NATIONAL INSTITUTE FOR COMMUNICABLE DISEASES
Division of the National Health Laboratory Service

Communicable Diseases Communiqué

OCTOBER 2019, Vol. 18(10)

CONTENTS

EDITORIAL

This month's Communiqué includes a summary of the RSA malaria control programme, a description of the public health response to confirmed measles cases in North West Province, an update on the ongoing Ebola outbreak in the Democratic Republic of Congo, and case reports or updates on a number of uncommon but important communicable diseases in South Africa, including tetanus, infant botulism, meningococcal disease and pertussis.

The article on tetanus reports a single case of neonatal tetanus this year, notified through the notifiable medical conditions surveillance system. In RSA, only six cases have been reported since 2014, one of which occurred this year. There is a global initiative to eliminate maternal and neonatal tetanus (MNT). The WHO defines elimination of neonatal tetanus as 'less than 1 case of neonatal tetanus per 1 000 live births'. Currently, only 14 countries globally have not achieved elimination status. Prevention of neonatal tetanus includes: 1) administration of at least two tetanus toxoid containing vaccine doses to pregnant women, separated by four weeks (only in women who have not had six lifetime tetanus toxoid vaccines); 2) promotion of clean birth and clean cord care practices; 3) supplementary immunisation activities and 4) surveillance for neonatal tetanus.

Currently, all provinces in South Africa except the Western Cape Province, provide maternal immunisation against tetanus. A recommendation to introduce national maternal immunisation against pertussis using the tetanus, adult diphtheria and acellular pertussis (TdaP) combination vaccine is under consideration by the RSA National Advisory Committee on Immunisation (NAGI). The adoption of this recommendation will also result in protection of neonates against tetanus.

As usual, we include the WHO-AFRO infographic on public health and humanitarian events in the AFRO region, and a summary of the infectious disease outbreaks of importance to South African travellers in our 'Beyond our Borders' section.

1 ZOONOTIC AND VECTOR-BORNE DISEASES

a An update on rabies in South Africa

The National Institute for Communicable Diseases has confirmed 10 cases of human rabies for South Africa, for 2019 to date. These cases were reported from KwaZulu-Natal (n=4), Eastern Cape (n=4) and Limpopo (n=2) provinces. In addition, four more deaths were classified as probable rabies cases, two each from KwaZulu-Natal and Eastern Cape provinces.

Since our last report (Communicable Diseases Communiqué, September 2019, Vol. 18(9)), three new human rabies cases have been reported, one confirmed and two probable, and are described below.

In the first case, a 32-year-old female student from Durban, KwaZulu-Natal Province, started having recurrent headaches in August 2019. The headaches became worse from 21 September onwards, and were associated with myalgia, hydrophobia and vomiting. She was initially seen at a private hospital in Durban on 21 September, but was discharged that day. She returned to the same hospital two days later and was transferred to a tertiary level government hospital. Here, she was admitted to the intensive care unit, intubated & ventilated. A diagnosis of rabies or viral encephalitis was suspected. Cerebrospinal fluid and saliva samples collected from the patient on 23, 25 and 27 September tested positive for rabies by PCR. The patient died on 30 September. Rabies was also confirmed by direct fluorescent antibody testing on post-mortem-collected brain samples on 4 October 2019.

Two months prior to the illness, the patient's parents' ten-year-old dog had become aggressive with abnormal behaviour. On 22 June 2019, she took the dog to a veterinarian, but while lifting the dog into the car, it scratched her. The dog was euthanised; however, rabies testing by fluorescent assay test was negative. No further testing was done to exclude rabies in the animal. On 28 June, a 2-month old puppy that the patient had adopted via an online social media platform a few days earlier became sick, and died one week later. Although rabies post-exposure prophylaxis (PEP) was given to the patient and her husband, this was done only when the patient was symptomatic, and not immediately after the dog exposures. Seven other contacts in the parental house completed rabies PEP regime. None of them had sustained bites or scratches from the dog. All relatives received counselling.

In the second case, a 45-year-old man was attacked and bitten by stray dogs in uMgungundlovu District, KwaZulu-Natal Province, on 2 July 2019. He sought care for his wounds and received rabies PEP at a local clinic, but did not go for follow-up visits. On the morning of 31 August, the man was found unconscious and taken to a nearby clinic. On 1 September, he was admitted to a district hospital in Pietermaritzburg where he died on 6 September. Rabies was not confirmed due to lack of adequate specimens from the patient. The family of the deceased refused post-mortem investigation. This case was classified as a probable rabies case.

The third case involved a 7-year-old male child who was bitten by a stray dog in Libode, Eastern Cape Province, around mid-August 2019. The dog later died but no further information could be obtained about the animal. The child was not taken to a healthcare facility. In September, he presented with fever, nausea, confusion, hypersalivation, hallucinations and vomiting of coffee-ground substance. On 18 September, he was transferred to an academic government hospital in Mthatha, but subsequently died. Three saliva specimens collected on 17, 18 and 19 September tested negative for rabies and no post-mortem brain samples were obtained to confirm rabies in this patient. Given the history of exposure to a stray dog prior to illness, and a clinical history that is compatible with the diagnosis of rabies, this case was also classified as a probable rabies case in the absence of laboratory confirmation.

