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

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CONTENTS

Editor's Note

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In this first edition of the Communique for 2021, we review the COVID-19 outbreak in South Africa to date. We provide a comparison of characteristics between the first and second waves. We also provide an overview of the end-of-year Rage Festival COVID-19 Cluster that began in KwaZulu-Natal and triggered the rise in COVID-19 cases in December 2020.

The update on rabies in South Africa includes the details of confirmed case in KwaZulu-Natal. A total of seven cases of rabies was confirmed in South Africa in 2020. Six of these cases originated in KwaZulu-Natal Province.

Increased rainfall at the end of 2020 and the beginning of 2021 and the consequent increase in the mosquito population have triggered an alert for Rift Valley fever. Outbreak characteristics are further elucidated in the article that follows.

In the month of January 2021 there have been two outbreaks of Odyssean malaria. Odyssean malaria is often a late consideration, in the absence of a travel history. The consequent late diagnosis can often lead to more severe and fatal outcomes, emphasizing the need for a high rate of clinical suspicion during the malaria season. Details are provided in the article.

Other international outbreaks of significance include pneumonia in Afghanistan, cholera, diarrhoea and dysentery in Yemen and legionellosis in Oregon, USA, all further discussed in our "Beyond our Borders" article.

ZOONOTIC AND VECTOR-BORNE DISEASES

An update on rabies in South Africa

A case of rabies has recently been confirmed in KwaZulu-Natal Province. The 10-year-old boy was reported to have been bitten by a dog in Umbumbulu, southwest of eThekwini, in November 2020. No medical consultation was sought until the child experienced nausea, vomiting, confusion and restlessness and died on 7 January 2021. Rabies virus antigen was detected in a post-mortem brain specimen collected on 12 January.

In 2020, a total of seven cases of human rabies was laboratory-confirmed in South Africa, six of which originated in KwaZulu-Natal (KZN) Province and one in Limpopo (LPP) Province. This compares to 10 laboratory-confirmed human cases in 2019. In addition, three children were identified in 2020 who had dog bites/exposure and died of clinically compatible rabies disease. These cases could not be confirmed in the laboratory and were classified as probable cases in the provinces of KZN (n=1), LPP (n=1) and Eastern Cape (n=1).

There was also a report of suspected rabies encephalitis in a 10-year-old child in KZN based on symptoms (disorientation, confusion, delirium, aggressiveness, anxiety, agitation) and a history of dog bite in December 2020. For this case, post-exposure prophylaxis (PEP) delivery was adequate and SARS-CoV-2 19 infection rather than rabies was confirmed as the cause of encephalitis after laboratory testing. Fortunately, the child survived, whereas rabies is inevitably fatal once symptoms appear.

Disadvantaged communities are disproportionately impacted, with the majority of deaths recorded in children <15 years of age. In order to achieve zero rabies deaths, bite prevention education and awareness of rabies are needed. For the effective delivery of PEP, good public awareness of rabies and access to treatment are critical. Timely prophylaxis, including wound cleaning, vaccines and occasionally rabies immunoglobulin, are required for people exposed to rabies. In South Africa's public health care facilities, human rabies vaccines and immunoglobulin are provided free of charge. A thorough risk assessment and adequate delivery according to the WHO and national guidelines will minimize the overuse or misuse of PEP, and guarantee the availability of PEP for individuals requiring rabies post-exposure prophylaxis. As infections are acquired in most cases from dog bites, the importance of dog vaccination awareness and increased vaccination rates is essential to minimize human exposure. In addition to dogs, any bites or scratches from cats, cattle or wild animals such as yellow mongoose, black-backed jackal, bat-eared fox and caracal must all be considered as possible exposure to the rabies virus. While rare, cases of bat-related rabies have been documented in South Africa. Figure 1 shows human rabies incidence in South Africa, 2000-2020.

Please visit the NICD website for more information on rabies and disease prevention: https://www.nicd.ac.za/diseases-a-z-index/rabies/.

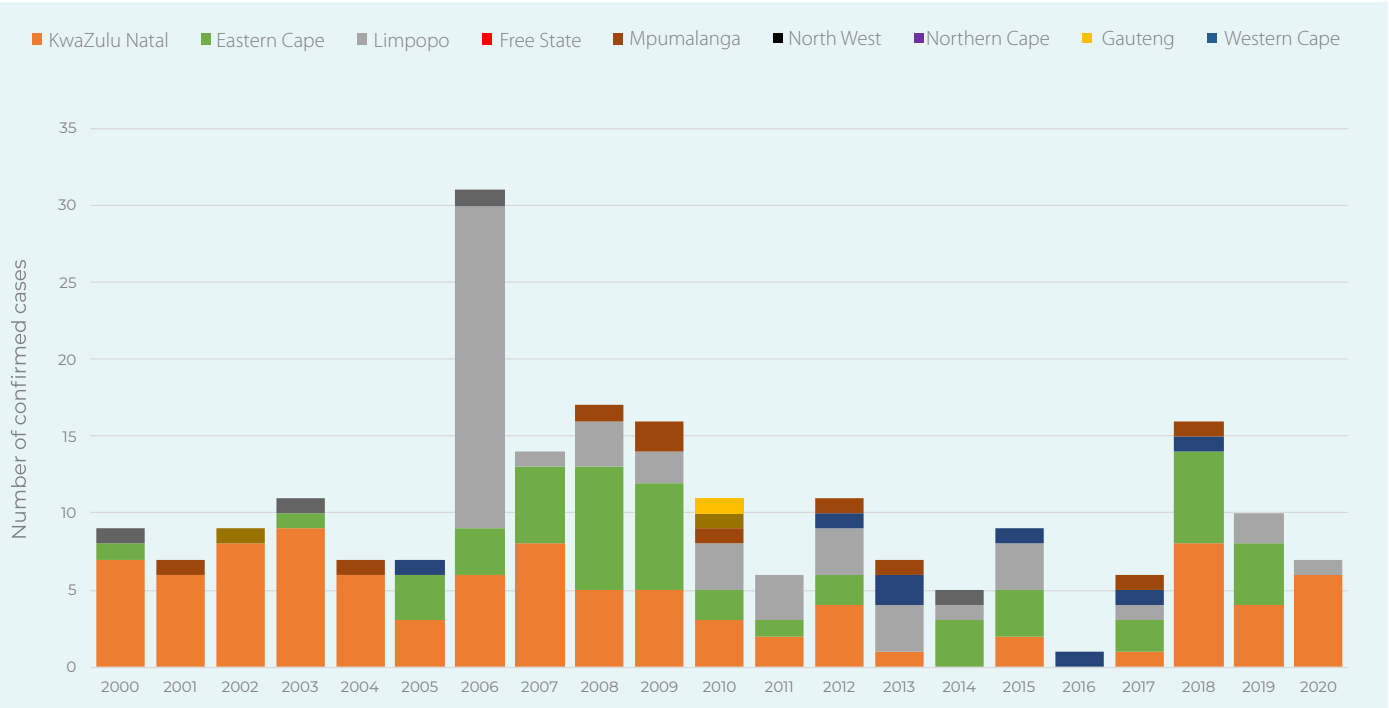

Figure 1. Laboratory-confirmed cases of human rabies in South Africa, 2000 - 2020.

