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COMMUNICABLE **DISEASES** COMMUNIQUÉ



NATIONAL INSTITUTE FOR COMMUNICABLE DISEASES

Division of the National Health Laboratory Service

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EDITORIAL

Editor's Note – Dr Michelle Groome

February has been a busy time for infectious diseases, both in South Africa and on the African continent. The number of measles cases continue to increase, with Western Cape being the latest province to declare a measles outbreak. Fortunately, vaccination campaigns are underway in all provinces among children aged 6 months to 14 years, the most affected age groups. Measles can cause severe diseases in the unvaccinated, especially in young and immunocompromised children. Vaccination is critical in controlling the spread of this highly transmissible virus, so please ensure that all those that are eligible receive a dose of the measles vaccine.

Cholera outbreaks in the African region, particularly Malawi and Mozambique, continue to threaten South Africa as evidenced by the five cholera cases and one death that occurred as of 24th February. Please be on the alert for cholera in patients presenting with watery diarrhoea, especially in travellers from countries experiencing outbreaks, and notify any suspected cases.

Pertussis cases have been increasing since mid-2022 with the majority of cases and deaths occurring in children under five years of age. Children under three months of age are at high-risk of severe disease and may not present with typical symptoms of pertussis, so consider this vaccine-preventable disease in your differential diagnosis. The respiratory syncytial virus detection rate in children under five years has increased in the last two weeks but activity is still below the seasonal threshold.

In this month's issue, we also provide updates on invasive group A streptococcus infections and genital ulcer syndrome, as well as an introduction to wastewater-based epidemiology to monitor infectious diseases. Check out the Beyond our Borders section for updates on infections pertinent to those travelling abroad.

Additional COVID-19 vaccine boosters are now available. So if you are 18 years or older and it has been 180 days or more since your last dose, you are eligible to receive an additional booster dose.

QUICK UPDATES

Measles, South Africa

The ongoing measles outbreak which began in October 2022, has resulted in a cumulative total of 560 laboratory-confirmed cases (as of 16 February 2023). The majority of cases (537/560; 95.9%) have been reported from the five provinces that have declared measles outbreaks, namely Limpopo (n=190), Mpumalanga (n=94), North West (n=169), Gauteng (n=61) and Free State (n=23).

On 20 February 2023, Western Cape Province became the sixth province to declare a measles outbreak. This followed confirmation of four laboratory-confirmed cases reported from the City of Cape Town.

For update case numbers and more information on the outbreak, please visit the NICD alerts page (<https://www.nicd.ac.za/media/alerts/>).

Source: <https://www.nicd.ac.za/south-african-measles-outbreak-update-2023-16-february/>, <https://www.nicd.ac.za/measles-outbreak-alert-western-cape-province-city-of-cape-town-20-february-2023/>

ZOONOTIC AND VECTOR-BORNE DISEASES

Rabies

For 2023 to date, there have been no laboratory-confirmed cases of human rabies reported in South Africa. In 2022, there were a total of 19 laboratory-confirmed and probable cases reported, four fewer than the previous year. The cases were reported from the following provinces: Eastern Cape, KwaZulu-Natal and Limpopo.

Nearly all human rabies cases in South Africa have been linked to exposures to rabid domestic dogs. The most important measure for preventing human rabies is to control the infection in dogs. Dogs (and cats) can be vaccinated against rabies.

Following exposures to possibly rabid dogs or other animals, human rabies infections can be prevented through prompt initiation of rabies post-exposure prophylaxis. This includes thorough wound washing with soap and water, administration of a series of rabies vaccines and rabies immunoglobulin therapy where appropriate. For further information on rabies and disease prevention, please visit the NICD website: <https://www.nicd.ac.za/diseases-a-z-index/rabies/>.

ZOOONOTIC AND VECTOR-BORNE DISEASES

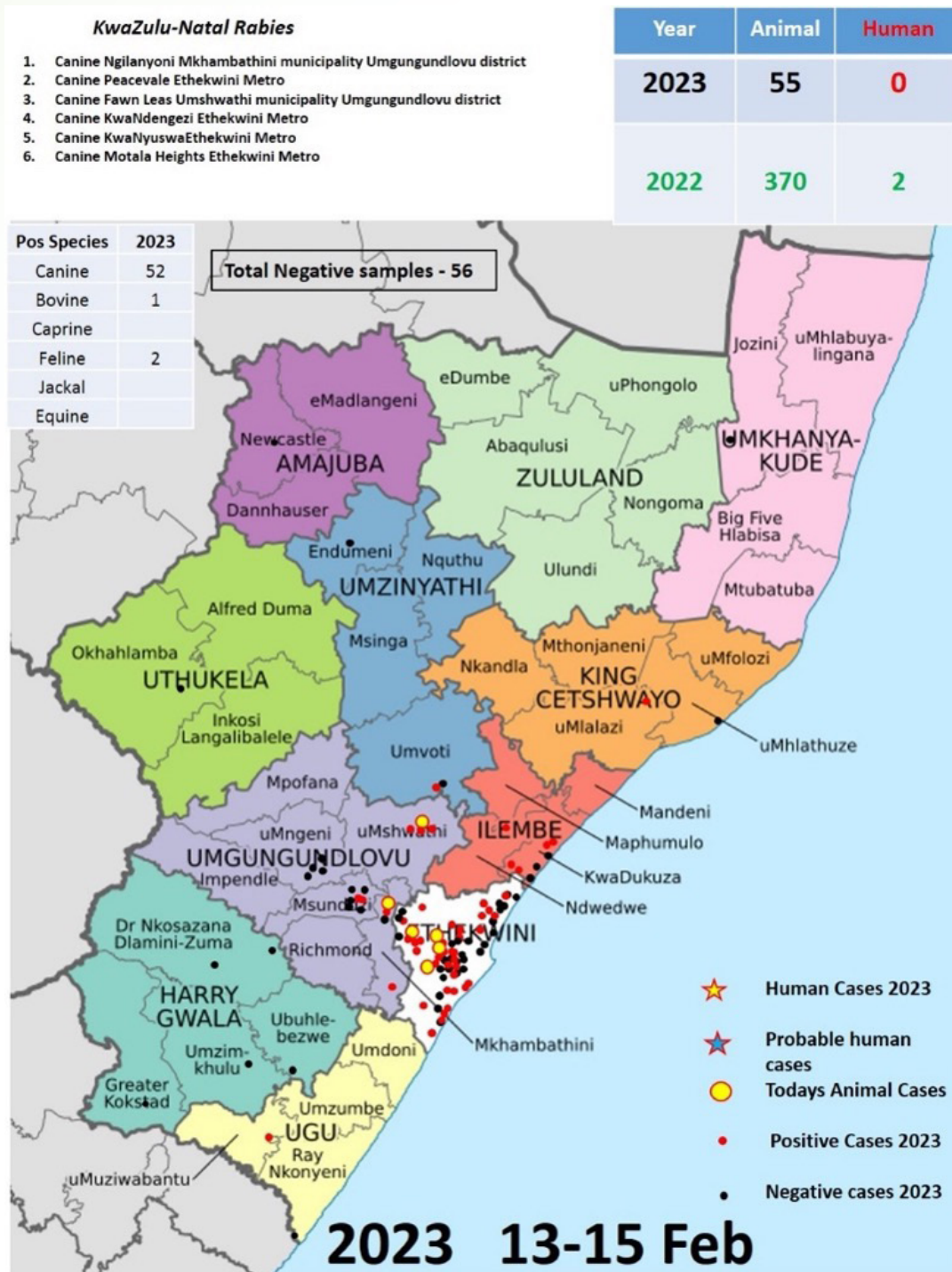


Figure 1. The geographic distribution of suspected and confirmed animal rabies cases in KwaZulu-Natal Province, as of 15 February 2023. Source: <https://www.kzndard.gov.za/latest-news/item/327-rabies-update>).

ZOONOTIC AND VECTOR-BORNE DISEASES

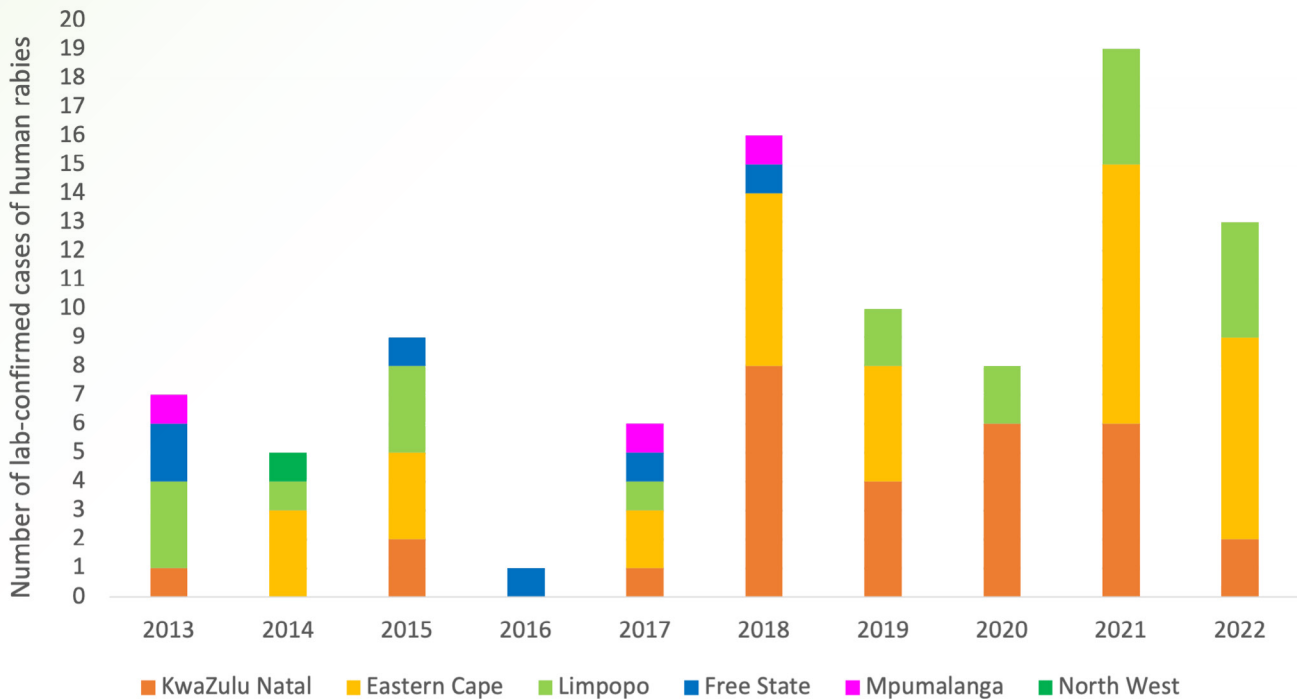


Figure 2. Laboratory-confirmed human rabies cases by province, South Africa, 2013-2022 (n=94) (Created from NHLS-NICD data).

