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Editor's Note



Dr Ann Mathews

In this month's edition of the Communicable Diseases Communiqué, our first for the year 2020, we bring you an update on the developing novel coronavirus outbreak that began in China during December 2019, and has spread to over 18 countries since then. The outbreak has been rapidly evolving over the past few weeks. Coronaviruses are a family of viruses that cause respiratory disease in both humans and animals. Previous outbreaks involving coronaviruses include

the severe acute respiratory syndrome (SARS) outbreak of 2002 and the Middle East respiratory syndrome (MERS) outbreak of 2012. This new coronavirus is thought to be of a zoonotic origin and has evolved to infect humans. The NICD remains on high alert as the situation progresses globally.

We also provide a report on the Ebola virus disease outbreak in the Democratic Republic of Congo, which seems to be on a downward trend. A summary of rabies in the country over the course of 2019 is also provided. We also report on two isolated cases of cholera in KwaZulu-Natal Province, with no epidemiological links. Such sporadic cases do occur, though rarely. To date, there are no reports of additional suspected cholera cases. Surveillance is ongoing, and the NICD continues to monitor the situation.

As usual, we include the WHO-AFRO infographic on public health and humanitarian events in the AFRO region.

ZOONOTIC AND VECTOR-BORNE DISEASES

An update on rabies in South Africa

In 2019, rabies was laboratory confirmed in 10 persons in South Africa. These cases were reported from Limpopo (n=2), KwaZulu-Natal (n=4) and Eastern Cape (n=4) provinces. In addition, six more deaths were classified as probable rabies cases, three each from KwaZulu-Natal and Eastern Cape provinces. Since our last report (Communicable Diseases Communiqué, December 2019, Vol. 18(12)), two new probable rabies cases have been reported, and are described below.

In the first case, a 52-year-old woman was bitten by her own dog in Mthatha, Eastern Cape Province, on 15 November 2019. She sustained injuries to her leg and eye. The dog, which was unvaccinated against rabies, was killed after the bite incident but not tested for rabies. The woman died in hospital after a short illness on 6 December 2019. She had clinical signs suggestive of rabies, notably excessive salivation. Rabies vaccine was reportedly administered after the bite. Diagnostic testing was not performed as nasal secretions from the patient were not received. This was not an appropriate sample for rabies detection. Suitable ante-mortem specimens for rabies testing include saliva, nuchal skin biopsy and cerebrospinal fluid (CSF). Submitting a full range of specimens for a suspected rabies case is recommended.

In the second case, KwaZulu-Natal Province recorded another rabies probable death in late January 2020, in a 36-year-old man who had sustained a bite on his arm from a stray dog in the eThekweni District area on 18 September 2019. He sought medical care at the local clinic but did not go for rabies post-exposure prophylaxis at the referral hospital. Prior to his death, on 21 December 2019, he presented with symptoms compatible with rabies, including headache, vomiting

and difficulty in breathing, confusion, hallucinations, restlessness, hypersalivation and hydrophobia. A post-mortem examination was not conducted.

The most common source of human rabies in South Africa is from dogs and is due to infection with the classic rabies virus. The Animal Diseases Act, 1984 (Act No.35 of 1984) requires that all domestic dogs and cats in South Africa be vaccinated against rabies, twice in the first year with a booster vaccine every three years.

The risk of rabies from the bite of a wild animal, although rare, is not often recognised. Bat bites in particular can be small and go undetected. Exposures to bats are considered category 3 exposures in all cases, regardless of whether there are visible injuries or not. With every bat exposure, rabies immunoglobulin and vaccination should be provided. Bats are considered an uncommon source of human rabies in Africa, with two confirmed cases in South Africa, a farmer in 1970 in Limpopo Province, and a tourist visiting North West Province in 2006. An additional case was confirmed in a visitor to Kenya exposed to a bat in 2007. All three patients were infected with the Duvenhage virus, a rabies-like lyssavirus and most likely linked to an insectivorous bat. Two other lyssaviruses have been detected in bats, Mokala and Lagos bat viruses, but no human cases have been reported.

For more information on rabies and rabies post-exposure prophylaxis following dog bites and other animal exposures, visit www.nicd.ac.za.

