

## b Yellow fever outbreak in Angola 2016: an update

As of 26 February 2016, totals of 1073 suspected cases and 166 deaths have been reported in Angola from a yellow fever outbreak ongoing since December of last year (Figure 6). Amongst all cases, 344 have been laboratory confirmed. The outbreak of yellow fever began in the Luanda suburb of Viana located about 20 km from the capital but has spread to other areas affecting the provinces of Bie, Benguela, Huambo, Cunene, Cabinda, Huila, Malanje, Cwanza Sul, Uige, Zaire and Cwanza Norte (Figure 7). The Luanda province remains the hardest hit with a suspected 461 people infected so far. Angola is one of 31 countries in Africa that fall within the yellow fever belt where there exists persistent or periodic yellow fever virus transmission. The first report of an epidemic in Angola was in Luanda in 1860 and other coastal cities in the northern portion of the country during 1860-1871. There after two outbreaks were officially notified in Angola in Luanda in 1971 (65 cases) and in 1986 prior to the current epidemic.

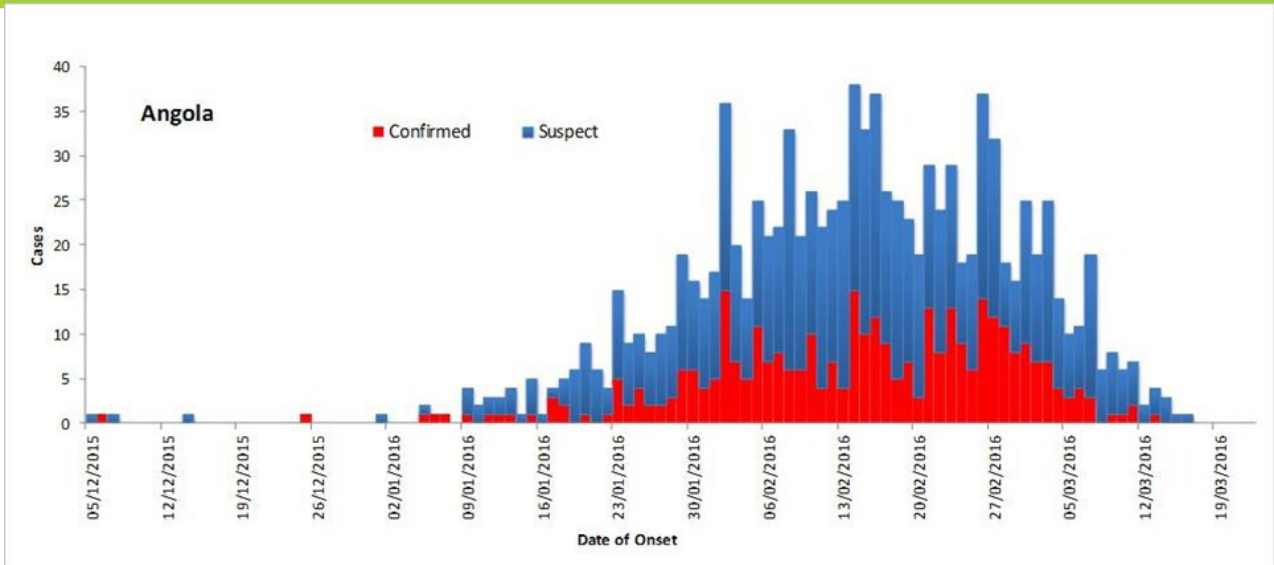
Yellow fever can be prevented through immunisation. A single dose of vaccine provides long-term, probably even lifelong, immunity in 99% of the individuals vaccinated. However epidemics appear to emerge and are in part driven by declining and low vaccination coverage. To prevent outbreaks, vaccination coverage amongst population at risk in an endemic region must reach minimum between 60 and 80%, according to the World Health Organization. Despite the yellow fever vaccine being introduced in routine enhanced programme of immunisation in Angola since 1991, and other countries across the region around that time, coverage is variable, often below 80%. Angola had an estimated 64% vaccination coverage against yellow fever in 2011. Mass vaccination campaigns are usually implemented to boost population with low immunity and have proven to be extremely effective to immediately curb yellow fever outbreaks. An immunisation campaign has been launched in the Luanda area and as of 17 March, a total of 5 792 294 persons have been vaccinated, a coverage of 83% of the target population. Vaccination is recommended for all travellers  $\geq 9$  months of age to Angola. China and Kenya have each reported imported cases in travellers returning from Luanda.