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

Non-Falciparum Odyssean Malaria In Gauteng

In South Africa, malaria is a category one notifiable medical condition (NMC) and is endemic to three provinces which border Botswana, Zimbabwe, Eswatini and Mozambique, namely KwaZulu-Natal, Mpumalanga and Limpopo.¹ Transmission is known to be higher in these low-altitude areas, as well as seasonal, with the highest rate of transmission occurring throughout the summer and rainy season from September until May.¹ From 2022 up until 01 November 2022, there were 3 518 laboratory-confirmed cases of malaria in South Africa, with 324 of these cases occurring within the City of Johannesburg District.^{2*}

In non-endemic areas, a large proportion of malaria cases are people with a positive travel history to or from endemic areas, known as imported malaria. Much more rarely, malaria is diagnosed in people with no notable travel history, known

as odyssean malaria. Odyssean malaria is transmitted by mosquitoes which have travelled and relocated to non-endemic areas via various transport modes (sea, air, rail, road), and is generally a diagnosis by exclusion. From 1996 to 2022, 165 cases of odyssean malaria have been reported in South Africa (including the case below), with the majority of cases reported from Gauteng Province. Most of these (162/165, 98.1%) were due to *Plasmodium falciparum*. Non-falciparum odyssean malaria cases are rare, with one *Plasmodium ovale* and two *Plasmodium malariae* cases reported to date.

In November 2022, the NICD and the City of Johannesburg District Health office investigated the second case of *P. malariae* odyssean malaria reported in Gauteng Province in the year.

ZOONOTIC AND VECTOR-BORNE DISEASES

Case and Environmental Investigation Report

The patient resides in a residential suburb of Johannesburg and is a student at a tertiary institute in the city. The only travel of note was to a mountain resort in a non-malaria-endemic area in October 2022. Two weeks thereafter, the patient presented to hospital with pyrexia and severe headache. He had a low-grade fever, headache, and myalgia intermittently in the ward and blood results showed a mild thrombocytopenia and lymphopenia. A bone marrow aspiration test (BMAT), done in order to exclude acute leukaemia or disseminated intravascular coagulation (DIC), showed inclusion bodies in the red blood cells, prompting malaria investigations. Infection with *P. malariae* was confirmed and the patient was started on artemether-lumefantrine orally. He improved clinically and was discharged.

The patient lives in a house with his parents; one tenant stays on the property. The family members, the tenant and the household workers had not travelled out of Gauteng Province

recently, nor received any visitors from other provinces or surrounding countries in the past few months. None of the surrounding neighbours in the immediate vicinity is from malaria-endemic areas and has not travelled out of Gauteng Province. An immediate neighbour has been renovating for the past eight months, with different builders working on the property at various times. The patient had no history of blood transfusions.

There were several mosquito breeding sites on the property including a water feature, a birdbath and a small pond. An inspection revealed no *Anopheles* mosquito larvae, but many *Culex* and *Aedes* larvae.

Culex and *Aedes* spp. mosquitoes are typically prevalent in Johannesburg at this time of year, but do not transmit malaria and are not a public health risk.

Discussion and Recommendations

Gauteng Province is a non-malaria-endemic area. It is possible that the patient may have acquired malaria from the bite of an infective *Anopheles* mosquito, inadvertently transported from a malaria-endemic area via a vehicle such as a minibus, car, bus or truck. This phenomenon is known as odyssean malaria. Construction workers working on a neighbouring property could have introduced an infected mosquito, depending on where they were travelling from. However, as this was the only known non-falciparum malaria case in this area, it is possible that the infection was acquired elsewhere (e.g., whilst travelling to or from the resort or an infected mosquito bite on campus), any time within the previous few months. Although the incubation period of *P. malariae* is typically 13 to 28 days, it can be longer and clinically, malariae malaria can be mild and protracted. There were no identified epidemiological links to the previous *P. malariae* odyssean malaria case reported in Gauteng Province in October 2022.

Specific vector control measures are not recommended, although the residents can reduce the prevalence of nuisance mosquitoes by draining the breeding sites. The local community in general should not be alarmed, as this case does not represent an expansion of the malaria transmission zone in South Africa. All healthcare practitioners are encouraged to consider malaria as a differential diagnosis in all patients presenting with a progressive febrile condition ($>38^{\circ}\text{C}$), even in the absence of a history of travel to a malaria-endemic region, especially if there is unexplained thrombocytopenia.

ZOONOTIC AND VECTOR-BORNE DISEASES

Malaria Advisory

With recent widespread rains and high temperatures, increased malaria transmission in endemic areas can be anticipated. Healthcare practitioners are reminded to consider malaria in patients presenting with fever and flu-like illness (headache, chills, fatigue, muscle, and joint pain) that occurs up to three weeks after potential exposure, particularly if travel to, or residence in, a malaria-endemic area is reported. In endemic areas within South Africa, all patients with a fever or a recent history of fever must be tested for malaria either by rapid diagnostic test (RDT) or microscopy. If this is initially negative and no other diagnosis is found, the malaria test should be repeated. Treat for malaria as soon as the patient is found to be positive; do not wait for COVID-19 or other results. Malaria rapidly progresses to severe illness, so early detection and treatment are essential for optimum outcomes.

FAQs and further information on malaria prevention are available on the NICD website at www.nicd.ac.za.

References

- South African National Department of Health. Malaria Elimination Strategic Plan for South Africa, 2019-2023 [Internet]. South Africa: Department of Health; 2019. Available from: <https://www.nicd.ac.za/wp-content/uploads/2019/10/MALARIA-ELIMINATION-STRATEGIC-PLAN-FOR-SOUTH-AFRICA-2019-2023-MALARIA-ELIMINATION-STRATEGIC-PLAN-2019-2023.pdf>
- National Institute for Communicable Diseases, National Department of Health. Notifiable Medical Conditions [Internet]. NMC Reporting. Available from: <https://nmc.nicd.ac.za/> ***Currently, the NMC malaria data do not include malaria cases reported to DHIS2. Efforts are underway to harmonize reporting of malaria cases through the different systems.**

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

RESPIRATORY DISEASES

Respiratory Syncytial Virus (RSV) Season Update, February 2023

For 2023 to date, RSV has been circulating since the first week of the year. As of week 5 (week ending 04 February 2023), of the 737 (118 outpatients and 619 in hospital) samples tested for RSV at the sentinel surveillance sites, 29 (4%) tested positive. The detection rate in the influenza-like illness (ILI) (outpatients in public health clinics) surveillance programme was 3% (3/118), and 4% (26/619) in the severe respiratory illness (SRI) surveillance programme (inpatients in public health hospitals). The majority of RSV-positive cases were subgroup A (20/29, 69%), followed by subgroup B (7/29, 24%), one (3%) sample subgroup was inconclusive, and one (3%) RSV subgroup has yet to be determined. Of the 29 total RSV positives, 27 (93%) were detected in children aged <5 years, including 24 from SRI surveillance and three from ILI surveillance.

The RSV detection rate in all ages in SRI surveillance has been increasing from week 1 (2%) to week 5 (5%) in 2023, however, remains below the 2010-2019 mean detection rate (Figure 3). In SRI surveillance, the RSV detection in children aged <5 years, remained low between week 1 (12%) and week 5 (13%), with RSV activity in the last two weeks slightly surpassing the 2015-2019 mean detection rate (Figure 4). In ILI surveillance the RSV detection rate in all age groups has been increasing from week 1 (0%) to week 5 (7%), however, remains below the 2013-2019 mean detection rate (Figure 5). In summary, although there have been increases in RSV activity in recent weeks in the syndromic sentinel surveillance programmes, activity still remains below the seasonal threshold from week 1 to week 5 of 2023.