Timeous and adequate administration of anti-rabies prophylaxis prevents disease in 100% of dog and other animal bite victims. For more information on rabies PEP, visit www.nicd.ac.za.

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

b East African trypanosomiasis

Three cases of East African trypanosomiasis (EAT, sleeping sickness) were medivaced to South Africa during September and October 2019.

The first patient was a 23-year-old male international student, who has been studying in South Africa since late July 2019. Between 6 and 16 September he was on vacation in Uganda. Places visited in Uganda were Entebbe, Sipi Falls, Moroto, Murchison Falls, and Masindi. He did not see any tsetse flies, nor was he aware of any insect bites. On Sunday 22 September, he felt unwell and noticed a lesion under his jaw. He was admitted to hospital and on 26 September underwent surgery for a presumed sub-

mandibular abscess. No abscess was found and no organisms were seen. The white cell count was about 3 x 10^9/L and platelets were 34 x 10^9/L, then 29 x 10^9/L, and postoperatively dropped to 4 x 10^9/L. Blood films were examined and numerous trypanosomes were seen, with a density of about 56 000/µL. On review of the blood sample from 26 September, scanty trypanosomes were present. The patient was transferred to the care of an infectious diseases physician on Saturday 28 September. On admission, he was very ill with unrelenting fever, tachycardia, periodic hypotension, dyspnoea, renal dysfunction (creatinine 300 µmol/L), jaundice with raised transaminases, and slight confusion. Test dose and first dose of suramin were well tolerated, and the second dose was given on 30 September. There was a rapid clinical response to treatment. The cerebrospinal fluid test results were normal. According to WHO EAT experts, the infection was most likely acquired at Murchison Falls, alternatively at Moroto.

The second patient was an expatriate working in conservation research in the Vwaza Marsh Game Reserve, Malawi. The patient had worked in the same game reserve with the expatriate volunteer who died in December 2018 after having contracted EAT (Communicable Diseases Communiqué, January 2019, Vol. 18(1)). The patient presented with an acute febrile illness and a typical trypanosomal chancre, and sought medical care. She was transferred to a Johannesburg hospital for treatment on 13 October 2019. Profound thrombocytopenia, jaundice, and hepatic and renal dysfunction were noted on admission. The parasite density was estimated as >100 000 parasites/µL. Initial doses of suramin were commenced, and the clinical response was satisfactory. The third patient had the same geographic and occupational exposure history and presented with an acute febrile illness, severe rigors and typical chancres. A scanty parasitaemia was noted on admission on 18 October 2019. The patient is also receiving suramin in a Johannesburg hospital. Both patients await lumbar puncture to exclude central nervous system involvement.

The Vwasa conservation area is well known as an area of high endemicity for EAT, but does not have high tourist traffic, and wildlife workers and researchers are mainly at risk. While suramin is available in the capital Lilongwe in the public hospital system, it appears that private medical services and medivac companies are not aware of this, with resulting delays in commencing treatment while insurance and transport arrangements are being made. East African trypanosomiasis is a severe and rapidly progressive infection and best clinical outcomes are achieved when diagnostic and treatment delays are minimised. A preliminary trial of an investigational antitrypanosomal drug, fexinidazole, is presently being done in Malawi for EAT. This agent has the major advantages of oral administration and low toxicity, unlike the traditional drugs used to treat EAT.

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

2 VACCINE-PREVENTABLE DISEASES

a Measles cases, North West Province

A measles outbreak was declared following the detection of three laboratory-confirmed measles cases in Bojanala Platinum District of the North West Province within a period of four weeks. As a result, the North West Provincial Department of Health, in collaboration with the National Department of Health (NDoH), the National Institute for Communicable Diseases (NICD), the United Nation International Children's Emergency Fund (UNICEF) and the World Health Organization (WHO) are co-ordinating outbreak response activities. In addition, two patients residing in Bojanala Platinum District tested positive for measles at the NICD on 18 October 2019, and have been classified as confirmed measles cases (Figure 1). A district-wide vaccination campaign is being organised, targeting individuals aged six months to 15 years in Rustenburg subdistrict (where cases were confirmed), and individuals aged six months to five years in the other subdistricts.

Measles is an infectious viral disease which is spread through respiratory droplets emitted when a patient coughs or sneezes. A suspected measles case is any patient presenting with fever and rash, along with any one of the following: cough, coryza (runny nose) or conjunctivitis (red eyes). Measles cannot be distinguished from other rash illnesses, such as rubella (German measles) without a blood test. Rubella is also circulating in all nine provinces, including the North West Province. Healthcare workers should collect a blood sample and complete a case investigation form (available on the NICD website) when they identify a suspected measles case. The case should also be notified through the electronic or paper-based Notifiable Medical Conditions (NMC) surveillance system.