In addition to vaccination, yellow fever outbreaks

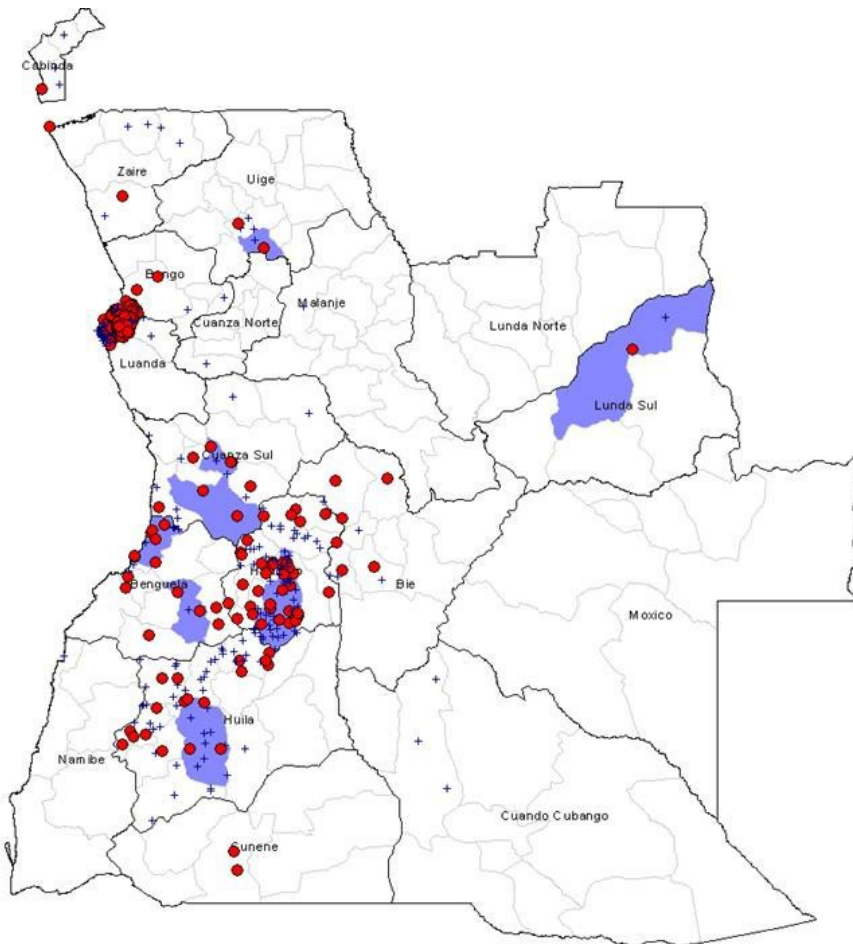
can be prevented and brought under control by anti-mosquito measures. *Aedes aegypti* mosquitoes are the main vectors. Entomological studies revealed that the city of Luanda was invaded by them since early 1970s though importation of large quantities of infested rubber tires. Favourable conditions made it possible for the species to establish itself in the suburban belt. As the sanitary services for the ever-growing and overpopulated periphery of the city are not sufficient, conditions for mosquito breeding have expanded, exacerbating the scale of the mosquito-borne public health problems.

Although no specific treatment exists for yellow fever, the majority of patients recover after 3 or 4 days from a febrile disease characterised by fever, muscle pains, nausea and vomiting, or headaches. However, 15% of patients relapse within 24 hours after initial recovery. The mortality rate amongst persons who enter this second, toxic phase of disease is over 50%. The onset of jaundice signifies the commencement of the toxic phase. Vomiting, abdominal pains and bleeding are also seen, and kidney failure. Infection is confirmed with a blood test to detect yellow fever virus-specific IgM and IgG antibodies by immunofluorescence assays. The patient must not have a history of yellow fever vaccination. Because of cross-reaction between antibodies against other flaviviruses, a four-fold increase in IgG antibodies in convalescent blood sample collected 3-4 weeks later can confirm recent infection. Positive IgM antibodies result by IFA is only suggestive of recent infection. PCR tests and virus isolation can detect virus and confirm infection in the early phase of illness. Testing of post-vaccinal antibodies is not done by the NICD because vaccinated patients may not necessarily develop a detectable antibody response and there are no standard antibody cut-offs that indicate immunity. The WHO yellow fever card should be obtained and is proof of vaccination when required by country of entry.

**Source:** Centre for Emerging and Zoonotic Diseases, and Division of Public Health, Surveillance and Response, NICD-NHLS; (cez@nicd.ac.za)



**Figure 6.** Epidemic curve showing suspected and confirmed cases of yellow fever in Angola from December 2015 until 17th March 2016 (source: WHO SITREP, March 18 2016)



**Figure 7.** A map of Angola showing the distribution of suspected (blue) and confirmed (red dots) cases of yellow fever, December 2015-March 2016 (Source: WHO SITREP, March 17, 2016)