RESPIRATORY DISEASES

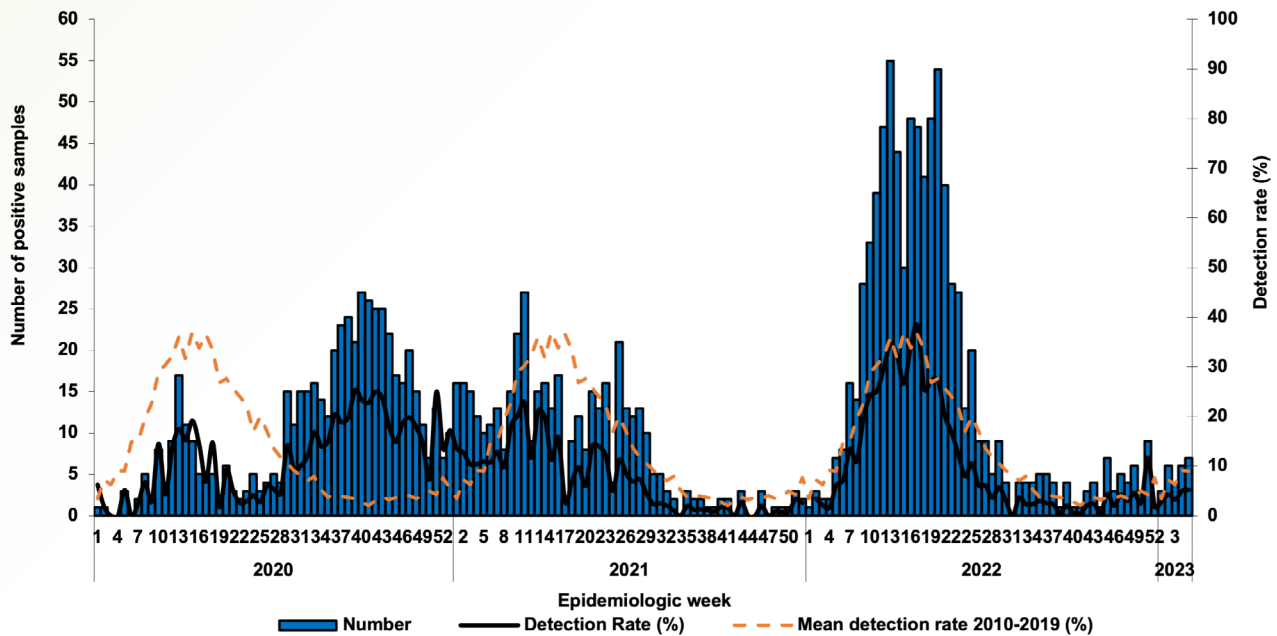


Figure 3. Respiratory syncytial virus positive samples and detection rate* for individuals of all ages by epidemiologic week, severe respiratory illness (SRI) surveillance, South Africa 2020-2023

*Detection rate is number positive / total tested

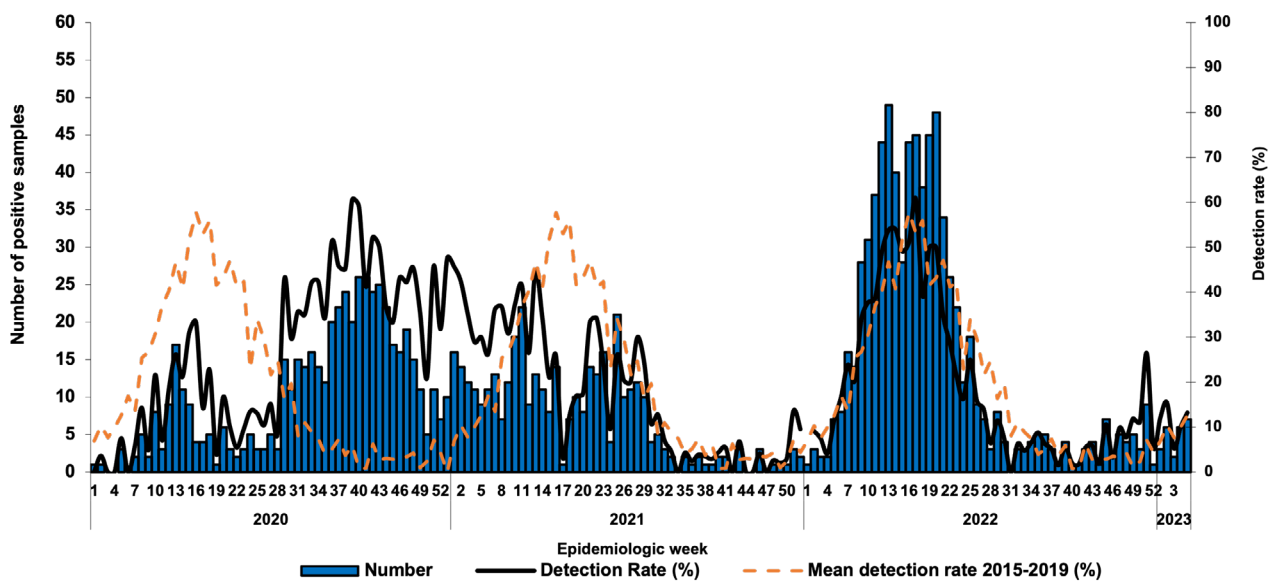


Figure 4. Respiratory syncytial virus positive samples and detection rate* among children aged <5 years by epidemiologic week, Severe Respiratory Illness (SRI) surveillance, South Africa 2020-2023 *Detection rate is number positive/total tested

RESPIRATORY DISEASES

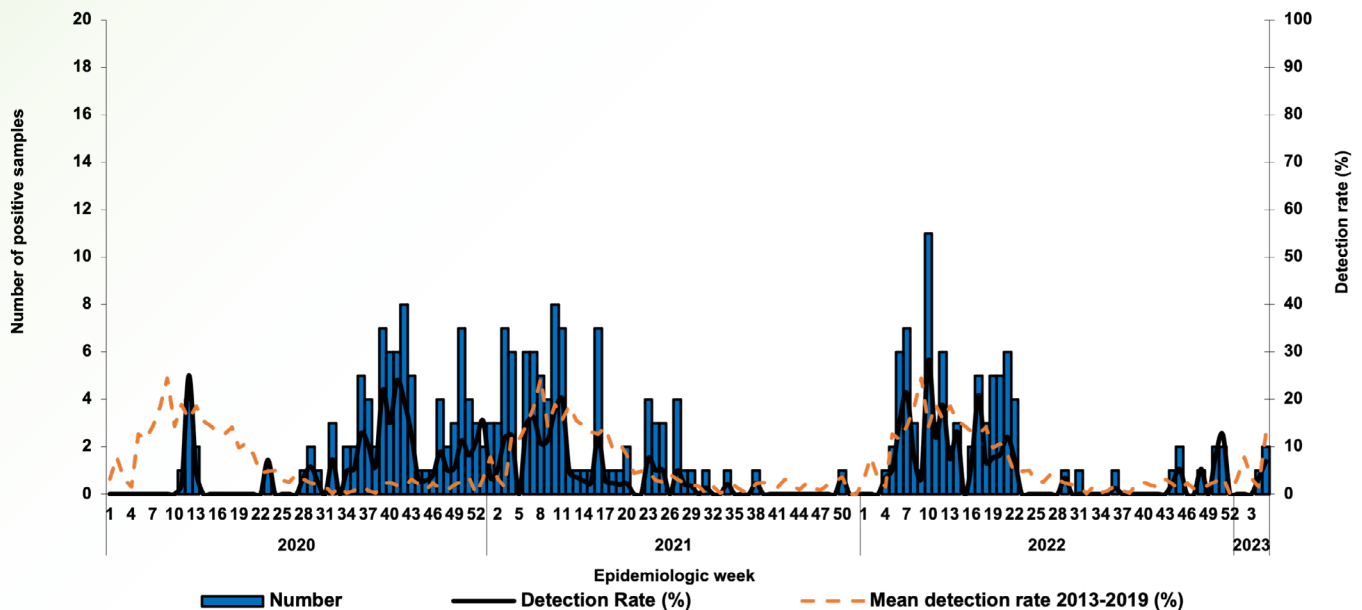


Figure 5. Respiratory syncytial virus positive samples and detection rate* among individuals of all ages by epidemiologic week, Influenza like illness (ILI) surveillance, South Africa 2020-2023 *Detection rate is number positive/total tested

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

Increase in Pertussis Cases, February 2023

There has been a significant increase in *Bordetella pertussis* (pertussis) cases detected in the pneumonia surveillance program in 2022/2023, compared to the COVID-19 pandemic years (2020/2021). Overall, 0.1% (2/3 634) of patients enrolled on pneumonia surveillance tested positive for pertussis from 01 January 2022 to 30 June 2022. The increase in the detection of pertussis cases started on 01 July 2022, with the detection rate increasing to 3.6% (137/3 747) for the period through 13 February 2023 (Figure 6). Western Cape Province reported the highest number of cases (99/137, 72.8%) in the period from 01 July 2022 to 13 February 2023 (Figure 6 and 7). The majority of cases were in children aged <5 years (80.3%, 110/137) and of these, 70% (77/110) were children aged <3 months. During the reporting period, there were three deaths reported: a child <3 months of age from Mpumalanga Province, a 49-year-old male on treatment for chronic medical conditions from Gauteng Province, and a 16-year-old male with medical conditions from North West Province. Of the pertussis-positive cases aged <5 years and with data on vaccination, 57.1% (44/77) were up-to-date for their age.

In addition to the increase in pertussis cases identified at surveillance sites, there has been an increase in cases identified from the NMC surveillance system. Some of these cases were also enrolled into the pneumonia surveillance programme (Figure 8) (notification of pneumonia surveillance cases is ongoing). The Western Cape Province reported the highest number of cases (537/1 015, 52.9%). The majority of cases (670/1 015, 66.0%) were in children aged <5 years and of those, 68.8% (461/670) were children aged <3 months. In addition, 16.7%(169/1 015) of all cases were reported from Gauteng Province, followed by 9.1%(92/1 015) from KwaZulu-Natal Province and 6.7% (68/1 015) from Mpumalanga Province. Among the 845 pertussis-positive cases in the NMC database with data available on the outcome, 19 deaths were reported (excluding the three deaths reported above under pneumonia surveillance). Of the 19 deaths, 18 were children aged <5 years and of those, 11 were children aged <3 months.

RESPIRATORY DISEASES

Pertussis, commonly known as 'whooping cough' is a vaccine-preventable disease caused by *Bordetella pertussis* and is a category 1 NMC. Clinicians are advised to be vigilant for cases, especially in very young children who may not present with typical symptoms of pertussis (cough and whoop). Immunity following vaccination lasts for approximately five to six years. Episodic increases in pertussis cases occur in vaccinated populations every three to five years. Completion of childhood primary vaccination series, Diphtheria, Tetanus and acellular-Pertussis (DTaP) and boosters, is important for prevention. Clinicians are advised to conduct diagnostic testing where appropriate, notify cases on the NMC mobile application, and prescribe post-exposure prophylaxis to close and high-risk contacts of suspected or confirmed cases.