Article source: Centre for Emerging Zoonotic and Parasitic Diseases, NICD-NHLS; januszp@nicd.ac.za

ENTERIC DISESES

Two confirmed cholera cases in KwaZulu-Natal Province, South Africa

KwaZulu-Natal Province investigated two sporadic cases of laboratory-confirmed toxigenic *Vibrio cholerae* O1 identified in December 2019 and January 2020. The first case was a 49-year-old male who lives and works in Durban (eThekweni Metropolitan Municipality) on weekdays. The patient travels to his home in Kwa Gubhuza (Ugu District) on weekends. On 20 December 2019, the patient travelled from Durban to Kwa Gubhuza for the holidays. There was no history of travel to known cholera-affected areas. The community in Kwa Gubhuza uses untreated water from the nearby Umzumbe River. On 25 December 2019 (five days after his arrival), the patient developed abdominal cramps and diarrhoea, and presented to the local clinic where he received symptomatic treatment as an outpatient. Three days later, he presented to Port Shepstone Hospital with severe watery diarrhoea and was admitted. A stool specimen was collected and submitted to the National Health Laboratory Service (NHLS) for routine microscopy, culture and sensitivity (MCS) testing. Presumptive *V. cholerae* was detected by the local laboratory on 2 January 2020. The Centre for Enteric Diseases at the National Institute for Communicable Diseases (NICD) confirmed the isolate as toxigenic *V. cholerae* O1 serotype Ogawa. The patient made an uneventful recovery and was discharged.

The second case was a 57-year-old female patient living in Pongola (Zululand District). The available history is that the patient works in Hluhluwe Game Reserve (Umkhanyakude District). At both her home and work place, there is municipal potable water and formal sanitation (flushing toilets). On 8 January 2020, the patient visited KaNgqamuzana area (King Cetshwayo District) where she drank untreated river water, as there is no supply of treated water to the area. She returned home to Pongola on 9 January, and her symptoms began on 10 January; however, the history still needs to be confirmed. She was admitted to a private hospital in Richards Bay on 12 January 2020. A stool specimen was collected and tested positive for presumptive *V. cholerae* at the private diagnostic laboratory. The Centre for Enteric Diseases confirmed the isolate as toxigenic *V. cholerae* O1 serotype Ogawa.

There is no apparent epidemiological link for the two cases and NICD is performing whole genome sequencing

to determine genetic relatedness between the isolates, and to ascertain possible origins of the strain/s. Both isolates show susceptibility to ciprofloxacin, which is the recommended treatment of choice for moderate and severe cholera. No additional suspected cholera cases were reported from the relevant districts. Results of water sampling from the two implicated rivers are still pending.

Healthcare workers should be on alert for suspected cholera cases to ensure early detection and prevention of transmission. Cholera should be suspected in the following situations:

- A patient presenting with acute watery diarrhoea with a history of recent travel to an area where cholera is known to be present;
- In an area where cholera is not known to be present, a patient of any age who develops severe dehydration or dies from acute watery diarrhoea.

The following countries have areas with cholera transmission:

- Africa: Angola, Burundi, Cameroon, Democratic Republic of the Congo, Ethiopia, Kenya, Malawi, Mozambique, Nigeria, Somalia, Sudan, Tanzania, Uganda, Zambia, Zimbabwe
- Asia: Bangladesh, India, Yemen
- Americas: Haiti

Cholera is a notifiable medical condition. Notify any suspected cholera case immediately - do not wait for laboratory confirmation. Healthcare workers should ensure that stool samples are collected from suspected cholera cases as a matter of urgency. On the specimen submission form, clearly request 'MCS & cholera' testing, because testing for cholera is not included in routine 'MCS'. Samples should be transported to the laboratory as soon as possible after collection; if a delay of >2 hours before processing is likely, place the stool specimen in Cary-Blair transport medium (available from the laboratory). Healthcare facilities and laboratories, especially those in the affected area, should ensure that adequate resources are available for sample collection, appropriate laboratory tests, and management of cases.

The mainstay of cholera treatment is fluid replacement. Mild-to-moderate cases may be treated with oral rehydration fluid. Severe cases require admission and intravenous administration of fluid. Antibiotic treatment (ciprofloxacin) is recommended for patients with moderate to severe dehydration, as it reduces disease severity and the risk of further transmission. The public is urged to drink water from safe water sources or treat water to render it safe before use, and to ensure good

hand hygiene before and after using the toilet, and before and after handling food.