Parents should ensure that their children have received all recommended vaccines. Measles vaccine is administered in both the public and private health sectors at six months of age, with a booster at 12 months. Further information is available at http://www.nicd.ac.za/diseases-a-z-index/measles/.

Source: Centre for Vaccines and Immunology, NICD-NHLS; North West Provincial Department of Health and National Department of Health; melindas@nicd.ac.za

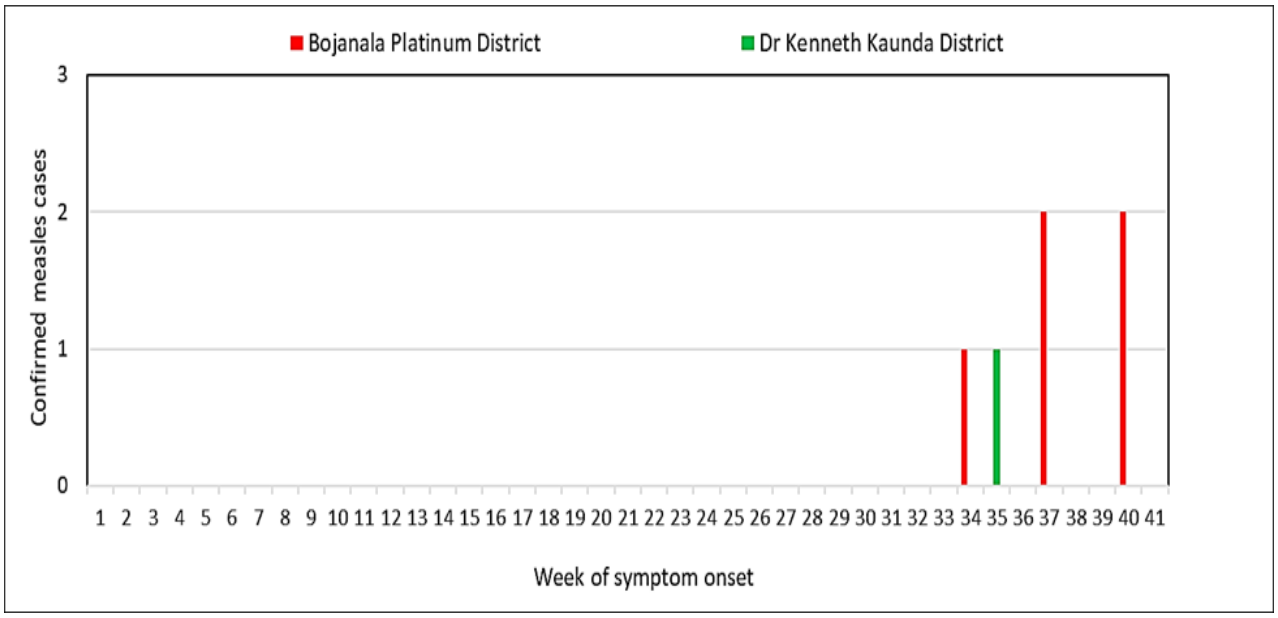

Figure 1: Number of laboratory-confirmed measles cases by district (n=6), North West Province, 1 January to 25 October 2019

b Tetanus cases reported through surveillance activities

There have been 11 suspected tetanus cases notified through the Notifiable Medical Conditions (NMC) surveillance system from 1 January to 10 October 2019. Of these, one case in a neonate was discarded, and another case was confirmed as neonatal tetanus in August. Investigation of the confirmed case revealed that rat droppings had been placed on the umbilical cord stump. The remaining nine suspected tetanus cases ranged in age from 10 to 74 years, comprising two confirmed, three probable, two discarded and two pending cases.

There is no laboratory test for tetanus, and cases are classified after reviewing medical records. Prior to implementation of the new NMC surveillance system, five neonatal tetanus cases were reported between 2014 and 2017 (two in 2014, two in 2015 and one in 2017) (data courtesy of WHO).

Tetanus is a category 2 notifiable disease caused by the bacterium *Clostridium tetani*. It typically presents as painful muscle spasms. Infection can result in serious complications, including death. It is not transmitted from person to person but occurs when wounds or animal bites are infected with tetanus spores.

Tetanus can be prevented by the administration of tetanus toxoid, which induces specific antitoxins. To prevent neonatal tetanus, tetanus toxoid needs to be administered to the mother before or during pregnancy, delivery has to take place under hygienic conditions and umbilical cord care needs to be appropriate. Neonatal tetanus, which is mostly fatal, is particularly common in rural areas where home deliveries are frequent.

Source: Centre for Vaccines and Immunology, NICD-NHLS; melindas@nicd.ac.za

c An overview of surveillance findings for pertussis, 2018-2019

An increase in laboratory-confirmed pertussis cases was observed during 2018 from all syndromic pneumonia surveillance and influenza-like illness (ILI) sentinel surveillance sites (Communicable Diseases Communiqué, November 2018, Vol. 17(11)). During January-September 2019, there has been a decline in the number of cases detected in these surveillance programmes.