Vaccination of healthcare workers against pertussis reduces transmission to vulnerable patients (e.g. neonates) and is recommended where resources are available. Maternal immunisation with acellular pertussis-containing vaccines (DTaP) is effective in preventing severe disease and mortality among young infants, before they receive their infant vaccines. NICD recommendations for pertussis diagnosis, management and public health response may be found on the NICD web page (<http://www.nicd.ac.za/index.php/pertussis/>).

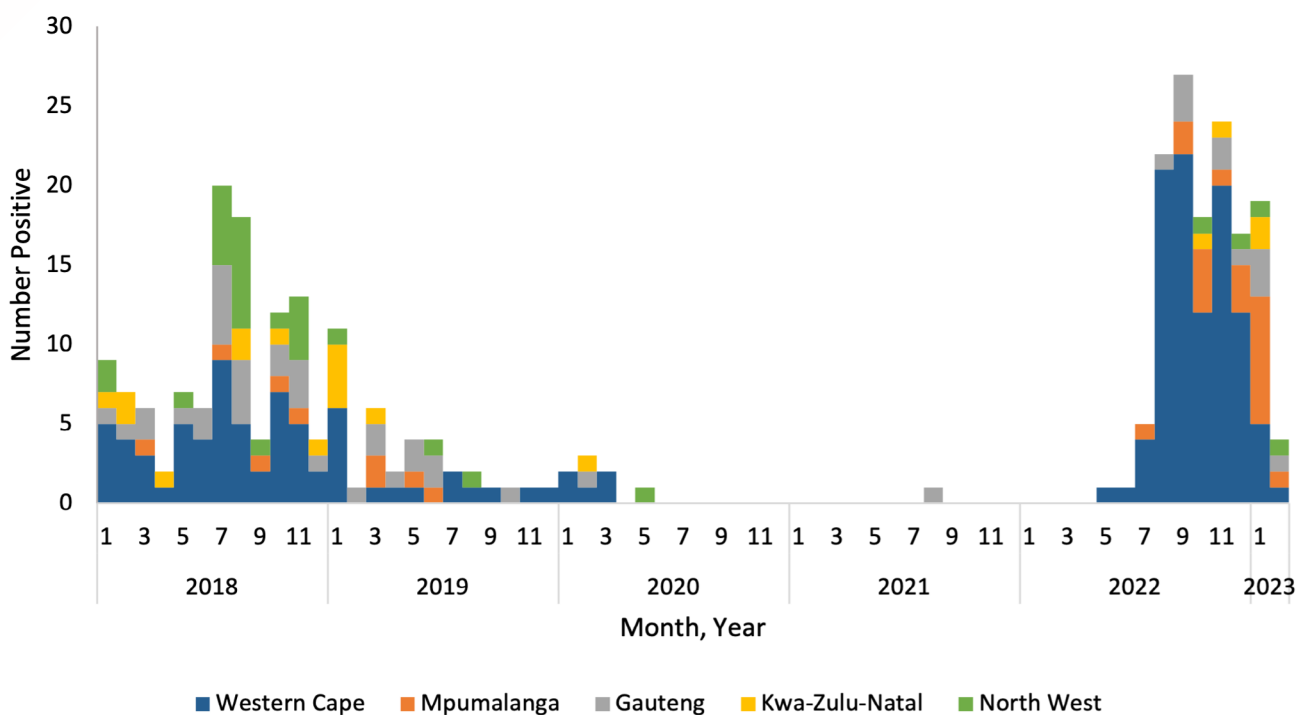


Figure 6. Number of laboratory-confirmed pertussis cases from pneumonia surveillance programme by year, month and province, South Africa, 2018-2023

RESPIRATORY DISEASES

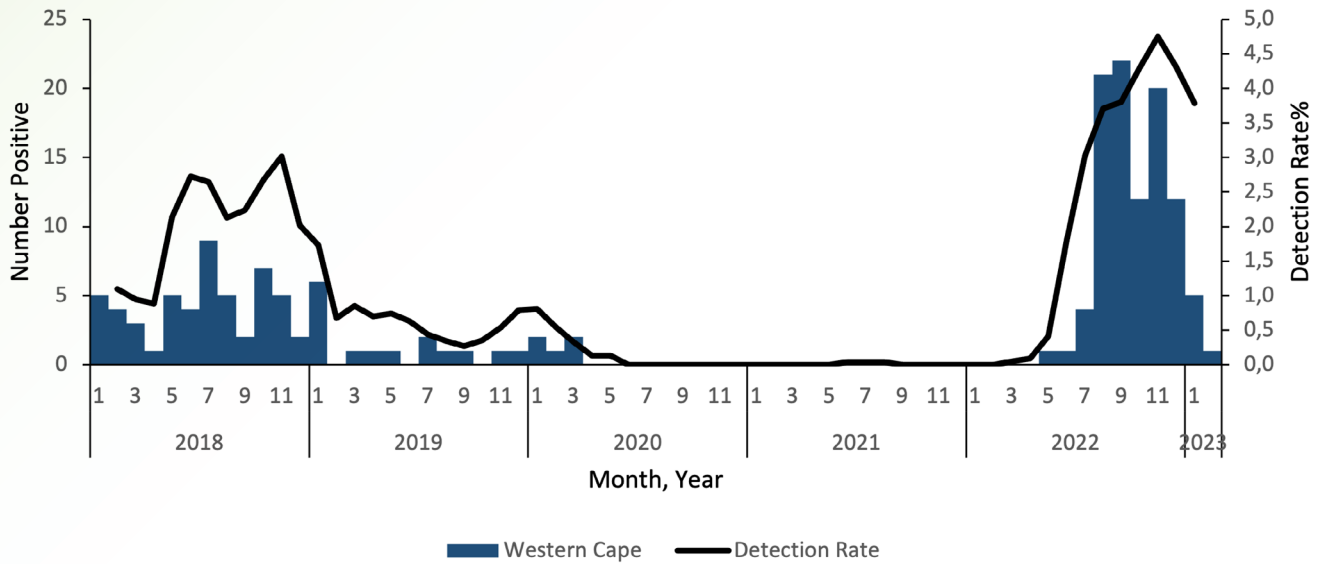


Figure 7. Number of laboratory-confirmed pertussis cases from pneumonia surveillance programme and 3-weeks rolling average detection rate by year, month in Western Cape, South Africa, 2018-2023

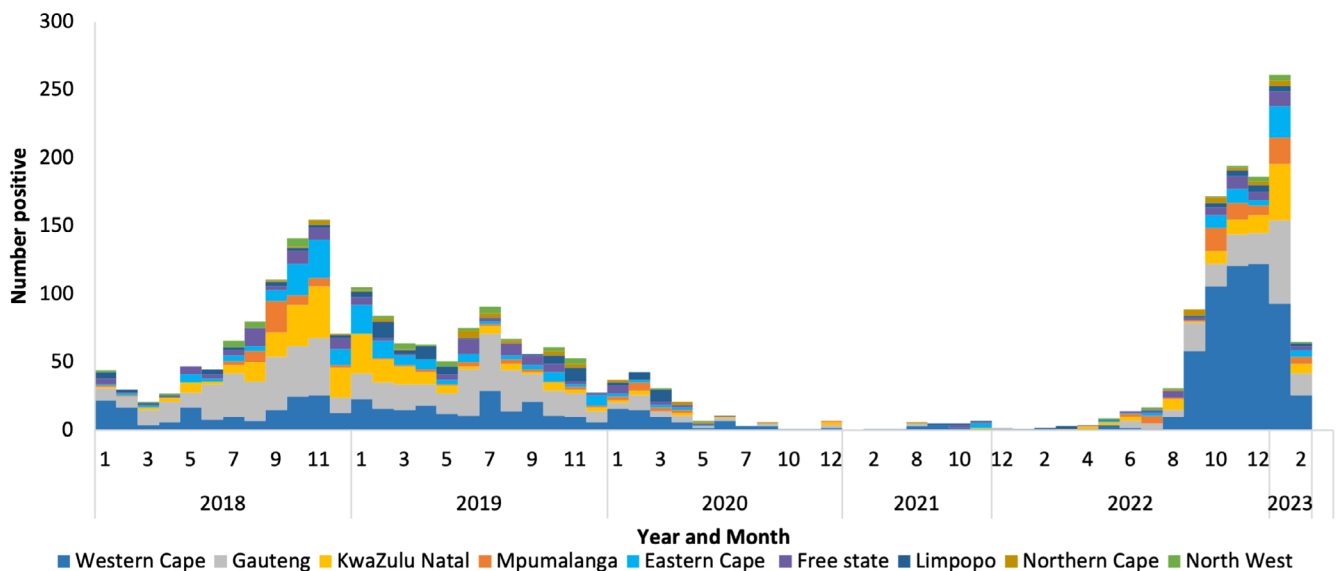


Figure 8. Number of notified pertussis cases from Notifiable Medical Conditions Surveillance System (NMC-SS) by year, month and province, South Africa, 2018-2023

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

RESPIRATORY DISEASES

Monitoring Invasive Group A Streptococcal Infections In South Africa

In December 2022, WHO reported an increase in invasive group A streptococcus (iGAS) infections observed in at least five European countries (<https://www.who.int/emergencies/disease-outbreak-news/item/2022-DON429>). This increase was particularly marked in the latter half of 2022 and mostly affected children <10 years of age. In the United Kingdom since early January 2023, new cases of iGAS in children have decreased, whilst the incidence of iGAS in the elderly remains high. In the USA, the Center for Disease Control and Prevention also noted a possible uptick in iGAS cases (<https://www.cidrap.umn.edu/cdc-issues-alert-uptick-invasive-group-strep-infections-kids>); and recently, Germany reported the death of two teenagers from secondary iGAS infection following an episode of influenza. (https://www.medscape.com/viewarticle/987595?src=WNL_trdalrt_pos1_ous_230130&uac=285215HJ&implID=5124893)

Viral coinfection may increase the risk of iGAS. In the Northern hemisphere, the iGAS increase is occurring amid an increase in circulating respiratory viruses (including influenza, respiratory syncytial virus and SARS-CoV-2), following an increase in social mixing in the latter stages of the COVID-19 pandemic.