Additional information on cholera can be accessed on the NICD website: <http://www.nicd.ac.za> under the Diseases A-Z Tab.

Article source: KwaZulu-Natal provincial Department of Health; Centre for Enteric Diseases and Provincial Epidemiology Team, NICD-NHLS; junot@nicd.ac.za

INTERNATIONAL OUTBREAKS OF IMPORTANCE

Novel coronavirus outbreak

On 31 December 2019, the World Health Organization (WHO) China country office reported a cluster of pneumonia cases in Wuhan City, Hubei Province of China (Figure 1). On 7 January 2020, the causative pathogen was identified as a novel coronavirus (2019-nCoV). There is currently limited epidemiologic data available on affected cases. There has been no sustained spread of the virus in the community. However, there have been indications of limited person-to-person transmission as a growing number of patients reportedly have not been exposed to animal markets. The transmissibility of the virus remains unclear. Cases outside of China have been linked to travellers from Wuhan City.

Coronaviruses are a large family of viruses, causing respiratory illness in humans and animals. In rare circumstances, animal coronavirus has the potential to evolve, infect humans and spread to others through human-to-human transmission. Novel coronaviruses emerge periodically in different parts of the world such as the severe acute respiratory syndrome (SARS) epidemic which arose in China in 2002, and the Middle East respiratory syndrome (MERS) epidemic which arose in Saudi Arabia in 2012. Currently, human-to-human SARS transmission has not been reported since the 2002-2003 outbreak. There are ongoing cases of MERS globally; however, 80% of human cases are reported in Saudi Arabia.

On 11 and 12 January 2020, the 2019-nCoV outbreak was epidemiologically linked to a seafood, poultry and live wildlife market (Huanan Seafood Wholesale Market) in Jiangnan District of Hubei Province. The majority of the case-patients were dealers and vendors at the seafood market, which suggests that the novel coronavirus has a possible zoonotic origin. The market was shut down on 1 January 2020 for environmental sanitation and disinfection.

As of 30 January 2020, there have been 7 818 confirmed cases of 2019-nCoV associated pneumonia, affecting 19 countries globally. Among the 7 818 confirmed cases, 7 736 (99.0%, 7 736/7 818) originated from China and 82 (1%, 82/7 818) were imported cases reported in parts of Western Pacific, South East Asia, North America, Eastern Mediterranean and the European region. Of the 7 736 confirmed cases in China with available data, 1 370 patients are hospitalised and severely ill (17.7%; 1 370/7 736) and 170 deaths have occurred (2.2%; 170/7 736). Of the 82 cases reported outside China, 7 were detected while asymptomatic. All reported cases had either a travel history to Wuhan City or had a contact history with a confirmed case. The main clinical signs and symptoms are fever and cough, with a few patients presenting with difficulty in breathing and bilateral lung infiltrates on chest radiograph.

Full genetic sequencing data for 2019-nCoV were released on 12 January 2020. Development of specific diagnostic tests is underway. There is still limited information regarding transmission route, illness severity and patient profile, but environmental assessments, contact tracing and further epidemiological investigations are currently underway. Travel health notices and screening at points of entry have been issued in China and neighbouring countries. Travellers returning from Wuhan or living in Wuhan were advised to seek medical attention and share travel history with their healthcare provider if they display symptoms suggestive of respiratory illness. On 30 January 2020, the Emergency Committee convened by the WHO Director-General has declared the 2019-nCoV outbreak a Public Health Emergency of International Concern (PHEIC). This is in acknowledgment of the risk the virus poses to countries beyond its origin in China and of the need for a more coordinated international response to the outbreak. More details can be found on: <https://www.who.int/emergencies/diseases/novel-coronavirus-2019>

[who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-\(2005\)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-\(2019-ncov\)](http://who.int/news-room/detail/30-01-2020-statement-on-the-second-meeting-of-the-international-health-regulations-(2005)-emergency-committee-regarding-the-outbreak-of-novel-coronavirus-(2019-ncov)). Based on current information, WHO does not recommend the application of any travel or trade restrictions on China. Recommendations on public health measures and surveillance of influenza and severe acute respiratory infections still apply.