From January to September 2019, the detection rate of *Bordetella pertussis* in the pneumonia and ILI syndromic surveillance programmes was 0.9% (41/4 707) (Figure 2). The detection rate decreased from 1.9% (127/6 613) in 2018. In the period January - September 2019, the highest detection rate was in infants aged <3 months (2.6%, 22/840), with a second peak in patients aged 5-24 years (1.5%, 7/478). Of the 41 pertussis cases in 2019, over half (53.7%, 22/41) occurred in infants aged <3 months. In 2019, there were no deaths among the 28 pertussis cases for whom outcome was available.

From January 2018 - September 2019, there were 1 586 pertussis cases reported to the Notifiable Medical Conditions (NMC) surveillance system, of which 905 (57.1%) were reported in 2018 and 681 (42.9%) reported from January - September 2019 (Figure 3). Of 1 125 (70.9%, 1125/1586) classified cases, 76.7% (863/1125) were laboratory-confirmed and 23.3% (262/1125) were suspected. The highest number of cases were reported from Gauteng (32.4%, 509/1572), Western Cape (22.3%, 350/1572) and KwaZulu-Natal (15.4%, 242/1572) provinces. The majority of cases occurred in children aged <1 year (59.3%, 938/1583). Outcome was known for 1 135 cases, of which 12 (1.1%) died; all in infants aged <1 year.

Suspected (clinical pertussis symptoms) and laboratory-confirmed pertussis is notifiable. Other *Bordetella* species, such as *Bordetella parapertussis*, *Bordetella bronchiseptica* and *Bordetella holmesii* can cause whooping cough-like disease; however, laboratory identification of other *Bordetella* species is not notifiable.

Pertussis occurs in epidemic cycles, with peaks every 3-5 years. Pertussis cases have been reported from all nine provinces, and can be severe or fatal, particularly in infants aged <12 months. Clinicians are advised to be vigilant for cases, especially in very young children who may not present with typical pertussis symptoms (cough and whoop). NICD recommendations for pertussis diagnosis, management and public health response are available at http://www.nicd.ac.za/index.php/pertussis/.

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

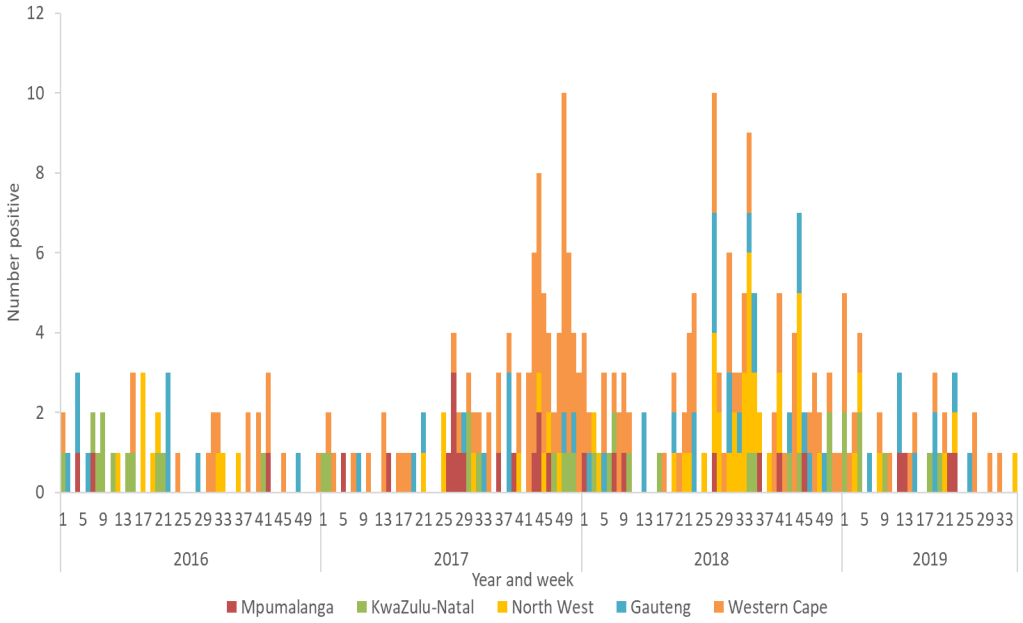

Figure 2. Number of laboratory-confirmed pertussis cases from pneumonia surveillance and influenza-like illness surveillance programmes by year, week and province, January 2016 - September 2019