Group A streptococcus infections typically cause mild illnesses, such as tonsillitis, pharyngitis, impetigo, cellulitis and scarlet fever. Rarely, GAS infections can lead to iGAS, which can be life-threatening.

Since 2019, the NICD has been conducting laboratory-based iGAS surveillance in South Africa through the GERMS-SA platform (including collecting outcome data on cases from 26 enhanced surveillance hospital sites since 2020). Episodes of iGAS isolated from any sterile body site, or from a non-sterile site in a patient diagnosed with necrotising fasciitis or toxic shock syndrome, are reported to the surveillance programme. Data from 2022 are still preliminary as case counts from the fourth quarter have not yet been finalised.

From January 2019 through December 2022, 3 319 cases of iGAS were reported through the GERMS-SA programme. The annual incidence of all reported iGAS infections were 1.8, 1.1, 1.3 and 1.4 per 100 000 persons from 2019 to 2022, respectively (Figure 9). Incidence decreased by 41% ($p<0.001$) in 2020 compared to 2019, followed by an overall year-on-year increase back to 6% ($p<0.001$) below pre-pandemic levels. Infants had the highest incidence rate throughout the study period. Incidence was lowest among children 10-14 years of age for all years except in 2020, where children 5-9 years of age had the lowest incidence.

Most cases of iGAS infection had positive blood cultures (1 722/3 319), with few cases testing positive from cerebrospinal fluid (45/3 319). The remainder tested positive from a mix of other invasive specimen types (i.e. pus from deep-seated abscesses, bone biopsies, necrotic tissue from muscles or fascia, and ascitic or pleural fluid) (Figure 10). Incidence of bacteraemia iGAS episodes was 5% higher in 2022 than 2019 (0.85 and 0.81 per 100 000 population respectively), with a similar age distribution for all invasive GAS infections across the years (Figure 11).

Amongst episodes of iGAS bacteraemia from enhanced surveillance hospitals, 33% (105/325) of persons were HIV co-infected and case fatality was 33% (128/393). There were no significant year-on-year changes in case fatality ($p=0.606$).

South Africa has not seen an obvious increase in iGAS infections in 2022 compared to pre-COVID pandemic levels amongst any age group. The NICD will continue to conduct laboratory-based surveillance on invasive disease episodes and encourage all microbiology laboratories to submit isolates to the Centre for Respiratory Diseases and Meningitis (CRDM) reference laboratory for further characterisation. Rheumatic fever (which can follow scarlet fever or tonsillitis from group A streptococcus) is a category 1 NMC and suspected cases should be notified on the NMC online platform in order to ensure adequate public health investigation.

RESPIRATORY DISEASES

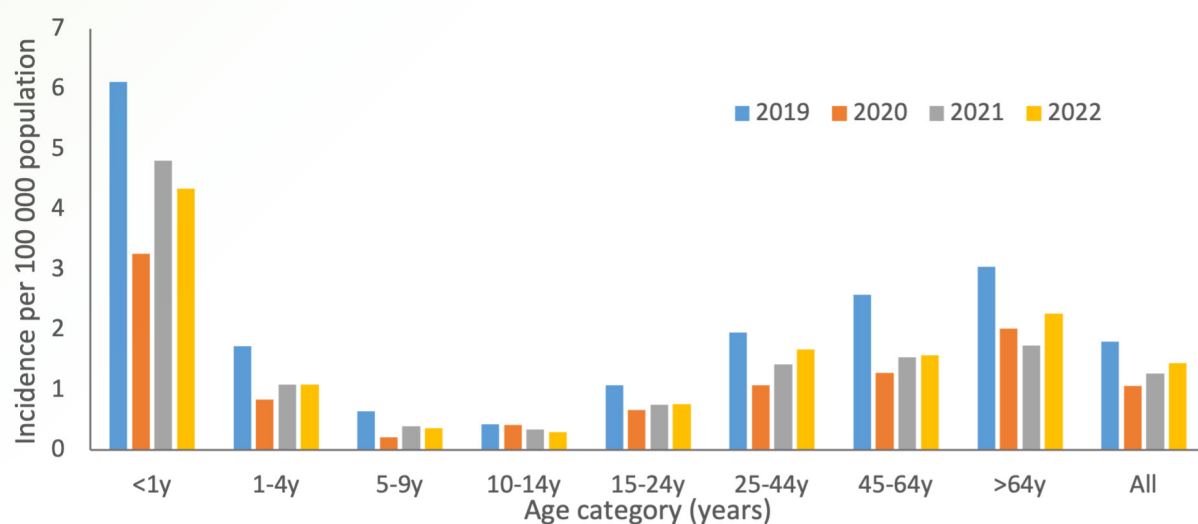


Figure 9. Incidence of invasive group A streptococcal infection by age category reported to GERMS-SA, 2019-2022 (n=3319, 191 with unknown age)

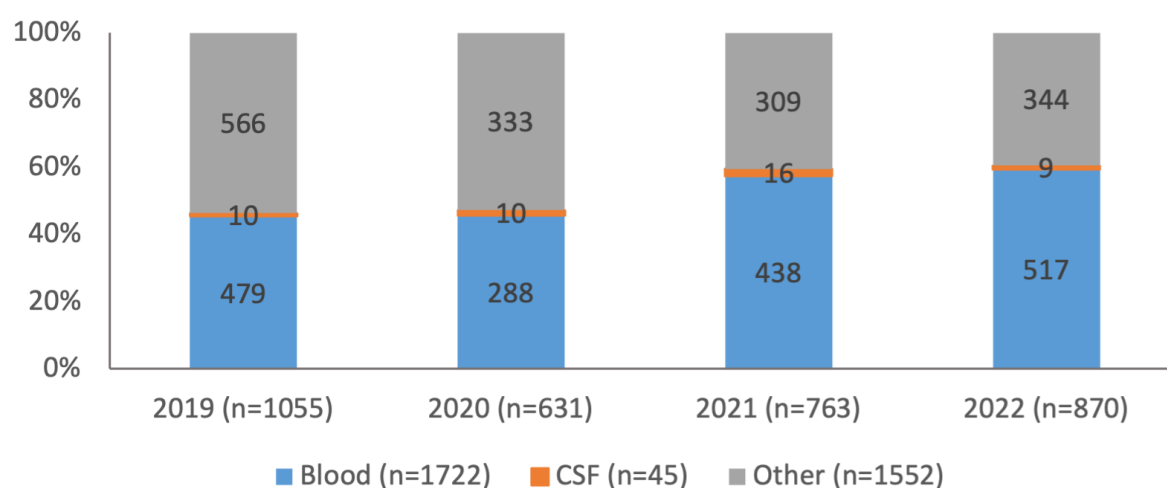


Figure10. Proportion of invasive group A streptococcal infections by specimen type, South Africa 2019-2022 (n=3319)

RESPIRATORY DISEASES

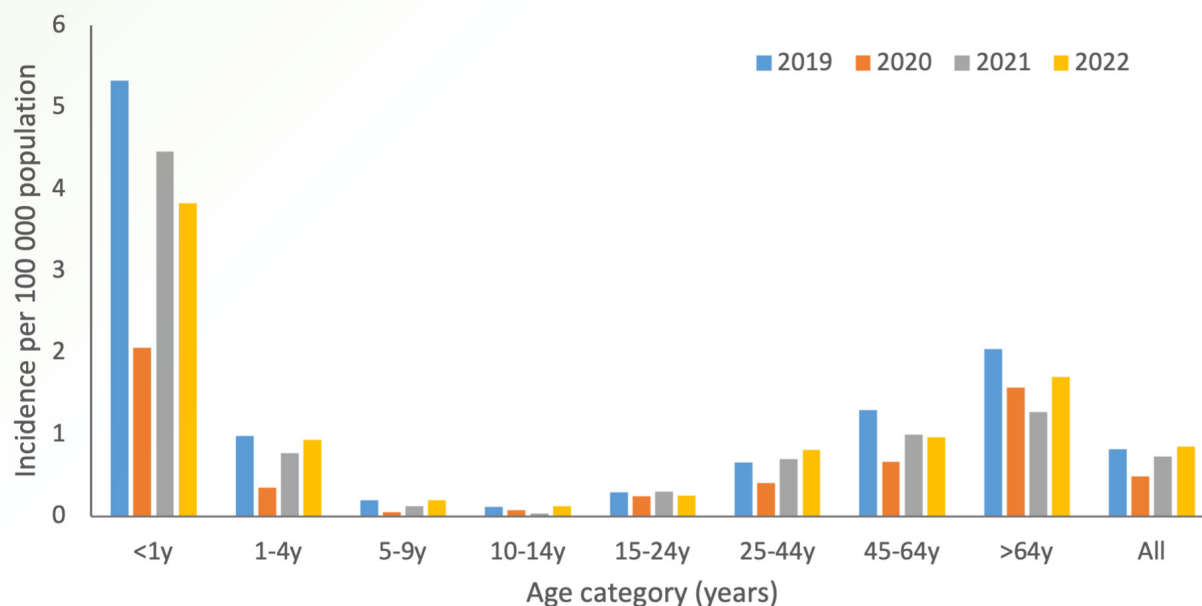


Figure 11. Incidence of group A streptococcus bacteraemia by age category reported to GERMS-SA, South Africa 2019-2022 (n=3319, 116 with unknown age)

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

HIV AND STIS

Trends In The Causes Of Genital Ulcer Syndrome, 2007- 2022

The NICD has conducted sentinel surveillance of genital ulcer syndrome (GUS) aetiologies since 2007. At each sentinel site per year, adult (≥ 18 years) male and female patients presenting with visible genital ulceration to public health care clinics (PHCs) were enrolled. Total nucleic acid was extracted from ulcer swabs which were tested by PCR for ulcer-causing pathogens, namely: herpes simplex virus (HSV) - the viral cause of genital herpes, *Treponema pallidum* - the spirochete causing syphilis, *Haemophilus ducreyi* (HD) - the bacterium causing chancroid, and *Chlamydia trachomatis* serovar L1-3 - the bacterium causing lymphogranuloma venereum (LGV). Data from the longest running sentinel site located in Alexandra, Johannesburg, are presented.