Respiratory illness caused by a novel respiratory pathogen is a category 1 notifiable medical condition (NMC) in South Africa; therefore, notification should be made immediately on identification of a case meeting the definition of suspected infection with 2019-nCoV, or a cluster of cases with severe respiratory illness with evidence of common exposure or epidemiologic link, or on receipt of a laboratory diagnosis of the novel respiratory pathogen. More details on the diagnosis of the novel respiratory pathogen can be found on: http://www.nicd.ac.za/wp-content/uploads/2019/05/NMC-case-definitions-FLIPCHART_v4_May-2019.pdf. South Africa has released case definitions and precautionary measures for 2019-nCoV which can be found on: <http://www.nicd.ac.za/novel-coronavirus-outbreak-in-wuhan-city-hubei-province-of-china/>



Figure 1. Location of the cluster of pneumonia cases in Wuhan City, Hubei Province of Republic of China

Source: <https://www.cdc.gov/coronavirus/novel-coronavirus-2019.html>

Article source: Centre for Respiratory Diseases and Meningitis, NICD-NHLS; cherylc@nicd.ac.za

An update on Ebola virus disease outbreak in Democratic Republic of Congo

The Ebola virus disease (EVD) outbreak in northeast Democratic Republic of the Congo (DRC) has become the country's largest-ever Ebola outbreak. It was declared a public health emergency of International concern on 1 August 2018. There have been positive signs that the number of cases is slowly reducing, although the figures have been fluctuating from the end of 2019 into early 2020. The affected provinces are North Kivu, South Kivu and Ituri.

As of 19 January 2020, a total of 3 414 EVD cases has been reported including 3 295 confirmed and 119 probable cases, of which 2 237 cases have died (overall case fatality rate 66%). Of the total confirmed and probable cases, 56% (1 911) were female, 28% (963) were children aged less than 18 years, and 5% (171) were healthcare workers.

In the past 21 days from 30 December 2019 to 19 January 2020, 37 new confirmed cases were reported from 12 of the 87 health areas in six active health zones in North Kivu and Ituri provinces: Mabalako (32%, n=12), Beni (32%, n=12), Butembo (19%, n=7), Katwa (3%, n=1), Musienene (3%, n=1), and Mambasa (11%, n=4). As of 19 January, more than 21 days have passed without reports of new confirmed cases in Kalunguta Health Zone.

More than 246 000 contacts have been registered to date, and 2 771 were under surveillance as of 19 January 2020. On average, 92% of contacts were followed daily in the last seven days in health zones with continued operations. An average of 5 092 alerts were reported per day over the last seven days, of which 4 972 (98%) were investigated within 24 hours of reporting. There are currently 11 operational Ebola treatment centres (ETC) and 25 Ebola transit centres

located in North Kivu, South Kivu and Ituri provinces. Ebola vaccinations continue with 270 138 people vaccinated with the rVSV-ZEBOV-GP Ebola vaccine as of 20 January 2020, and 6 317 vaccinated with the Ad26.ZEBOV/MVA-BN-Filo vaccine in two health areas near Goma since its introduction on 14 November 2019. There is still the need for continued efforts to follow contacts, detect symptomatic patients early and to engage communities in response efforts.

The government and the Ministry of Health (MOH), and other national authorities in the DRC, WHO and partners are implementing outbreak control interventions together with teams in the surrounding provinces, who are taking measures to ensure that they are response-ready. WHO still advises against any restriction of travel to, and trade with

the DRC based on the currently available information. WHO continues to closely monitor and, if necessary, verify travel and trade measures in relation to this event. Travellers should seek medical advice before travel and should practice good hygiene.

As of 28 January 2020, there have been no EVD cases in South Africa associated with the current outbreak in the DRC. In addition, there are no suspected cases of EVD in South Africa at present. Surveillance amongst returned travellers is ongoing.