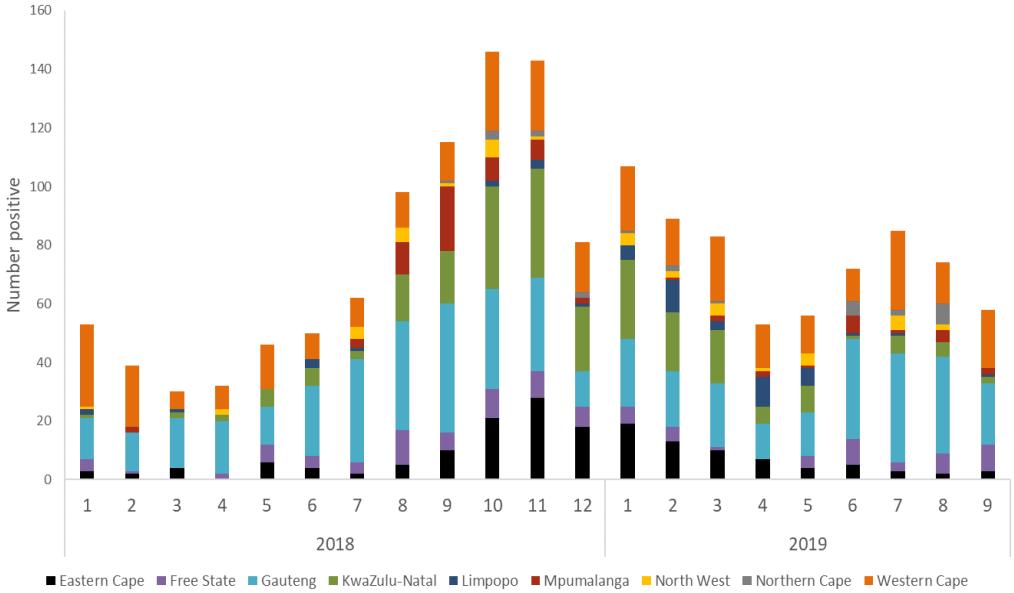

Figure 3. Number of pertussis cases reported to the Notifiable Medical Conditions surveillance system by year, month and province, January 2018 -September 2019

3 ENTERIC DISEASES

a Infant botulism

Two cases of suspected infant botulism were investigated. Case 1 was a 2½-month-old baby, with clinical signs of poor breastfeeding, ptosis, and muscle weakness. She was admitted to an intensive care unit but did not require ventilation. Botulinum neurotoxin (BoNT) testing of stool in mice at NICD was suggestive of presence of a neurotoxin but did not identify BoNT types A, B or E. These are the most common causes of human botulism; other toxin types are occasionally responsible, but routine mouse testing cannot specifically identify these. However, stool culture for anaerobes revealed the presence of a *Clostridium* species, this was identified on MALDI-TOF MS as *Clostridium botulinum*. Whole genome sequencing showed that the organism carried genes for both BoNTs B and F. Such dual toxin-producing strains of *C. botulinum* have been previously identified as very rare causes of infant botulism in the USA and UK. Heptavalent botulinum antitoxin was obtained and administered, and the clinical condition reportedly improved. Case 2 was a 4-month-old baby with a history of poor feeding and muscle weakness. Stool and serum samples were negative for BoNT on mouse bioassay, and *C. botulinum* was not detected in stool cultures. The possibility of a genetically-determined muscle disease is being investigated.

The pathogenesis of this condition involves colonisation of the immature intestine of infants by *C. botulinum*, and local production of BoNT. Although spores of *C. botulinum* are widely present in soil and agricultural products, the natural gut defences of children older than six months and adults are generally able to prevent germination and growth of the organism. Honey, sometimes fed to infants, has been implicated as the source of spores in some infant botulism cases. The definitive treatment of all forms of botulism (infant, foodborne, wound) is botulinum antitoxin, usually in polyvalent formulation, but this is only obtainable in South Africa by special import from overseas suppliers. The prognosis of treated infant botulism is good. Long-term recovery occurs when motor nerve endplates slowly regenerate and muscle function returns.

Infant botulism has not been previously definitively diagnosed in South Africa. Sporadic cases of foodborne botulism have been described in South Africa, most recently in 2015 (Communicable Diseases Communiqué, March 2015, 14(3): 4).

Source: Centre for Emerging Zoonotic and Parasitic Diseases; Sequencing Facility, NICD-NHLS; johnf@nicd.ac.za

4 INTERNATIONAL OUTBREAKS OF IMPORTANCE

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

Ebola virus disease (EVD) outbreak has been ongoing since it was declared on 1 August 2018 to date in the Democratic Republic of the Congo (DRC). The provinces where the outbreak is currently happening are North Kivu, South Kivu and Ituri. Neighbouring countries are taking steps to mitigate the spread of EVD outbreak. As of 18 October 2019, a total of 3 228 EVD cases (3 114 confirmed & 114 probable) has been reported. Of the total confirmed and probable cases, 56% (1 811) were female, 28% (918) children aged less than 18 years, and 5% (162) were healthcare workers. There have been 2 157 deaths (overall case fatality of 67%).