Over the 16 year period, HSV was the most frequent cause of GUS with prevalence rates fluctuating between 35% and 74%. Although *T. pallidum* was the second most predominant aetiology, its relative prevalence has increased from 4.2% (2016) and peaked at 17.8% (2021). This increase coincided with global and local shortages of benzathine penicillin G (BPG), the drug of choice for syphilis treatment. This was mirrored by the increased RPR seroprevalence amongst pregnant women seen in the 2015- 2019 national antenatal HIV sentinel survey, and the rise in congenital syphilis (CS) notifications since 2017 (Figure 12). *H. ducreyi* and LGV have not been detected as GUS causes in this population for several years. HIV-1 associated ulceration may account for ulcers of unknown aetiology.

HIV AND STIS

Primary prevention through condom use and voluntary male medical circumcision (VMMC) should be strengthened, availability of BPG ensured, and adherence to longer-duration alternative treatments emphasized, to reduce community syphilis transmission.

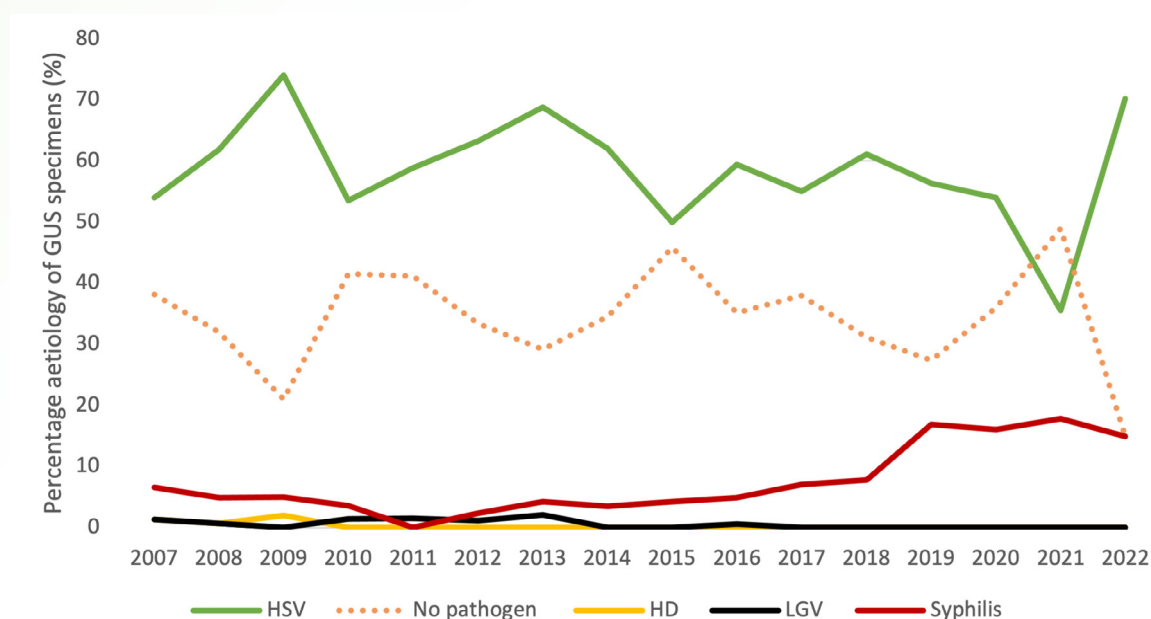


Figure12. Trends in the relative prevalence of genital-ulcer causing pathogens by year of enrolment, 2007-2022, at the Alexandra Health Centre in Johannesburg, Gauteng

Source: Centre for HIV and STIs, NICD-NHLS, biancad@nicd.ac.za

VACCINES AND IMMUNOLOGY

Wastewater-Based Epidemiology Of Sars-Cov-2 – An Introduction To A New Surveillance Modality

Wastewater-based epidemiology (WBE) can be used for monitoring infectious diseases by analysing their genetic materials in wastewater. SARS-CoV-2 can be shed in faeces of infected individuals and can be detected in sewage samples. SARS-CoV-2 RNA detected in wastewater is non-infectious. So, WBE is an effective and safe modality for early detection of outbreaks and inferring disease burden. The testing of 87 wastewater treatment plants since the COVID-19 pandemic has shown the feasibility and usefulness of WBE for SARS-CoV-2 in South Africa.

Increases in quantitative levels of SARS-CoV-2, which indicates more people shedding the virus and increased community transmission, have mostly preceded the increases in clinical

cases. This scenario was seen in the third (July 2021), fourth (December 2021) waves and the resurgence (May 2022) (Figure 13). Furthermore, the next generation sequencing of SARS-CoV-2 RNA fragments in wastewater identified variants of concerns and their evolution - Beta in April 2021, Delta in May 2021 and Omicron in November 2021 which continues to circulate, with BA.5 dominances from August 2022 followed by the emergence of BQ.1, BA.2.75 and XBB.1.5 in January, 2023.

Our wastewater data cannot currently be used to predict a new outbreak. This limitation may be attributed to the inherent complexity of wastewater coupled with non-standardised methods for sample collection and testing among the partner laboratories.

VACCINES AND IMMUNOLOGY

Nevertheless, with the current low clinical testing rates, WBE has been able to infer the 'true' disease burden within communities. Furthermore, preliminary findings from our interviews with policy makers within the country have shown that they are

beginning to use WBE to support public health decision-making. Overall, WBE is a promising modality for disease surveillance that can potentially revolutionize public health surveillance.

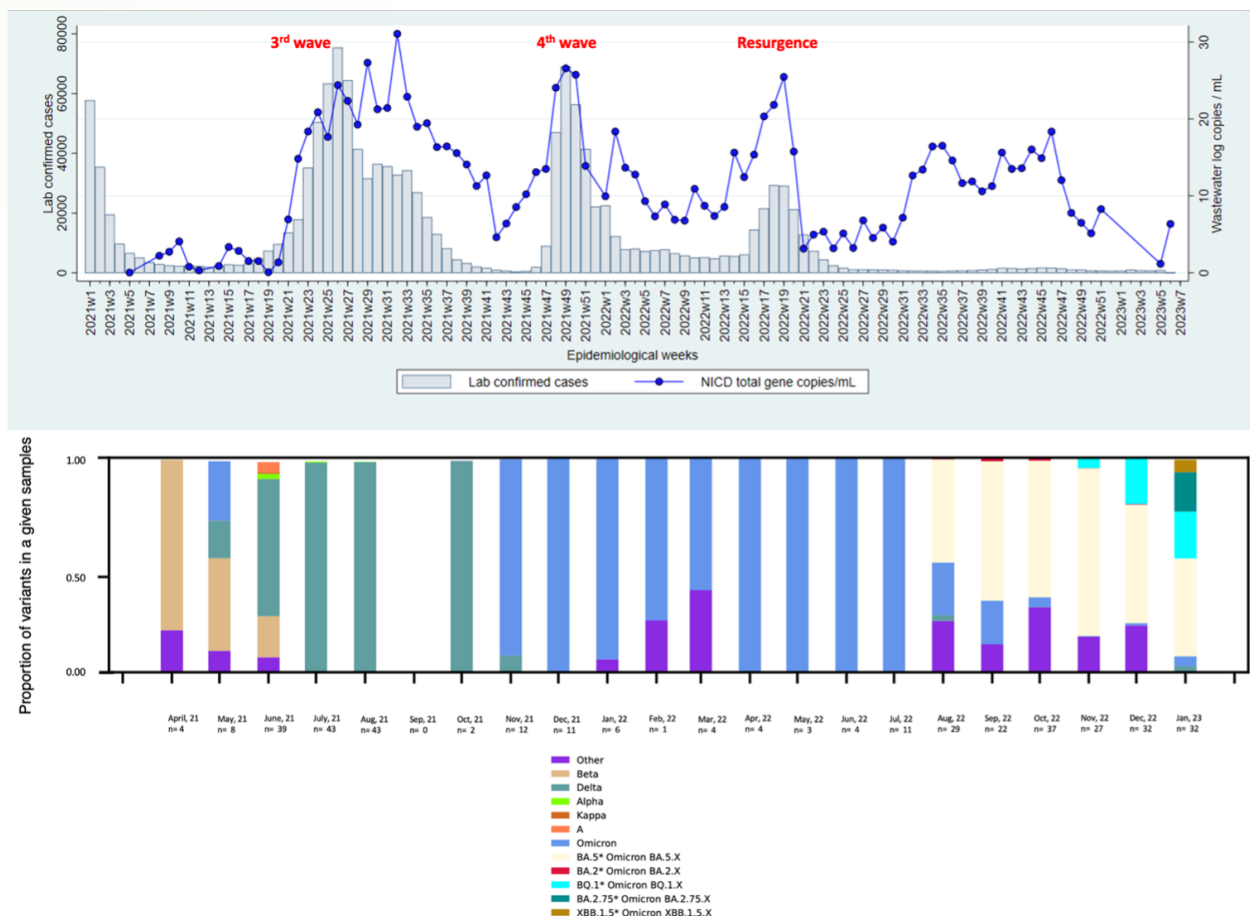


Figure13. Time series of laboratory confirmed cases of SARS-CoV-2 (bar graph), levels of SARS-CoV-2 taken as log genome copies SARS-CoV-2 per millilitre (blue coloured line graph) and proportion of variants of concern for selected wastewater treatment plants (WWTPs) in the South Africa during epidemiological weeks 01 of 2021 to week 07 of 2023. More information about our results can be found in our weekly reports <https://www.nicd.ac.za/diseases-a-z-index/disease-index-covid-19/surveillance-reports/weekly-reports/wastewater-based-epidemiology-for-sars-cov-2-in-south-africa/>

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

BEYOND OUR BORDERS

The 'Beyond our Borders' column focuses on selected and current regional and international diseases that may affect South Africans travelling outside the country.