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

ZOONOTIC AND VECTOR-BORNE DISEASES

Alert: Rift Valley fever

Increased rainfall levels that have been reported during the last quarter of 2020 and in the first few weeks of 2021 which constitute risk for re-emergence of RVF outbreaks in South Africa, and in the region.

Rift Valley fever (RVF) is caused by a RNA virus that is transmitted by mosquitoes. Since it was first described in Rift Valley of Kenya in 1930, RVF virus (RVFV) has caused multiple outbreaks in Africa, including major outbreaks in South Africa and outside the African continent.

RVF in animals

The virus can cause severe disease in domestic ruminants and many wildlife species may also be affected. RVF outbreaks are associated with losses in livestock production and have devastating economic impact on farmers and traders of animal products due to trade embargos. Almost all pregnant animals will abort if they are infected with the virus, thus the outbreaks of RVF are often recognized following so-called "abortion storms". Newborn lambs and goat kids are extremely susceptible to RVFV infection with a very short incubation, rarely surviving longer than two days after the onset of illness. Mortality may exceed 90% in animals less than a week old.

RVF in humans

Humans are highly susceptible to RVFV infection, which they acquire in sub-Saharan Africa mostly from contact with blood, body fluids, or tissues of infected animals or by bites from infected mosquitoes. Human-to-human transmission has not been documented, but cases of prenatal or intrapartum transmission has been reported. While RVF epidemics can involve large numbers of individuals, the majority of infections in humans are unapparent or associated with moderate, nonfatal influenza-like illness. The rare, severe human cases may develop or haemorrhagic and/or encephalitic forms of the disease. Human cases with jaundice, neurological disease, or haemorrhagic complications are at increased risk of fatality. In some patients the disease is complicated by the development of ocular lesions (retinitis), resulting in temporary vision loss, but permanent blindness has also been reported.

Characteristics of RVF outbreaks

Epizootics of RVF have a number of simultaneous and interconnected features allowing for an accurate prediction and recognition of outbreak events, including:

- unusually heavy and persistent rainfall resulting in flooding over a wide area and subsequent abundance of vector competent (or "suitable") mosquitoes;
- sudden and simultaneous onset of abortions among domestic ruminants and a high mortality rate, particularly in new-born lambs, kids and calves;
- other severe, often haemorrhagic, clinical signs, gross and histological lesions, especially in the livers of young animals or aborted foetuses;
- the presence of usually benign febrile illness among people involved in handling the blood, tissues, secretions or excretions of infected animals (especially after abortion) or involved in the slaughtering and autopsying of infected animals.

Historically, RVF has been reported from all nine provinces of South Africa. During the last major outbreak in 2010, the largest number of cases were reported from the central plateau of the country, mostly from parts of the Free State and Northern Cape (Figure 2).

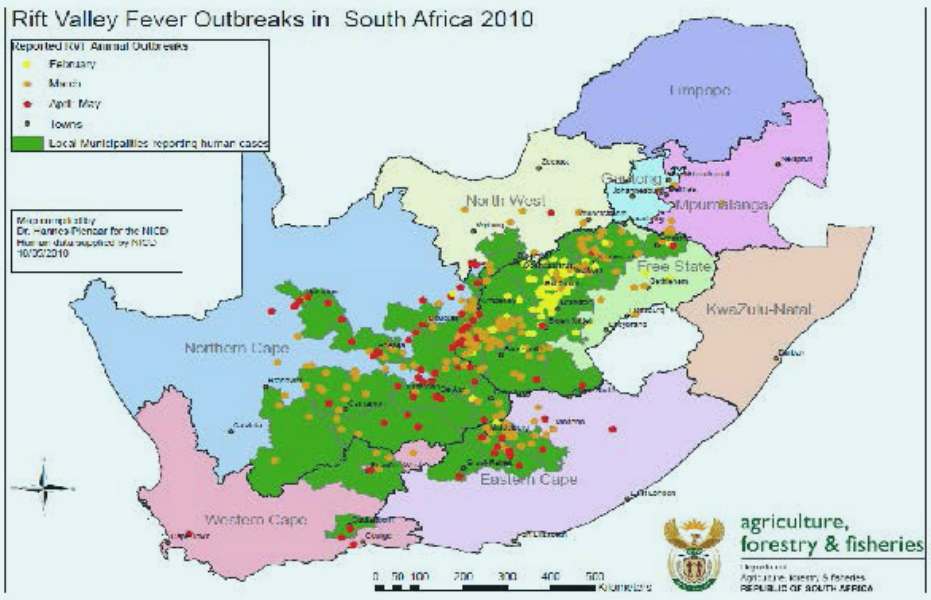

Figure 2. Geographic overlap of RVF cases in animals (red, yellow and brown circles) and humans (green area) in February-May 2010, South Africa (From Department of Agriculture, Land Reform and Rural Development

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

ZOONOTIC AND VECTOR-BORNE DISEASES

Outbreaks of RVF are closely correlated with above-normal rainfall and flooding. Present cumulative rainfall trend continues to depart from the 2010/2011 season in the Free State and central eastern regions of South Africa, when the most recent RVF epidemic occurred and it is well above the long-term cumulative daily mean (Figure 3). RVF outbreaks have historically occurred in central South Africa, but the country as a whole is at risk. Weather forecasts expect more rainfall over South Africa, with possibility of further heavy rain and localized flooding over the Free State, KwaZulu-Natal, North West and Mpumalanga provinces. Increased rainfall levels that have been reported during the last quarter of 2020 and in the first few weeks of 2021 constitute potential risk for re-emergence of RVF outbreaks in South Africa, and in the region.