The number of confirmed cases of EVD has been relatively low in recent weeks, with 15 new confirmed cases reported in North Kivu and Ituri provinces in the week of 7 to 13 October. These encouraging signs are offset by a marked increase in case incidence in Biakato Mine Health Area, Mandima Health Zone. From 25 September to 15 October 2019, the number of affected health areas have decreased, with 22 health areas and ten health zones reporting new cases (50 confirmed cases). Of the 50 cases, 62% (n=31) were reported from or had transmission links with Biakato Mine Health Area. There are still issues of mistrust and poor understanding of transmission mechanism and symptoms of the disease among the population and local health workers from these 10 health zones. This has greatly impacted on case finding and investigations, and will affect engagement with response activities.

Three months have passed since a declaration of the public health emergency of international concern (PHEIC) was made on 17 July 2019. The Emergency Committee, under the International Health Regulations (IHR), will reconvene to review the progress in the implementation of the Temporary Recommendations issued by the Director-General on 17 July. This is to assess if the outbreak still constitutes a PHEIC, and if so, advice on new updated recommendations under the IHR.

In terms of risk assessment, the WHO continues to monitor the changes in the context of the outbreak to ensure support to the response is adapted to the evolving circumstances. The conclusion of the last assessment (8 October 2019) was that national and regional risk levels remain very high, while global risk levels remain low.

Based on the current information, WHO still advices that there should be no restrictions of travel or trade with the DRC. Travellers should however seek medical advice before travel and should practice good hygiene. More information can be accessed from the WHO recommendations for international traffic related to the EVD outbreak in the DRC.

As at 28 October 2019, 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.

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

5 SEASONAL DISEASES

a Meningococcal disease update—January to September 2019

From 1 January through 30 September 2019, 74 laboratory-confirmed, invasive meningococcal disease episodes have been reported to the GERMS-SA surveillance programme (less than the 96 episodes reported over the same time period in 2018). Most affected persons were from Gauteng (n=25, 34%), Western Cape (n=22, 30%), KwaZulu-Natal (n=10, 14%) and Eastern Cape (n=9, 12%) provinces. Serogroup data was available for 60 isolates. *Neisseria meningitidis* serogroup B predominated (n=25, 42%), followed by serogroup Y (n=18, 30%), W (n=13, 22%) and C (n=4, 7%). Most cases occurred in children <1 year of age (n=9, 12%), although all age groups were affected (Figure 4).

While meningococcal disease is seasonal, peaking from May to October, cases occur sporadically throughout the year. Healthcare workers should always consider a diagnosis of invasive meningococcal disease in persons presenting with sudden onset of fever, vomiting, headache, neck-stiffness or petechial rash. Meningococcal disease is a category 1 notifiable medical condition (NMC) and any clinically suspected or laboratory-confirmed case should be reported immediately to the provincial communicable disease control coordinators to ensure appropriate contact tracing, responsible prescribing of chemoprophylaxis and case counting.

As part of ongoing surveillance, the Centre for Respiratory Diseases and Meningitis (CRDM) at the NICD offers meningococcal isolate confirmation/ serogrouping and *Neisseria meningiditis* detection by PCR of culture-negative/autopsy cases, free of charge. For more information, please contact the CRDM laboratory at the NICD, 011 555 0327.

Source: Centre for Respiratory Diseases and Meningitis, NICD-NHLS; annev@nicd.ac.za

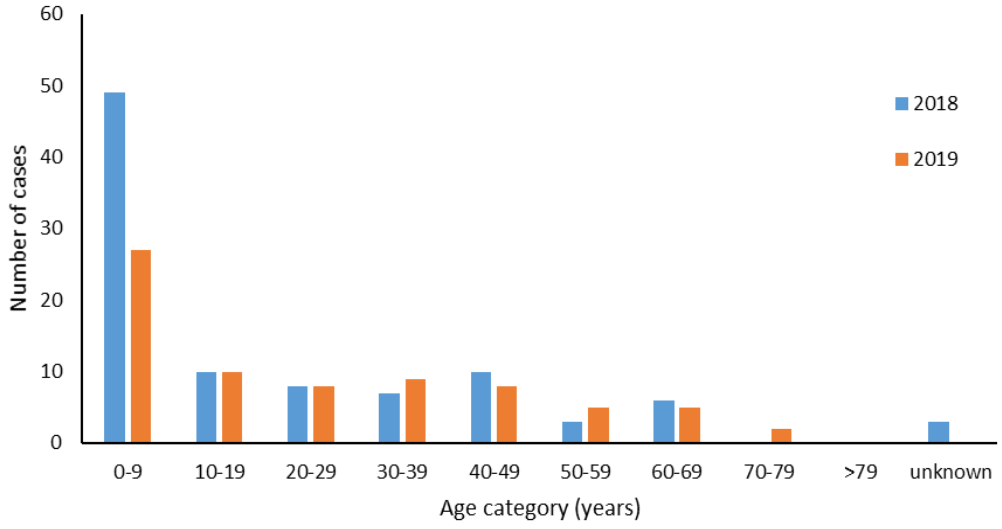

Figure 4. Number of cases of invasive meningococcal disease reported to the GERMS-SA surveillance programme by age category, 1 January to 30 September, 2018 (n=96) and 2019 (n=74).