Mpox

According to WHO, as of 20 February 2023, the multi-country mpox outbreak has resulted in a cumulative total of 86 019 laboratory-confirmed cases and 96 deaths globally. For the year 2023, the number of new cases has increased by 76.1% in week six (06 - 12 February 2023) (n=280 cases) compared to week five (30 January 2023 - 05 February 2023) (n=159 cases). The majority of cases reported in the past four weeks have been from the Region of the Americas (82.2%), while 9.5% of cases have been reported from the African Region.

As of 16 February 2023, the ten most affected countries globally are: United States of America (n=29 974), Brazil (n=10 808), Spain (n=7 538), France (n=4 128), Colombia (n=4 080), Mexico (n=3 828), Peru (n=3 752), the United Kingdom (n=3 735), Germany (n=3 692) and Canada (n=1 460). Together, these countries account for 85.0% of all cases reported globally since the start of the outbreak. Seventy-nine countries have reported no new cases in the past 21 days (as of 16 February 2023). There has been a notable decrease in the number of weekly cases reported since August 2022.

WHO has assessed the global risk as moderate, with the South-East Asia Region and Western Pacific Region being the only ones classified as low-risk. The fourth meeting of the WHO International Health Regulations (IHR) Emergency Committee was held on 09 February 2023 and concluded that mpox still remains a Public Health Emergency of International Concern (PHEIC). The committee recommended continued laboratory-based surveillance, as well as integration of mpox-related activities into the HIV and STI prevention and control programmes and services. In South Africa, the number of mpox cases remains unchanged at a total of five cases to date. According to the South African Government Gazette published on 03 February 2023, mpox has been classified as a category 1 NMC. Therefore, clinicians are required to notify cases of mpox within 24 hours.

Sources: https://worldhealthorg.shinyapps.io/mpox_global/ | [https://www.who.int/news/item/15-02-2023-fourth-meeting-of-the-international-health-regulations-\(2005\)-\(ihr\)-emergency-committee-on-the-multi-country-outbreak-of-monkeypox-\(mpox\)](https://www.who.int/news/item/15-02-2023-fourth-meeting-of-the-international-health-regulations-(2005)-(ihr)-emergency-committee-on-the-multi-country-outbreak-of-monkeypox-(mpox))

COVID-19

As of 17 February 2023, there have been approximately 756 million confirmed cases of COVID-19 and 6.8 million deaths reported globally since the start of the pandemic. Over the last 28-day reporting period (16 January 2023 - 12 February 2023), there were approximately 6.7 million new cases and 64 000 deaths reported globally. This represents a decrease of 92% and 47% in the number of new cases and new deaths, respectively, compared to the previous 28 days. During this period, all six WHO regions reported a decrease in the number of new cases. Two regions reported an increase in the number of new deaths, namely the African Region at 22% and the Eastern Mediterranean Region at 33%.

The countries which reported the highest numbers of new cases over the same 28-day reporting period were: Japan (n=

1 627 259; -61%), China (n= 1 272 035; -98%), the United States of America (n= 1 165 050; -36%), the Republic of Korea (n= 543 308; -66%), and Brazil (n=332 404; -54%). The countries with the highest numbers of new deaths over the same period were China (n=20 979; -68%), the United States of America (n=14 326; +12%), Japan (n=8 294; -7%), Brazil (n=2 426; -29%), and the United Kingdom (n=2 269; -47%).

As per the report of the 14th meeting of the IHR (2005) Emergency Committee regarding the COVID-19 pandemic held on 27 January 2023, COVID-19 continues to constitute a PHEIC.

The risk of importation of cases from other countries is still a possibility, however, there have been no new reports of variants of concern which could pose a new threat to South Africa.

Source: <https://www.who.int/publications/m/item/weekly-epidemiological-update-on-covid-19---15-february-2023> | <https://covid19.who.int/table>

BEYOND OUR BORDERS

Dengue Fever

For the year 2022, there were 4 110 465 cases of dengue fever and 4 099 deaths reported globally (as of 31 December 2022). The countries that reported the highest number of cases were as follows: Brazil (n = 2 363 490), Vietnam (n= 367 729), Philippines (n = 220 705), Indonesia (n = 125 888), and India (n = 110 473). The number of dengue cases reported to WHO has increased eight-fold over the last two decades. For the year 2023 so far, the following countries have reported ongoing dengue fever outbreaks (as of 16 February 2023):

Cambodia: As of epidemiological week 5 of 2023, a total of 580 dengue cases and one death (CFR=0.2%) were reported to the National Dengue Surveillance System in Cambodia since 1 January 2023; compared to 219 cases and zero deaths in 2022 over the same period.

Lao People's Democratic Republic: During epidemiological week 5 of 2023, 51 dengue cases and zero deaths were reported. There were 46 cases reported in the previous week. The cumulative number of cases reported since the start of the year is 271, this is 15.9 times higher compared to the 17 cases reported during the same period in 2022.

Malaysia: During epidemiological week 5 of 2023, Malaysia recorded 2 159 new dengue cases and two deaths. This is an increase compared to the 1 910 cases reported in the previous week. For the year 2023 so far and as of epidemiological week 5, the country has recorded a cumulative total of 11 127 cases and

six deaths (CFR 0.05%).

Philippines: From 01 January 2023 to 14 January 2023, the Philippines reported a total of 2 535 dengue cases and seven deaths (CFR=0.3%). The number of cases is 3% higher compared to the same period in 2022 (n=2 470).

Singapore: During epidemiological week 1 of 2023, 284 dengue cases were reported in Singapore. In 2022, the country recorded a cumulative total of 32 130 cases.

Vietnam: As of 12 February 2023, Vietnam recorded a cumulative total of 11 991 cases and no deaths for the year so far. The number of cases is 2.1 times higher compared to the same period in 2022.

Australia: For the period 12 December 2022 to 08 January 2023, Australia recorded a total of 24 cases of dengue. The cumulative total of cases for the year 2022 and including the first week of 2023 (as of 08 January 2023), is 355 cases.

While local transmission of dengue has not been reported in South Africa, the mosquito vector of disease, *Aedes aegypti*, is present in certain regions of South Africa, namely KwaZulu-Natal Province coastline. Clinicians are urged to maintain a high index of suspicion for dengue fever in anyone returning from dengue-endemic regions, presenting with signs and symptoms of the disease.

Sources: https://www.who.int/docs/default-source/wpro---documents/emergency/surveillance/dengue/dengue-20230216.pdf?sfvrsn=fc80101d_127#:~:text=During%20epidemiological%20week%20of%202023%2C%20there%20were%20%2C159%20dengue,11%2C127%20cases%20were%20cumulatively%20reported,https://www.ecdc.europa.eu/sites/default/files/documents/communicable-disease-threats-report-week-4-January-2023.pdf

Cholera – African Region

On 16 December 2022, WHO published a report detailing the increasing trend in the number of cholera cases globally since 2021. Two toxin-producing strains, namely O1 and O139 Ogawa serotypes, have been associated with causing outbreaks. Transmission is closely linked to poor access to clean water and sanitation services.

According to WHO, the countries currently experiencing ongoing cholera outbreaks (as of 11 February 2023) are as follows:

- **African Region:** Burundi, Cameroon, DRC, Ethiopia, Kenya, Malawi, Mozambique, Nigeria and Zambia.
- **Region of the Americas:** Dominican Republic and Haiti
- **Eastern Mediterranean Region:** Afghanistan, Lebanon, Pakistan, Somalia and Syria
- **European Region:** Northwest Syria
- **South-East Asian Region:** Bangladesh
- **Western Pacific Region:** Philippines

BEYOND OUR BORDERS

Cholera – African Region

WHO Member States are continuing their efforts to strengthen and maintain cholera surveillance to enable early detection, treatment of new cases, and to prevent ongoing transmission. Countries are advised to continue their efforts to provide safe water and adequate sanitation, health promotion activities and social mobilisation, to reduce the impact of cholera and other waterborne diseases. Some countries have already initiated Oral

Cholera Vaccination (OCV) campaigns in collaboration with WHO. Clinicians are urged to maintain a high index of suspicion for cholera in anyone presenting with acute watery diarrhoea, particularly if they have a history of travel to any of the countries mentioned above.

Source: <https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON437>

Lassa Fever – Nigeria

From week 1 through to week 3, 2023, a total of 244 confirmed cases of Lassa fever, including 37 deaths (CFR=15.2%), have been reported in 16 states in Nigeria. Of the reported cases, the predominant age group was 21-30 years (range: 1 to 79 years). The male-to-female ratio for confirmed cases was 1:0.9. Five confirmed cases and one death were reported among health workers. In week 3 alone, the number of new confirmed cases increased from 77 in week 2, 2023 to 137 cases in week 3, and the number of deaths from six in week 2 to 18 in week 3. Compared to the previous year 2022, from week 1 to week 3, the number of confirmed cases has increased from 170 cases in 2022 to 244 cases in 2023.

Following a risk assessment conducted in January 2023, the Nigeria Centre for Disease Control and Prevention (NCDC) activated the National Multisector Emergency Operations Center for Lassa fever at Level 2, to coordinate and strengthen the ongoing response activities in the country. Activities have been organized to validate a strategic plan for Lassa fever and dissemination of reviewed case management and safe burial

guidelines. A review of Lassa fever deaths as well as an in-depth investigation into healthcare worker infections were performed. The distribution of equipment to the affected states and treatment centers was conducted, which included: personal protective equipment, Ribavirin (injection and tablets), body-bags, thermometers, hand sanitizers as well as information, education and communication materials.

Lassa fever is endemic in Nigeria with seasonal outbreaks reported and the number of cases typically increases between December and March, which coincides with the dry season in the country. For the past five-year period, from week 1 through week 3 of each year, except in 2021, the trend in number of suspected and confirmed cases has been increasing as well as the number of the affected States, however the case fatality ratio has been decreasing since 2021. This may be considered as the positive impact of the strengthened surveillance and case management response activities. Lassa fever is one of the diseases linked to poor environmental health conditions.