Contact with blood and organs from sick or dead animals must be avoided or minimized, and personal protective equipment (PPE) (including plastic apron, examination gloves, respirator and eye protection such as safety goggles) should be provided and worn by persons who perform veterinary procedures and necropsies, or otherwise handle carcasses or aborted foetuses. Improved hand hygiene is also recommended to reduce risks of transmission when in contact with sick animals, carcasses or aborted foetuses. All products and tissues of animal origin such as the internal organs (liver, kidneys and lungs), meat and milk should be thoroughly cooked before eating. In times of an epidemic, in the affected areas, sick animals should not be eaten. Personal and community protection against mosquito bites through the use of insecticides, impregnated mosquito nets, insect repellants, wearing light colored clothing, long-sleeved shirts and trousers, and avoiding outdoor activity, particularly at peak mosquito biting times, is strongly recommend.

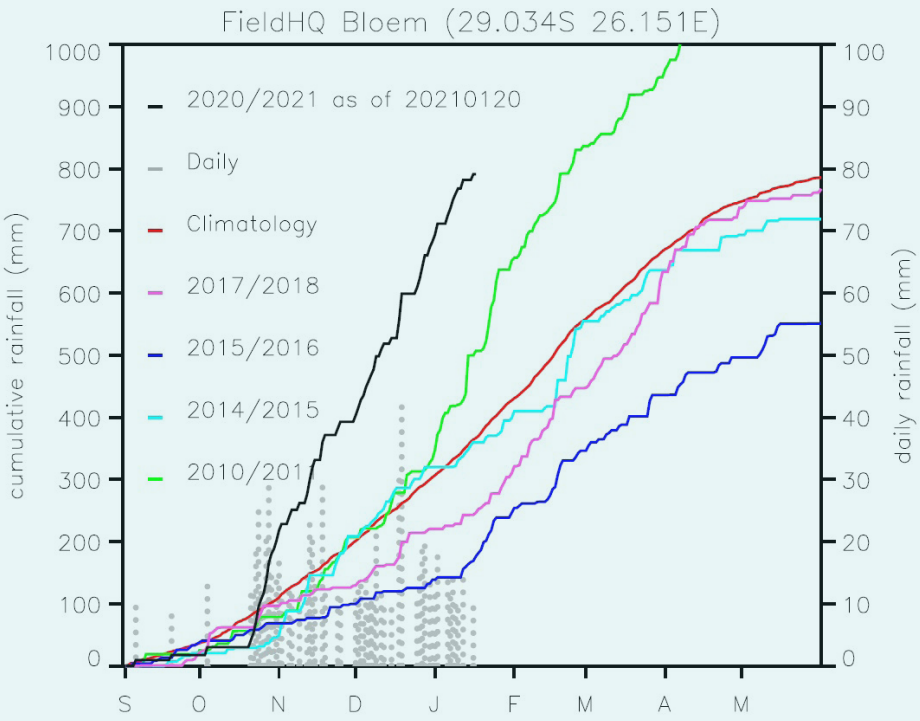

Figure 3. Rainfall trend in Bloemfontein, Free State, South Africa as of 13 January 2021. (current cumulative rainfall shown in black, for 2010/2021 season in green and long-term cumulative rainfall mean in red). Source: Ecohealth One Health RVF project in South Africa; Goddard Earth Sciences Technology and Research (MSU), Code 614, NASA Goddard Space Flight Center Greenbelt, MD 20771, USA.

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

ZOONOTIC AND VECTOR-BORNE DISEASES

Case definition and management

The case definition for human case RVF in South Africa is as follows:

A suspected case is defined as a person with recent contact with hoofed animals (sick or dead animals, aborted fetuses) and/or exposure to mosquito bites and presenting acutely with an influenza-like illness (which may include fever, myalgia, arthralgia or headache), or with encephalitis, haemorrhage, hepatitis and/or ocular pathology (retinitis) with or without fever, or a person with unexplained encephalitis, hepatitis or haemorrhagic illness.

The clinical features of COVID-19 may overlap with the presentation of RVF and RVF should be considered as differential diagnosis in cases that match the definition described above. RVF differential diagnosis include malaria, Crimean-Congo haemorrhagic fever (CCHF), tick-bite fever and other endemic arboviral infections such as West Nile and Sindbis fever and Wesselsbron disease.

Mild cases are self-resolving and patients are recommended to bedrest and to remain hydrated. Symptomatic treatment is assessed on case-to-case basis. Severe cases are also managed empirically but often required hospitalization. It is recommended to monitor fluid and electrolyte balance and renal function, blood pressure, oxygenation, rehydration, support of coagulation. Analgesic and pyretic drugs are provided as required. There are currently no antiviral drug therapies recommended to treat RVF.

RVF in humans is a Category I notifiable medical condition in South Africa (https://www.nicd.ac.za/nmc-overview/overview/).

Laboratory investigation

Specialized laboratory investigation is only recommended for those cases that meet the case definition. Laboratory investigation includes molecular (RT-PCR) and serological testing (ELISA). Virus isolation may be attempted when required. Differential diagnosis of RVF concerns a broad array of conditions, especially when first cases are encountered during yet unrecognized outbreaks. These include:

- malaria, rickettsial infections, Q fever,
- typhoid fever, dysentery, plague, brucellosis, leptospirosis,
- meningitis, other sepsis from bacterial infections, viral
- hepatitis, other viral haemorrhagic fevers, non-infectious
- causes of disseminated intravascular coagulopathy, and
- acute leukaemia.

While RVF remains a relatively rare disease in humans in South Africa, the risk of infection is humans are higher in occupational groups such as livestock owners, farmers and farm workers, abattoir workers or butchers and veterinarians or animal health technicians or wildlife capture and culling teams from outbreak areas. Veterinary and medical laboratory workers handling infectious clinical material are also at risk.

Testing for suspected human cases of RVF is performed at the Center for Emerging Zoonotic and Parasitic Diseases at the NICD. More information is available from the NICD website: https://www.nicd.ac.za/diseases-a-z-index/rift-valley-fever/.

Prevention and control

There are no licensed vaccines or chemotherapeutics available for RVF prevention and treatment in humans. Both inactivated and live-modified RVF veterinary vaccines are available in South Africa. Annual vaccination of domestic ruminants is the recommended strategy to prevent the disease in animals and consequently to reduce the risk of human infection. Most human infections result from contact with the blood or organs of infected animals. Transmission of the virus through infected mosquito bite is also possible, but less frequently reported. Activities related to infected animal husbandry and slaughter or butchering practices are risky especially during an outbreak. Contact with blood and organs from sick or dead animals must be avoided or minimized, and personal protective equipment (PPE) (including plastic apron, examination gloves, respirator, eye protection such as safety goggles) should be provided and worn by persons who veterinary procedures and necropsies, or otherwise handle carcasses or aborted fetuses. Improved hand hygiene is also recommended to reduce risks of transmission when in contact with sick animals, carcasses or aborted fetuses. All products and tissues of animal origin such as the internal organs (liver, kidneys and lungs), meat and milk should be thoroughly cooked before eating. In times of an epidemic, in the affected areas, sick animals should not be eaten. The risk associated with mosquito bites may be addressed to the application of insecticides, repellent, screening of windows and mechanical ventilation.