b The National Malaria Elimination Strategy

The 5th MRC Malaria Research Conference, held in Pretoria at the end of July, provided the setting for the launch of the national Malaria Elimination Strategic Plan for South Africa, 2019-2023 (available on the NICD website, http://www.nicd.ac.za/diseases-a-z-index/malaria/). While it is acknowledged that, given its geographical relationship to malaria distribution in Africa, South Africa will continue to experience imported malaria until there is wider regional elimination, the goal is to achieve zero local malaria transmission in South Africa by 2023. The plan for elimination utilises five key strategies, namely:

1) **Programme management**, providing effective management, leadership and coordination for the optimal implementation of malaria elimination interventions at all levels;

2) **Surveillance**, strengthening and sustaining the surveillance system so that 100% of malaria cases are reported by the malaria information system within 24 hours;

3) **Health promotion**, ensuring that 90% of the at-risk population receives information and education messaging;

4) **Vector control**, with the objective of achieving at least 95% coverage of at-risk populations with key vector suppression interventions; and

5) **Case management**, to ensure universal access to diagnosis and treatment according to national guidelines.

The NICD contributes significantly to most of these strategies and objectives, both directly through activities of the NMC, Communications, and the specialised reference laboratories dealing with malaria parasites and vectors, and also through its advisory responsibilities on the South African Malaria Elimination Committee (SAMEC), chaired by Professor Lucille Blumberg. Staff members of the NICD sit on the SAMEC subcommittees for case management, vector control, and health promotion. The NICD also contributes to national malaria treatment, prevention, and diagnosis guidelines (all available at www.nicd.ac.za).

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

6 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 5 on page 9.

1. Yellow fever: Nigeria
On 29 August 2019, a suspected yellow fever (YF) case was reported from Kano state with a travel history to Yankari game reserve, Alkaleri Local Government Area (LGA), Bauchi state, Nigeria.

From 29 August to 22 September 2019, Nigeria reported an outbreak of YF with an epi-centre in the Yankari game reserve. According to Nigeria Centre for Disease Control (NCDC), 231 suspected cases have been reported in four states, including Bauchi (110), Borno (109), Gombe (10) and Kano (2). The vaccination history for the 231 suspected YF cases is not known. This outbreak is unique in the broad geographic distribution of cases, most with linkage through travel, work or residence in, or close to, the Yankari game reserve, which is an ecological zone highly prone to YF virus circulation (with suitable vectors and reservoir hosts).

2. Pertussis: USA and Canada
Pertussis (whooping cough) is a respiratory disease caused by the bacterium *Bordetella pertussis*. It is a highly contagious disease that is spread by respiratory droplets. In young infants, pertussis can be fatal. The three dose vaccination regimen for pertussis has averted many pertussis related deaths; however, the United Stated Centre for Disease Control has reported that pertussis vaccinations decreased by 1.4%, while cases has increased to 10 per 100 000 population. A high school in Nevada, USA, was closed following a whooping cough outbreak, and a few other schools have also reported cases. On 16 October 2019, a total of 15 confirmed cases were reported in Alberta, Canada, in the previous two weeks. The cases were all locally acquired. There may be under-reporting of pertussis cases, as adults often have mild flu-like symptoms. Infected adults with mild symptoms would still be able to transmit the disease on to other adults and children. Adults have been asked to check their own and their children's immunisation status, and get booster vaccinations where indicated. Pregnant women and adults who are in contact with infants have also been advised to get booster vaccinations.

3. Cholera : Yemen
More than two million cases of cholera (2 036 960), with 3 716 deaths have been reported in Yemen since October 2016 to August 2019. From January

to August 2019, there were 936 822 suspected cholera cases, with 1 313 reported deaths (CFR 0.14%). Close to a quarter of cases (24.5%) are reported to occur in children less than five years old. Although the World Health Organization (WHO) continues to support the Yemen health authorities and its partners in averting the epidemic, lack of access to clean water and sanitation services, as well as medical services has led to the ongoing fluctuating trend in the morbidity and mortality from the *Vibrio cholerae* bacterium.

Cholera is a highly virulent acute diarrhoeal disease which is often an indicator of inequity and poor social development. It is usually predictable and preventable and can be eliminated by ensuring access to clean water and sanitation, as well as good hygiene conditions for the population.

4. Lassa fever: Nigeria

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, including Nigeria.