Article source: WHO: www.who.int; WHO-AFRO, Division of Public Health Surveillance and Response, NICD-NHLS; outbreak@nicd.ac.za

SEASONAL DISEASES

Odyssean malaria, Gauteng Province, December 2019 – January 2020

When some travellers return home to Gauteng Province after the festive season holidays, they unknowingly bring sinister hitchhikers back with them, namely infected vector mosquitoes that transmit malaria to residents who have either stayed at home, or if they travelled, have not visited any malaria transmission areas. In the December 2019 Communicable Diseases Communiqué issue (Vol 18(12)), we reported a case in Soshanguve, near Pretoria (first case in Table 1, below). In this issue, we summarise the odyssean malaria cases that were notified and investigated during December 2019 and January 2020 (to date) by NICD and the Gauteng district and subdistrict health teams (Table 1). Although having foreign national neighbours is a possible risk, any travellers returning from malaria-endemic areas, including South Africans, may inadvertently transport infected mosquitoes. Fortunately there have been no deaths among these patients, but the risk of delayed diagnosis, severe and complicated disease, and fatal outcome, is much higher for odyssean malaria than for malaria acquired in known transmission areas in South Africa and

surrounding countries. All of these cases were caused by *Plasmodium falciparum*, the most virulent malaria species.

At this time of year the NICD repeatedly appeals to healthcare workers to consider a diagnosis of malaria in any patient who presents with a 'flu-like illness that gets progressively worse over a short period, regardless of whether there is a history of travel or not, and to urgently request and obtain the results of a malaria test (repeatedly if necessary). This will help to prevent tragic and unnecessary deaths from malaria.

| Patient age; gender; nationality | Likely place of transmission | Possible risk factors identified |
|----------------------------------|---|--|
| 19; female*; S. African | Soshanguve; informal settlement | Near busy road; foreign national neighbour |
| 23; male; S. African | Pretoria East; formal housing | Neighbours and domestic help are foreign nationals |
| 23; female*; Malawian | Olievenhoutbosch, Midrand; formal housing | Many foreign nationals in community; church services held nearby |
| 19; female*; S. African | Kagiso, Roodepoort | Large foreign national migrant community |
| 50; male; S. African | Pretoria East; formal housing | Close to N4 highway; foreign national neighbours |
| 7; female; S. African | Eastern Cape, according to date of onset of illness | Travelled to E. Cape in a car from Limpopo Province |

Table 1. Odyssean malaria cases, December 2019 – January 2020, Gauteng Province

Article source: Centre for Emerging Zoonotic and Parasitic Diseases, NICD-NHLS; johnf@nicd.ac.za

BEYOND OUR BORDERS

The 'Beyond our Borders' column focuses on selected and current international diseases that may affect South Africans travelling abroad. Numbers correspond to Figure 2 on page 8.

1. Influenza: Asia and Northern America

In the temperate zone of the northern hemisphere, respiratory illness indicators and influenza activity continued to increase in most countries. In the countries of North America, influenza activity further increased. All seasonal influenza subtypes co-circulated in Canada, with a slightly higher proportion of influenza A viruses; the proportion of influenza B viruses (mainly B/Victoria lineage), however, was higher than in previous years for this period of the influenza season. In Canada, the percentage of visits for influenza-like illness (ILI) followed the average trend of previous seasons. In the United States of America, influenza B/Victoria viruses continued to be the predominant influenza subtype detected, followed by influenza A(H1N1)pdm09. ILI activity might have peaked and reached levels above what was reported in the 2014-2015 season, though hospitalisation rates and the percentage of deaths attributed to pneumonia and influenza remained low.

In Central Asia, influenza activity remained elevated with influenza B viruses predominant in all reporting countries. In Western Asia, influenza activity remained elevated overall. Influenza activity continued to increase in Iraq, Israel, Turkey and Yemen, with detections of predominately influenza A(H1N1)pdm09. In the West Bank and Gaza Strip, influenza and severe acute respiratory infection (SARI) activity increased during this period with all subtypes reported. In East Asia, ILI and influenza activity continued

to increase overall. In China, ILI activity continued to increase and was greater than that during the same time period in the three previous seasons; influenza activity also increased, with detections of predominately influenza A(H3N2), followed by a smaller proportion of influenza B/Victoria lineage viruses, especially in the southern provinces. In Japan, the number of influenza cases per sentinel site was higher compared to the same time in the previous three seasons, and influenza A(H1N1)pdm09 virus detections predominated.