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

CORONAVIRUS DISEASE (COVID-19) PANDEMIC

An update on COVID-19 outbreak in South Africa The first and the second wave of COVID-19 cases in South Africa, January 2021

South Africa, with an estimated population of 59 622 351 people in 2020, reported its first two cases of COVID-19 on 2 March 2020 (epidemiologic week 11 of 2020). From 2 March 2020 through 16 January (week 2 of 2021), there were 1 337 926 cases of COVID-19 reported from South Africa. To date, there have been two periods of increased transmission, the first wave defined as the period from weekly incidence of 30 cases per 100 000 persons to peak weekly incidence (week 24 - week 28), and the second wave, the period from incidence of 30 cases per 100 000 persons to week 1 of 2021. At the start of the pandemic the weekly incidence risk of cases was 0.02 cases per 100 000 persons, increased steadily to peak (138.1 cases per 100 000) in week 28 (week ending on 11 July 2020). From week 28 there was a steady decline in weekly incidence risk until week 39 (16.1 cases per 100 000 persons). Between week 40 and 46 of 2020 the incidence of cases ranged between 17.7 to 23.9 cases per 100 000 persons. There has been an ongoing resurgence of cases from week 47 of 2020 to week 1 of 2021 (29.9 to 228.9 cases per 100 000 persons), with a steep increase reported from week 50 of 2020 to week 1 of 2021 (Figure 4). Case numbers appear to have peaked in the Eastern Cape and possibly the Western Cape Province. The reduction in numbers in week 2 of 2021 may be as a result of delayed reporting.

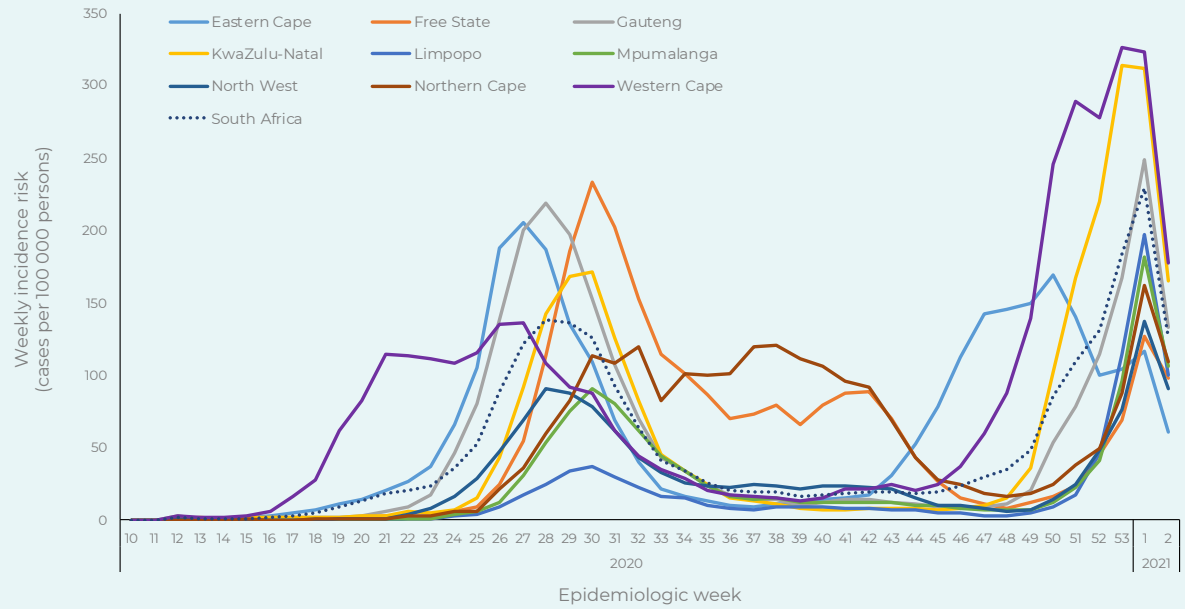

Figure 4. Weekly incidence risk of PCR-confirmed cases of COVID-19 by province and epidemiologic week, South Africa, 2 March 2020 – 16 January 2021 (n=1 337 926)

In week 2 of 2021, South Africa reported the cumulative incidence risk of 2 244.0 cases per 100 000 persons, and the highest weekly incidence risk of 228.9 cases per 100 000 persons was reported in week 1 of 2021. Western Cape was the first province to reach a peak during the first wave, followed by Eastern Cape. The first wave in South Africa peaked in week 28 of 2020, incidence risk 138.1 cases per 100 000 persons, with highest incidence risk reported in Gauteng (218.8 cases per 100 000), followed by Eastern Cape (186.8 cases per 100 000), KwaZulu-Natal (142.5 cases per 100 000), Free State (113.3 cases per 100 000) and Western Cape (108.4 cases per 100 000) provinces. Although it is unclear when the second wave of infections will peak in South Africa, the overall weekly incidence risk of cases in week 1 of 2021 was higher (228.9 cases per 100 000) than the first peak in week 28 of 2020. The weekly incidence risk in three provinces that contributed the most to the second wave was higher compared to the first wave; Western Cape (322.9 vs 108.4 cases per 100 000), KwaZulu-Natal (312.3 vs 142.5 cases per 100 000) and Gauteng (248.5 vs 218.8 cases per 100 000 persons) (Table 1).

The majority of cases in the first wave (week 24-28 of 2020) were in the 30-34- (34 000/259 834, 13.1%) and 35-39- year (34 319/259 834, 13.2%) age groups. Similarly during the resurgence in the second wave (week 47 of 2020 – week 1 of 2021), the majority of cases were in the 30-34- (55 633/507 821, 11.0%) and 35-39-year (57 087/507 821, 11.2%) age groups.