From 1 January to 6 October 2019, a total of 4 019 suspected cases of Lassa fever was reported from 23 Nigerian states. Of these, 721 were confirmed positive. Since the onset of the 2019 outbreak, there have been 154 deaths in confirmed cases (CFR 21.4%). From 30 September to 6 October 2019, seven new cases of Lassa fever were reported, with one fatality. On 21 October, it was reported that there are currently 12 patients being managed across various health establishments. Since the outbreak onset, 19 healthcare workers have been infected in 10 districts. A total of 8 345 contacts has been identified from 21 states. Of these, 7 872 (94.3%) have completed 21 days follow-up, 396 (4.7%) are still being followed up, while 12 (0.1%) have been lost to follow-up. Of the total number of contacts, 132 were found to be symptomatic. Sixty-five out of the 132 symptomatic contacts tested positive for the virus (49.2%). From 9 to 15 September, no new healthcare workers were infected. This has been attributed to improved barrier nursing and the use of personal protective equipment. The National Lassa fever multi-partner, multi-sectoral Technical Working Group (TWG) continues to coordinate response activities at all levels.

Source: Promed (www.promed.org), World Health Organization (www.who.int)

Figure 5. 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.

7 WHO-AFRO: OUTBREAKS AND EMERGENCIES

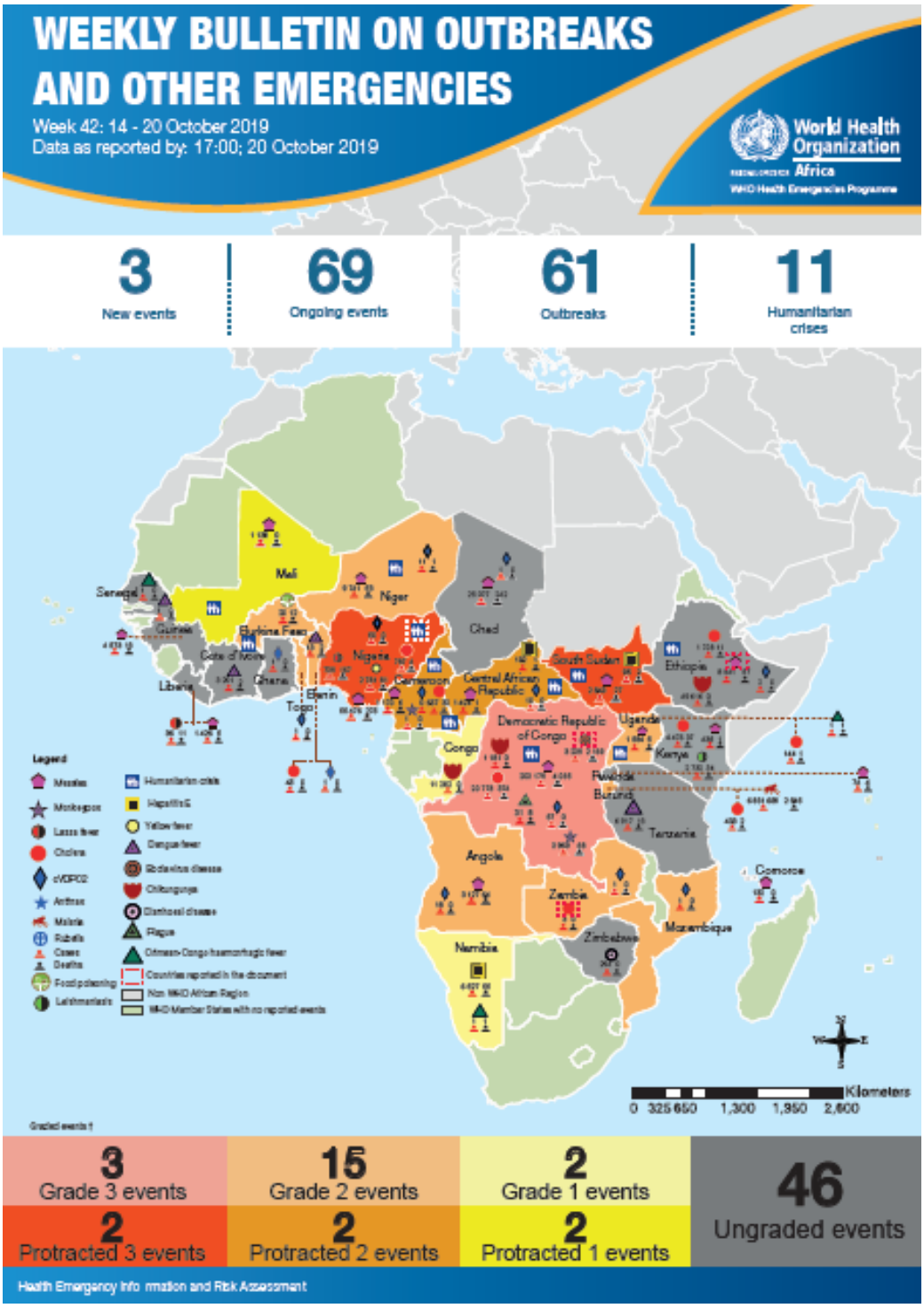

Figure 6. The Weekly WHO Outbreak and Emergencies Bulletin focuses on selected public health emergencies occurring in the WHO African Region. The African Region WHO Health Emergencies Programme is currently monitoring 72 events. For more information see link below: https://apps.who.int/iris/bitstream/handle/10665/329415/OEW42-1420102019.pdf