There are four types of seasonal influenza viruses, types A, B, C and D. Influenza A and B viruses circulate and cause seasonal epidemics of disease. Only influenza type A viruses are known to have caused pandemics. The most effective way to prevent the disease is vaccination. Immunity from vaccination wanes over time so annual vaccination is recommended to protect against influenza. Injected inactivated influenza vaccines are most commonly used throughout the world. WHO recommends annual vaccination for pregnant women at any stage of pregnancy, children aged between 6 months to 5 years, elderly individuals (aged more than 65 years), individuals with chronic medical conditions and healthcare workers.

2. Measles: Democratic Republic of the Congo (DRC)

Measles outbreaks are currently ongoing in Nigeria, the Democratic Republic of Congo (DRC), the Gaza Strip and Samoa. Recently confirmed cases have occurred in

New Zealand and New South Wales, Australia. On 9 January 2020 the Maldives Health Protection Agency reported a suspected case of measles after being declared measles free by the World Health Organization (WHO) in June 2017.

In the DRC, since January 2019, more than 288 000 people have contracted measles, and more than 5 700 have died from the disease; over 90% of the deaths are children under the age of five. According to the World Health Organization (WHO), this is the largest measles epidemic in the world today and the largest recorded in DRC for decades. Efforts have been made at national level, but more resources must be quickly committed and targeted to areas that are still affected in order to stop this outbreak. Measles is an infectious viral disease spread through respiratory droplets emitted when a patient coughs or sneezes. At the moment in DRC, a measles patient infects on average two to three other people. There is no specific treatment once someone contracts measles, but a well-conducted vaccination campaign is extremely effective to prevent new cases. In areas with low immunisation coverage, vaccination can reduce infant mortality by 50%.

3. Yellow fever: Nigeria

According to the WHO, from 1 January to 10 December 2019, a total of 4189 suspected yellow fever cases was reported from 604 of 774 local government area across all the 36 states and the federal capital territory in Nigeria. Recently, in Plateau State, 141 cases were suspected with 25 cases of yellow fever confirmed, and three deaths in four local government areas have been reported.



Figure 2. Current outbreaks/events that may have implications for travellers. Numbers correspond to text above. The red dot is the approximate location of the outbreak or event.

Yellow fever is endemic in tropical areas of Africa as well as Central and South America. It is a viral disease that is transmitted by the *Aedes* and *Haemogogus* mosquitoes. There is an effective yellow fever vaccine, which is usually protective within 10 days of administration and confers lifelong immunity.

4. Lassa fever: Liberia and Nigeria

A recent outbreak of Lassa fever has occurred in Liberia. A total of 20 confirmed cases, including three deaths, has been reported. Liberia does not lie in the usual 'Lassa fever belt'; however, Lassa fever is not new to this country and cases have occurred there sporadically for several years.

In Nigeria, which falls within this belt, in week 3 of 2020 (13 – 19 January), the number of new confirmed cases has increased from 64 cases in week 1 to 81. These new cases were reported from six states (Ondo, Edo, Delta, Taraba, Plateau and Bauchi). Overall, from 1 – 19 January 2020, a total of 163 confirmed cases, with 24 deaths (case fatality rate (CFR) 14.7%) has been reported. This

CFR is lower than the CFR for the same period during 2019 (23.4%). In total for 2020, nine states have recorded at least one confirmed case across 32 Local Government Areas. Most confirmed cases are from three states: Edo (38%), Ondo (38%) and Ebonyi (11%). The predominant age-group affected is 11-40 years. No healthcare worker infection was identified in this reporting week.

Lassa fever is an acute viral haemorrhagic disease, that occurs from contact with urine or faeces of infected *Mastomys natalensis* rats. Person-to-person transmission can also occur, especially in healthcare settings where there are poor infection prevention and control measures. The virus is endemic in *Mastomys* rodents in multiple West African countries. Prevention of Lassa fever relies on promoting good community hygiene to discourage rodents from entering homes. Effective measures include storing grain and other foodstuffs in rodent-proof containers, disposing of garbage far from the home, maintaining clean households and keeping cats.