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

CORONAVIRUS DISEASE (COVID-19) PANDEMIC

Table 1. Number and incidence risk (cumulative/weekly) of laboratory-confirmed cases of COVID-19 per 100 000 population during the first wave (week 24-28 of 2020) and second wave (week 47 of 2020 – week 1 of 2021) by province, South Africa, 2 March 2020 – 9 January 2021 (n=767 655)

District	Cumulative number of cases in South Africa to 16 January 2021	Number of cases in wave 1 (weeks 24-28 of 2020)	Number of cases in wave 2 (week 47 of 2020-week 1 of 2021)	Population mid-2020*	First wave peak weekly incidence risk of cases per 100 000 population (week 28 of 2020)	Second wave peak weekly incidence risk of cases per 100 000 population (week 1 of 2021)**
Eastern Cape	186 772	50 561	71 884	6 734 001	186.8	116.6
Free State	705 12	6 071	9 139	2 928 903	113.3	126.8
Gauteng	361 901	105 870	109 140	15 488 137	218.8	248.5
KwaZulu-Natal	280 018	34 629	135 810	11 531 628	142.5	312.3
Limpopo	47 297	3 383	23 161	5 852 553	24.9	197.5
Mpumalanga	53 314	5 024	17 550	4 679 786	54.0	181.6
North West	51 318	10 348	13 206	4 108 816	91.2	137.2
Northern Cape	29 558	1 668	5 377	1 292 786	59.6	162.1
Western Cape	257 236	42 280	122 554	7 005 741	108.4	322.9
Grand Total	**1 337 926**	**259 834**	**507 821**	**59 622 351**	**138.1**	**228.9**

**2020 Mid-year population Statistics South Africa; **Numbers of cases may still increase in future weeks in some provinces*

When comparing characteristics of COVID-19 cases between the first and second waves of infection on multivariable analysis, individuals in the older age groups (≥60 years) had increased odds of being diagnosed with COVID-19 in the second wave (Table 2). In the second wave, cases were more likely to be reported from Limpopo, Mpumalanga, KwaZulu-Natal, Northern Cape and Western Cape. Cases were more likely to be diagnosed with COVID-19 in the public sector in the second wave compared to the first wave (Table 2).

Table 2. Comparison of characteristics of new COVID-19 cases between first wave and second wave in South Africa, N=767 655

Characteristic	Wave 1 (week 24-28 of 2020) (N=259 834)	Wave 2 (week 47 of 2020-1 of 2021) (N=507 821)	Univariable OR (95% CI)	Multivariable OR (95% CI)
Age group (years)				
0-4	3 104 (1.2)	5 465 (1.1)	1	1
5-9	3 577 (1.4)	6 927 (1.4)	1.1 (1.0 - 1.2)	1.1 (1.1 - 1.2)
10-14	6 099 (2.4)	11 542 (2.3)	1.1 (1.0 - 1.1)	1.1 (1.1 - 1.2)
15-19	9 758 (3.8)	20 582 (4.1)	1.2 (1.1 - 1.3)	1.3 (1.2 - 1.4)
20-24	14 149 (5.5)	33 556 (6.6)	1.3 (1.3 - 1.4)	1.4 (1.3 - 1.5)
25-29	27 332 (10.5)	49 157 (9.7)	1.0 (1.0 - 1.1)	1.1 (1.0 - 1.1)
30-34	34 000 (13.1)	55 633 (11.0)	0.9 (0.9 - 1.0)	1.0 (1.0 - 1.1)
35-39	34 319 (13.2)	57 087 (11.2)	0.9 (0.9 - 1.0)	1.0 (1.0 - 1.1)
40-44	29 273 (11.3)	49 730 (9.8)	1.0 (0.9 - 1.0)	1.1 (1.0 - 1.1)
45-49	26 766 (10.3)	48 283 (9.5)	1.0 (1.0 - 1.1)	1.1 (1.1 - 1.2)
50-54	23 305 (9.0)	44 507 (8.8)	1.1 (1.0 - 1.1)	1.2 (1.1 - 1.2)
55-59	18 502 (7.1)	38 675 (7.6)	1.2 (1.1 - 1.2)	1.2 (1.2 - 1.3)
60-64	11 088 (4.3)	29 589 (5.8)	1.5 (1.4 - 1.6)	1.6 (1.5 - 1.7)

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

CORONAVIRUS DISEASE (COVID-19) PANDEMIC

Characteristic	Wave 1 (week 24-28 of 2020) (N=259 834)	Wave 2 (week 47 of 2020-1 of 2021) (N=507 821)	Univariable OR (95% CI)	Multivariable OR (95% CI)
65-69	6 250 (2.4)	20 337 (4.0)	1.8 (1.8 - 1.9)	1.9 (1.8 - 2.0)
70-74	4 106 (1.6)	14 503 (2.9)	2.0 (1.9 - 2.1)	2.0 (1.9 - 2.2)
75-79	2 704 (1.0)	8 665 (1.7)	1.8 (1.7 - 1.9)	1.9 (1.8 - 2.0)
>=80	3 783 (1.5)	8 954 (1.8)	1.3 (1.3 - 1.4)	1.4 (1.3 - 1.5)
unknown	1 719 (0.7)	4 629 (0.9)	1.5 (1.4 - 1.6)	1.5 (1.4 - 1.7)
Sex, (n, %)				
Female	148 599 (57.19)	287 054 (56.53)	1	
Male	109 097 (41.99)	214 736 (42.29)	1.0 (1.0 - 1.0)	1.1 (1.0 - 1.1)
Unknown	2 138 (0.82)	6 031 (1.19)	1.5 (1.4 - 1.5)	1.1 (1.0 - 1.2)
Province, (n, %)				
Eastern Cape	50 561 (19.5)	71 884 (14.2)	1.1 (1.1-1.1)	1.0 (1.1-1.1)
Free State	6 071 (2.3)	9 139 (1.8)	1.2 (1.1 – 1.2)	1.1 (1.0 – 1.1)
Gauteng	105 870 (40.8)	109 140 (21.5)	0.8(0.8 - 0.8)	0.8 (0.8 - 0.8)
KwaZulu-Natal	34 629 (13.3)	135 810 (26.7)	3.1 (2.9 – 3.2)	2.9 (2.8 – 3.0)
Limpopo	3 383 (1.3)	23 161 (4.6)	5.4 (5.1 – 5.6)	5.3 (5.1 – 5.5)
Mpumalanga	5 024 (1.9)	17 550 (3.5)	2.7 (2.6 – 2.9)	2.6 (2.5- 2.8)
North West	10 348 (4.0)	13 206 (2.6)	1	1
Northern Cape	1 668 (0.6)	5 377 (1.1)	2.5 (2.4-2.7)	2.2 (2.1-2.2)
Western Cape	42 280 (16.3)	122 554 (24.1)	2.3 (2.2-2.3)	2.1 (2.0 – 2.2)
Sector, (n, %)				
Private	163 502 (63.0)	274 196 (54.0)	1	1
Public	96 332 (37.0)	233 625 (46.0)	1.4 (1.4 - 1.5)	1.3 (1.3 - 1.3)

This summary highlights an increase in the burden of COVID-19 cases in South Africa currently, mainly driven by Western Cape, KwaZulu-Natal and Gauteng provinces, with incidence risk of cases exceeding those reported during the first wave in all provinces except the Eastern Cape. Cases diagnosed in the second wave were more likely to be in the older age group and from the public sector, possibly related to changes in health seeking, testing or other factors. With increasing numbers of cases, strengthening the capacity of the country to cope with increasing demand for admissions is recommended.

