slim.

Vijay Shankar Balakrishnan

## Infectious disease surveillance update

### Cholera in Yemen

As of June 2, 2017, more than 73 700 suspected cases of cholera have been reported in Yemen since the epidemic began in late April, 2017. 605 deaths have also been reported. Cases have been reported in 19 governorates. Only 45% of hospitals are operational with shortages of staff and supplies due to the ongoing conflict.

### Zika virus in India

On May 15, 2017, the first cases of Zika virus infections in India were reported. The Ministry of Health and Family Welfare reported three laboratory-confirmed cases of Zika virus in Ahmedabad District, Gujarat. The earliest case was a woman who developed low-grade fever after the birth of a healthy baby on Nov 9, 2016. The second case was identified from 111 blood samples obtained as part of antenatal clinic surveillance between Jan 6 and Jan 12, 2017. The

sample was from a woman in her 37th week of pregnancy. The third case was a 64-year-old man who was identified as part of acute febrile illness surveillance samples collected between Feb 10 and Feb 16, 2017.

### Meningitis in Nigeria

Between May 22 and June 2, a further 468 cases of meningococcal meningitis were reported by the Nigerian Centre for Disease Control including 44 deaths. Since the beginning of the outbreak in December, 2016, a total of 14 473 cases of suspected meningitis have been recorded including 1155 deaths; a case-fatality rate of 8%. Cases have been reported in 25 of the 36 states in Nigeria. 460 of the 998 samples sent for laboratory testing since the outbreak began were confirmed as positive for bacterial meningitis. 371 (81%) of these positive bacterial meningitis samples were *Neisseria meningitidis* serogroup C.

### Measles in Romania

Between September, 2016, and May 25, 2017, 6434 cases of measles had been confirmed in Romania. 26 measles-related deaths have also been confirmed. The most deaths were recorded in the counties of Timiș (eight), followed by Arad (five), Dolj (five), Caraș Severin (three), and one each from Bihar, Călărași, Satu Mare, Vaslui, and Bucharest. Of those falling ill, 7% of parents refused vaccination whereas one in three families were unable to access doctors or vaccines. In the past 10 years, overall immunisation rates in Romania have dropped from 95% to 86%. In some areas only half of the population is vaccinated against measles. Health authorities have begun pro-vaccination and immunisation programmes.

Ruth Zwizwai

For more on **cholera in Yemen** see [http://news.xinhuanet.com/english/2017-06/03/c\\_136337253.htm](http://news.xinhuanet.com/english/2017-06/03/c_136337253.htm)

For more on **Zika virus in India** see <http://www.who.int/csr/don/26-may-2017-zika-ind/en/>

For more on **meningitis in Nigeria** see <http://ncdc.gov.ng/diseases/sitreps/?cat=6&name=An%20Update%20of%20Meningitis%20Outbreak%20in%20Nigeria>

For more on **measles in Romania** see <http://outbreaknewstoday.com/romania-measles-outbreak-update-27th-possible-death-investigated-23322/>