Sources: <https://apps.who.int/iris/bitstream/handle/10665/365964/OEW06-300105022023.pdf>, <https://ncdc.gov.ng/news/438/ncdc-activates-lassa-fever-emergency-operations-centre-to-strengthen-the-response-to-rising-cases-of-lassa-fever-in-nigeria>

BEYOND OUR BORDERS

Diphtheria – Nigeria

Diphtheria is a contagious and potentially life-threatening bacterial disease. It is caused by an infection with a toxin-producing strain of *Corynebacterium diphtheriae*, or more rarely *Corynebacterium ulcerans* or *Corynebacterium pseudotuberculosis*. It occurs in two forms – respiratory diphtheria and cutaneous diphtheria.

As of 14 February 2023, a diphtheria outbreak in Nigeria has resulted in approximately 522 cases (216 confirmed and 306 suspected) and 40 deaths (case fatality ratio=18.5%) amongst confirmed cases. Based on the information given by the Nigeria CDC (NCDC), their case definition of a suspected case is any person with an illness of the upper respiratory tract characterized by: pharyngitis, nasopharyngitis, tonsillitis or laryngitis AND adherent pseudo-membrane of the pharynx, tonsils, larynx and/or nose. A laboratory-confirmed case is a person with *Corynebacterium* spp isolated by culture and positive for toxin production, regardless of symptoms. For SA case definitions please see: https://www.nicd.ac.za/wp-content/uploads/2021/12/NMC_category-1-case-definitions_Flipchart_01October-2021.pdf

The outbreak, which initially began in December 2022, is now affecting four states: Kano (211 confirmed cases, 38 deaths),

Lagos (2 confirmed cases, 2 deaths), Yobe (2 confirmed cases, 0 deaths), and Osun (1 confirmed case, 0 deaths). Among the 216 confirmed cases, 27 (20.1%) were fully vaccinated, 20 (15.3%) were partially vaccinated, and 84 (64.1%) were unvaccinated. The age range for individuals with confirmed disease is two to 14 years of age.

Ongoing transmission may be facilitated by the country's sub-optimal coverage for the third dose of the diphtheria containing pentavalent vaccine (54% - 2021, Multiple Indicator Cluster Surveys & National Immunization Coverage Survey). Other challenges, as stated by NCDC, are poor surveillance and limited laboratory capacity to properly diagnose the disease, thus indicating that the reported numbers are a possible underestimation of the outbreak.

The NCDC has been working with the ministry of health and other partners to enhance surveillance and response activities in the country, which includes harmonizing surveillance and laboratory data from across states, as well as training of clinical and surveillance officers. The NCDC is also providing support to intensify activities related to immunization of children under two years of age, particularly in Kano state where confirmed cases and deaths are highest.

Sources: <https://www.gavi.org/vaccineswork/united-crisis-nigeria-battles-diphtheria>, <https://ncdc.gov.ng/news/435/diphtheria-public-health-advisory-amidst-outbreak-in-nigeria>, https://www.nicd.ac.za/assets/files/Diphtheria%20FAQ_%20Final%2020161222.pdf

BEYOND OUR BORDERS

Meningitis – Niger

From 1 November 2022 to 27 January 2023, a total of 559 cases of meningitis (111 laboratory confirmed), including 18 deaths (case fatality ratio=3.2%) have been reported from Zinder Region, southeast of Niger. The case number is an increase when compared to the 231 cases reported in the region from 1 November 2021 through 31 January 2022.

The majority of the laboratory-confirmed cases (93.7%) are due to *Neisseria meningitidis* serogroup C (NmC). Among the 559 cases, the most affected age group are people under 20 years of age (n=538; 96.2%), with 202 cases (37.5%) in the 10-14 age group, 153 cases (28.4%) in the 5-9 age group, 107 cases (19.9%) in 15-19 age group, and 76 cases (13.6%) in the 0-4 age group.

Historically, serogroup A (NmA) accounted for 80-85% of all meningococcal cases in the meningitis belt. Since 2010 with the implementation of the mass vaccination campaigns in the meningitis belt countries with the monovalent serogroup A meningococcal conjugate vaccine, epidemics due to NmA have largely decreased or been eliminated in areas with vaccination. More so for countries, like Niger, who have subsequently incorporated the vaccine as part of their childhood vaccination program.

Niger, a country located in the African meningitis belt, experienced seasonal outbreaks recurring every year (January to June) and has been affected by several meningitis epidemics resulting in 20 789 cases and 1 369 deaths (CFR=6.6%) reported since 2015. Studies conducted into the epidemiology of bacterial meningitis since the monovalent A meningococcal vaccine campaign in 2010 showed a marked reduction in serogroup A cases reported after 2011. Following this there has been an emergence of NmC, along with the continued detection of NmW and NmX, showing that while NmA is well controlled, there are epidemics relating to other serogroups. For the current meningitis outbreak in Niger, mostly due to NmC, reactive vaccination campaigns with the trivalent ACW meningococcal polysaccharide vaccine have been implemented, with the vaccine offering protection against serogroups A, C and W.

Jigawa State in Nigeria currently also has an ongoing NmC outbreak, and shares an international border with the Zinder region, Niger. WHO currently assessed the risk posed by the current meningitis outbreak in Niger as high at the national level, moderate at the regional level, and low at the global level.

Sources: <https://www.who.int/emergencies/disease-outbreak-news/item/2023-DON439>, <https://www.afro.who.int/health-topics/meningococcal-meningitis>, <https://www.cdc.gov/meningococcal/global.html>, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7808897/pdf/nihms-1656620.pdf>, <https://www.menafri.net/who-meningitis-bulletins>

WHO AFRO UPDATE

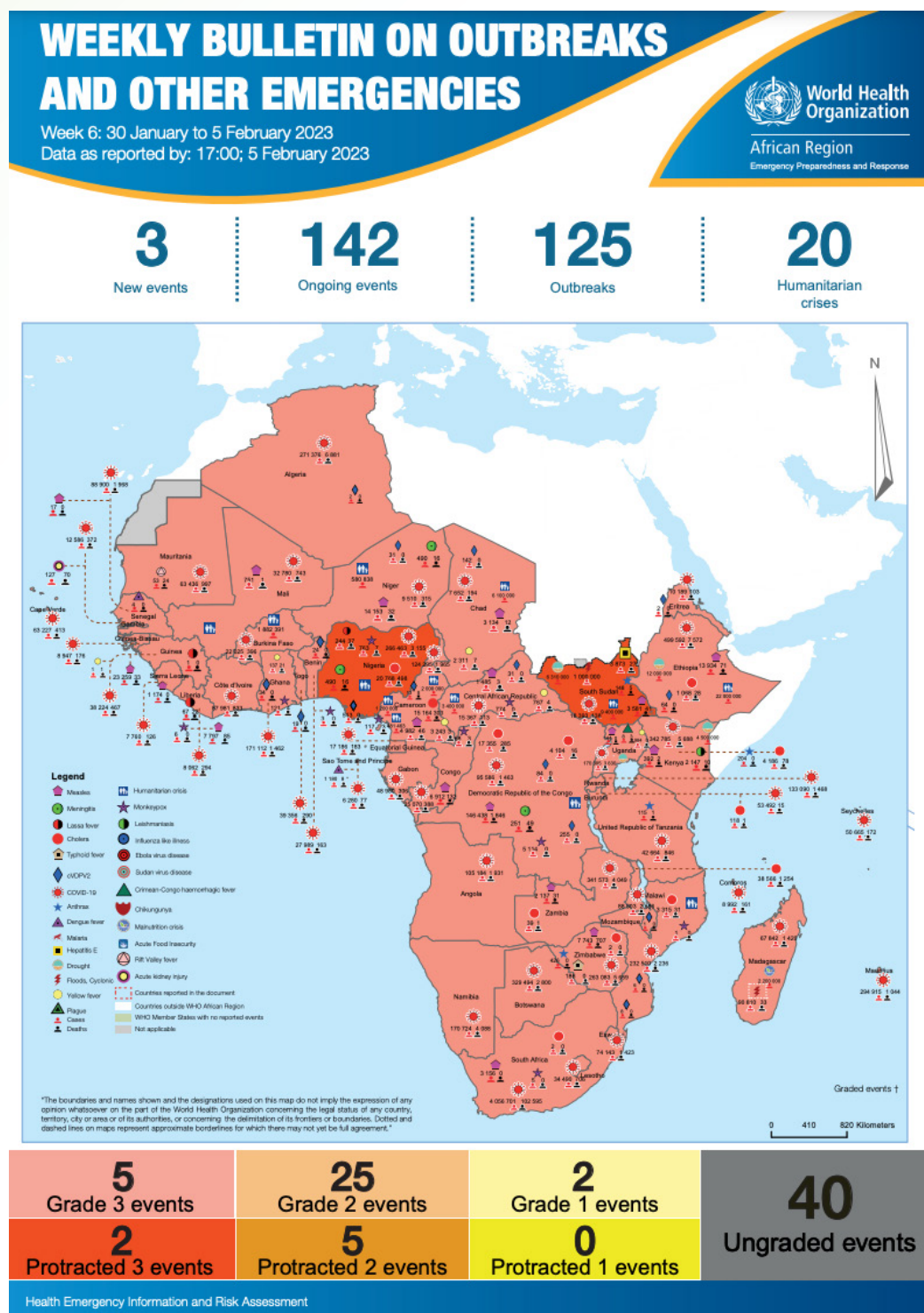


Figure 14. The Weekly WHO Outbreak and Emergencies Bulletin focuses on selected public health emergencies occurring in the WHO African Region. The African Region WHO Health Emergencies Programme is currently monitoring 142 events. For more information, see link below:

<https://www.afro.who.int/health-topics/disease-outbreaks/outbreaks-and-other-emergencies-updates>