References

https://www.nicd.ac.za/wp-content/uploads/2021/01/COVID-19-Weekly-Epidemiology-Brief-week-1-2021.pdf

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

CORONAVIRUS DISEASE (COVID-19) PANDEMIC

A cluster of COVID-19 cases following the 2020 Matric Rage Festival in KwaZulu-Natal Province, South Africa, November – December 2020

On the weekend of 5 - 6 December 2020, the National Institute for Communicable Diseases (NICD) received an alert from a clinician from Hillcrest, KwaZulu-Natal (KZN) Province regarding a number of COVID-19 cases amongst young people who reported to have attended a Rage Festival in Ballito, KZN. This prompted an investigation to ascertain the existence of a COVID-19 cluster related to attendance of Rage Festival (Rage) and to provide epidemiological characteristics of the cluster.

We conducted a retrospective cohort investigation of 2 253 festival attendees (1 954 revelers and 299 crew). COVID-19 confirmed cases were identified retrospectively using multiple data sets, the Rage ticket purchaser record list obtained from the organizers, and the national COVID-19 laboratory-based confirmed cases line list obtained from the Notifiable Medical Conditions Surveillance System (NMCSS). A standardized questionnaire was created and circulated to 1 814 Rage attendees using Google Forms to determine COVID-19 risk factors. Inclusion criterion for this cohort was defined as any person who attended Rage in KZN between 27 November to 4 December 2020. A case was defined as any person within the cohort with a positive SARS-CoV-2 RT-PCR laboratory test results. A cluster was defined as the identification or presence of two or more laboratory confirmed COVID-19 cases in a group of people between 27 November to 27 December 2020 who were epidemiologically linked by Rage attendance.

Of the 2 253 Rage attendees, 848 (37.6%) laboratory confirmed COVID-19 cases were identified, of which 846 (99.8%) were revelers and two were crew (0.2%). Due to an inability to match negative test results to the list of ticket purchasers at the time of writing, the percentage negative cannot be reported with confidence. Age ranged from 16 to 58 years (Median: 18, IQR: 18-18). The 15-19-year-old age group accounted for 802 (94.6%) of the cases. Gender was known for 802 cases, of which 425 (53.0%) were males. Most cases were from Gauteng Province (66.2%, 561/848), followed by KwaZulu-Natal (30.0%, 254/848) Province (Table 3). An epidemiological curve shows a rapid increase in cases from 03 December 2020, with a peak observed on 07 December followed by a gradual decline from 09 December 2020 (Figure 5). Two confirmed cases identified amongst the Rage attendees (both revelers), were before the Rage with specimen collection date on 17 and 19 November 2020. Response on the investigation questionnaire was received from 19 of the 1 814 attendees (response rate: 1.0%) with only 13 giving consent to participate in the study and completed the questionnaire while 1 795 (99%) did not respond.

Rage is an annual South African electronic music festival held to coincide with the end of the South African final matric exam season. The official Rage took place on 28 November to 4 December 2020 at various venues (three outdoor events at Kings Park Stadium and a small pop-up bar at Rage Bar Ballito). A number of the Rage revelers reported to have attended other non-Rage related events and parties, such as The Litchi Party on the night of 27 November 2020 that took place in three different bars simultaneously and another large party on 25 November 2020, while other revelers attended privately organized parties amongst others. Although wearing of face mask was mandatory at Rage with hand sanitizers available, social distancing and mask wearing was compromised in most gatherings that took place before the Rage and also masks were not worn all the times during the Rage. Factors such as mass gathering without using appropriate personal protective equipment, crowded spaces, poor hygiene and ventilation, and increased social inhibition due to alcohol consumption, may have produced a conducive environment for transmission of SARS-CoV-2 during these gatherings. The investigation revealed that two of the Rage attendees had positive SARS-CoV-2 results before the Rage but still proceeded to attend the event. This indicate lack of discipline and irresponsible risk behaviours amongst revelers as there is little or no adherence to the recommended prevention measures. This was also demonstrated with the Tin Roof party "superspreader event" in the Western Cape in October. These kinds of entertainment gathering should be deemed unnecessary and be prohibited during the outbreak period as they influence and contribute to the increase in community transmission, undermining mitigation efforts put in place to contain the virus.

The limitations of the study included delayed circulation of questionnaire, which resulted in poor response rate (1%); lack of secondary attack rate data due to contact tracing activities being conducted at the provincial and districts levels and the information not available to the NICD investigation team; and the lack of clinical information for all identified cases, limited the analysis. Non-pharmaceutical interventions such as physical and social distancing, wearing of face mask, frequent hand washing with clean water and soap, and frequent hand sanitization are recommended effective mitigation measures to prevent the spread of the virus. Early identification of superspreader events and initiation of contact tracing to identify close contacts, quarantining of asymptomatic suspected cases/contacts and isolation of symptomatic or asymptomatic laboratory confirmed cases, are crucial for reducing widespread transmission, and containing the outbreak.

Source: Division of Public Health Surveillance and Response, South African Field Epidemiology Training Programme, NICD-NHLS; Gauteng and KwaZulu-Natal Provincial Department of Health; Rage Festival organisers; outbreak@nicd.ac.za

CORONAVIRUS DISEASE (COVID-19) PANDEMIC

Table 3. The Rage Festival confirmed COVID-19 cases by province of residence, 17 November to 27 December 2020

Province of residence	Total reported cases	Percentage (%)
Eastern Cape	4	0.47
Free State	2	0.24
Gauteng	**561**	**66.16**
KwaZulu-Natal	**254**	**29.95**
Limpopo	1	0.12
Mpumalanga	11	1.30
North West	0	0.00
Northern Cape	0	0.00
Western Cape	15	1.77
Unknown	0	
Total	**848**	**100.00**