Article source: Promed; www.promed.org, World Health Organization; www.who.int

WHO-AFRO: OUTBREAKS AND EMERGENCIES

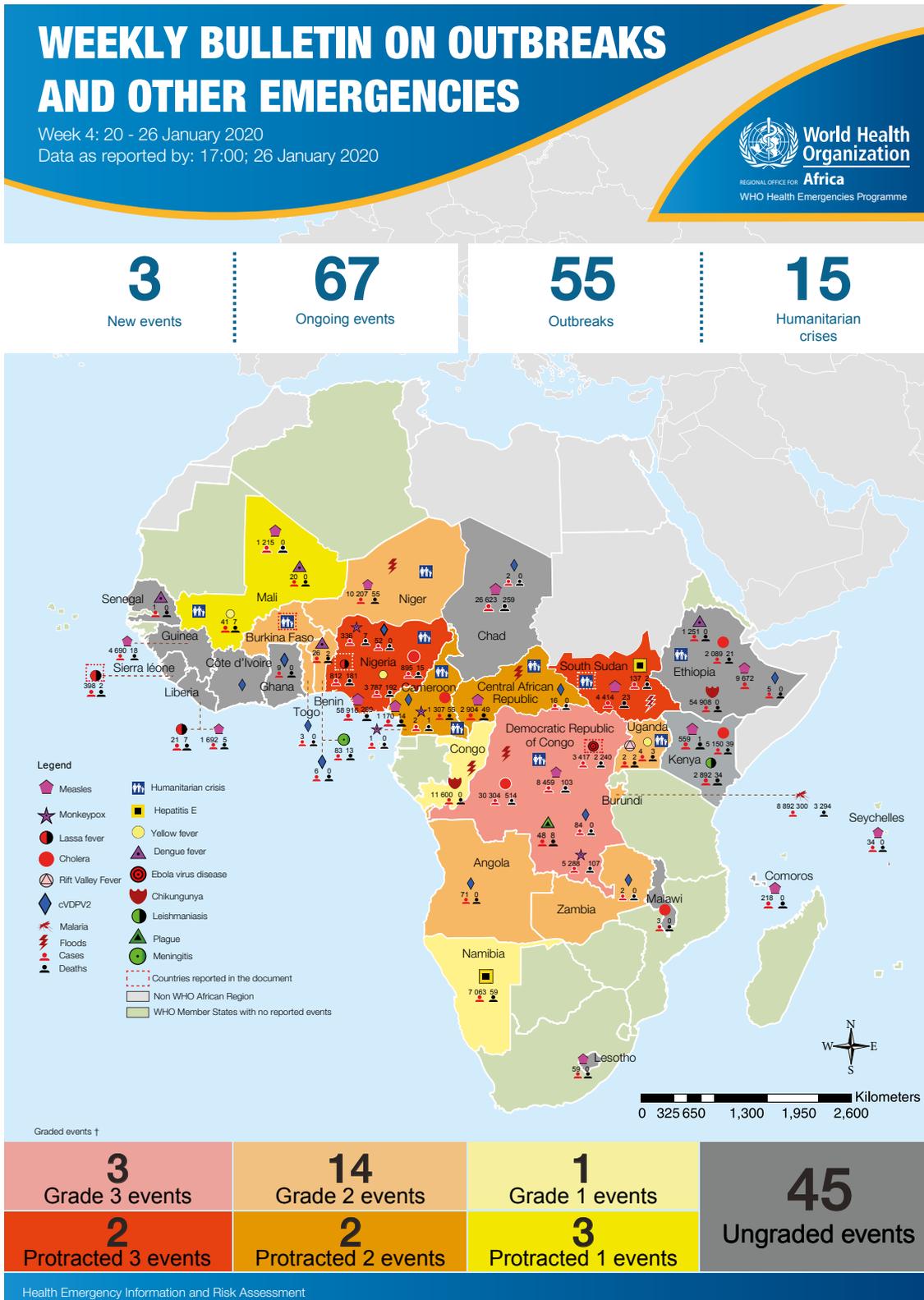


Figure 3. The Weekly WHO Outbreak and Emergencies Bulletin focuses on selected public health emergencies occurring in the WHO African Region. The African Region WHO Health Emergencies Programme is currently monitoring 70 events. For more information, see link below:

<https://apps.who.int/iris/bitstream/handle/10665/330642/OEW04-2026012020.pdf>

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