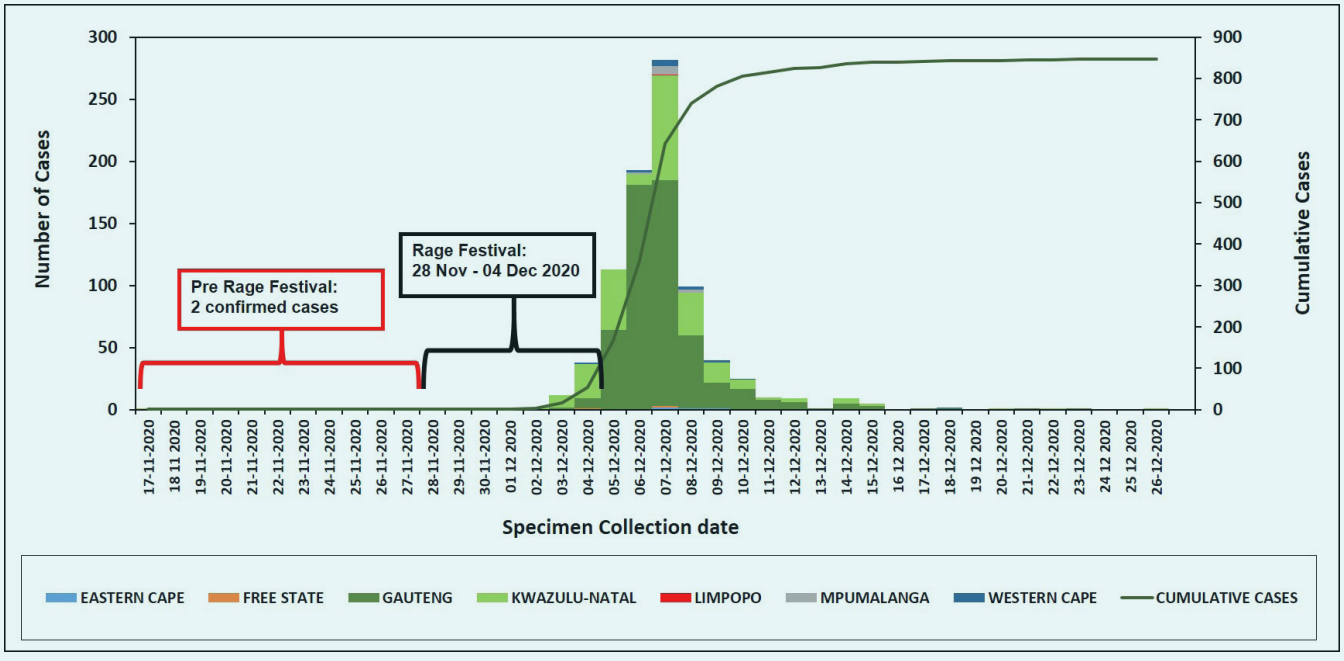

Figure 5. Epidemic curve of the Rage laboratory confirmed COVID-19 cases, 17 November – 27 December 2020.

Source: Division of Public Health Surveillance and Response, South African Field Epidemiology Training Programme, NICD-NHLS; Gauteng and KwaZulu-Natal Provincial Department of Health; Rage Festival organisers; outbreak@nicd.ac.za

SEASONAL DISEASES

Odyssean malaria outbreaks in Gauteng Province

Infected malaria vector mosquitoes are sometimes transported from malaria-endemic areas and then transmit the disease, a phenomenon known variously as 'odyssean', 'taxi', 'minibus', or 'suitcase' malaria. Two recent such episodes have been investigated by the National Institute for Communicable Diseases (NICD) in partnership with Gauteng district and provincial health departments.

Outbreak 1: a married couple, resident on an isolated smallholding in a game conservancy near Hammanskraal, north of Pretoria (a non-malaria area), and with no history of recent travel, developed symptoms of fever and fatigue on January 6th. Tests for COVID-19 were negative, and their illness got progressively worse until falciparum malaria was diagnosed (at the husband's suggestion, because of his previous experience of malaria), and they were admitted to hospital for parenteral artesunate treatment. Both recovered without complications. Investigations did not reveal the likely source of infection, other than the possibility that they were bitten by the same infected mosquito at a local restaurant in late December. There had been no visitors or workers returning from malaria areas on their property.

Outbreak 2: Four-year-old twin girls and their mother became ill on January 7th. Again, COVID-19 was suspected because of febrile illness but tests were negative. The clinical condition of all rapidly deteriorated over the next five days, particularly in the children, whose full blood counts for investigation of possible septicaemia revealed profound thrombocytopenia; subsequent blood film examination showed *Plasmodium falciparum* parasites. The patients were treated with intravenous artesunate in hospital and have been discharged. Genotyping of the malaria parasites carried out at NICD showed that the three cases were infected with the same strain, indicating that a single mosquito had bitten all of them. The family had visited a resort in North West Province in late December; although this is not a malaria-endemic area, a resort guest's or worker's vehicle may have released a stowaway infected mosquito.

Recent issues of the Communiqué have emphasised the importance of contemplating malaria in febrile patients with a relevant residence or travel history involving malaria areas, even if COVID-19 or other infection is the primary concern. Odyssean malaria is often a late consideration, in the absence of a travel history. As a consequence diagnosis is typically delayed, with resulting high rates of severe and fatal malaria. We again remind clinicians that during the malaria transmission season, patients who have a progressive febrile illness and no clear diagnosis, should be checked for malaria even in the absence of a history of residence in, or travel to, a malaria risk area. Unexplained thrombocytopenia is an important clue to the diagnosis of malaria.

Source: Centre for Emerging Zoonotic and Parasitic Diseases, NICD-NHLS; Gauteng Provincial Department of Health; 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 6 on page 13

Pneumonia: Afghanistan, Balkh

In December 2020 more than 20 children died in Balkh province of Afghanistan due to pneumonia. A rise in cases is usually seen in the winter months due to extremely cold weather in the region. This year however, trends have shown a notable rise in incidence with a reported 20% increase in pneumonia cases in December 2020. This accounted for 326 child pneumonia associated admissions (out of a total of 1 679 child admissions). The aetiology of the cases and clusters of the outbreak have not yet been identified/reported.

Following years of war and political turbulence, economical strife is at a high in Afghanistan. The Save the Children organisation estimates that over 300 000 children would face the extreme weather conditions of the winter months without adequate clothing, housing or heating equipment resulting in more disease and probable death. The organisations director released a statement saying that, "schools are closed until March 2021 (due to COVID-19)… this is a serious blow because often the classroom is the only source of warmth for children during winter when temperatures can plummet to below 27 degrees Celsius in parts of the country."

It is anticipated that temperatures will continue to drop until March. A 5-day vaccination campaign has been launched by the Afghan government and the United Nations Children's Fund (UNICEF). This campaign program is expected to cover the vaccination of 10 million children under the age of 5 across the country.

Although news reports have not specified the exact vaccine(s) that will be rolled out, the Afghanistan Ministry of Public Health said that the insecurity in different parts of the country is, and will be, the main barrier in reaching most children. Reports from BBC news however positively report that Taliban deputy leader, Mullah Baradar, announced support of the vaccine efforts following meetings with UNICEF and World Health Organization.

Cholera, Diarrhoea & Dysentery: Yemen

Yemen is fighting a new cholera outbreak in the south-eastern province of Hadramout. Health officials attribute the regular resurgence of cholera to the crumbling sewage and drinking water systems, which have been devastated by flash floods and heavy rains. This destruction of water pipelines has resulted in houses discharging sewage in the open or small holes close by. The outbreak is also exacerbated by seasonal gathering of people during harvest of date palm trees.

In the Hajjar district, outbreaks are commonly seen in the months between April and September with cases ceasing in the following months. For the first time in decades however, 2020 saw the main district hospital reporting the arrival of new cases of cholera from October through to December. UNICEF, the World Health Organization and Yemen health authorities joined efforts to carry out a vaccination campaign in Hajjar from 20 - 25 December 2020, targeting 40 000 people in the district's rural and urban regions. Additional public health efforts included the distribution of information posters and leaflets and broadcast campaigns from roaming trucks which spoke of the campaign's significance. These awareness activities took place both before and during the campaign and were seen to have yielded success as most residents took the vaccine with little objection.

It is agreed that long term interventions are required to prevent regular resurgence. This would require rebuilding of water and sanitation systems. In the interim, floods often isolate villages due to their rough geography, making it difficult to access health care. Suggestions from local health authorities to remedy this include building several health centres in remote villages, equipping them with staff, and also creating rehydration corners for dealing with mild cases of cholera.

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

BEYOND OUR BORDERS

Legionellosis – United States of America, Oregon

Initial reports on 6 January 2021 identified a local outbreak of legionnaires' disease at a North Portland, Oregon, apartment building. This infection was sourced to a common water supply and since then all the residents in the building were temporarily moved from their homes until the buildings water system and plumbing could be fully assessed, cleaned and determined to be safe.

On 5 January there were four hospitalised cases reported and one reported death all from the same apartment building. However as of 7 January a further four people from nearby buildings were presumed to have the illness based on symptomatology.

County health department officials are advising increased awareness and vigilance of symptoms of the illness as investigations continue.

Figure 6. 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.

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

WHO AFRO UPDATE

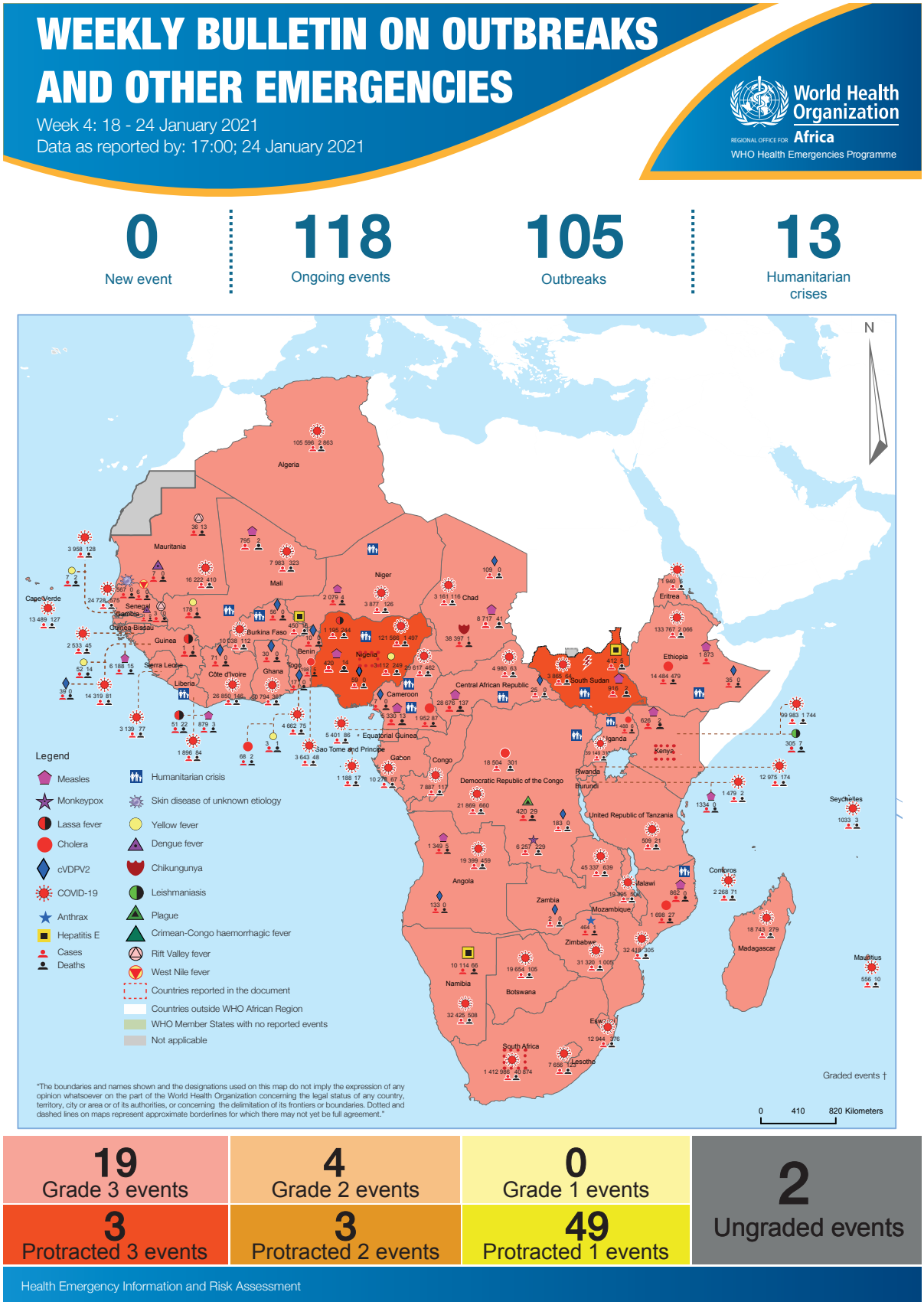

Figure 7. The Weekly WHO Outbreak and Emergencies Bulletin focuses on selected public health emergencies occurring in the WHO African Region. The African Region WHO Health Emergencies Programme is currently monitoring 118 events. For more information see link below:
https://apps.who.int/iris/bitstream/handle/10665/338891/OEW04-1824012021.pdf

The Communicable Diseases Communiqué offers up-to-date information regarding communicable diseases in South Africa and abroad. It forms part of the NICD's key mandate of disease surveillance, outbreak response and research on communicable diseases. The publication is released on a monthly basis and can be accessed via the NICD website on http://www.nicd.ac.za/publications/internal-publications/

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