



Increase in meningococcal disease in South Africa continues into 2024: clinicians urged to be on alert

***Susan Meiring¹, Linda de Gouveia², Vanessa Quan¹, Mignon du Plessis², Jocelyn Moyes², Brian Brümmer³, Rivionia Nero², Susan Nzenze¹, Sibongile Walaza², Cheryl Cohen², Anne von Gottberg²**

¹ Division of Public Health Surveillance and Response, National Institute for Communicable Diseases, a division of the National Laboratory Service, Johannesburg, South Africa

² Centre for Respiratory Disease and Meningitis, National Institute for Communicable Diseases, a division of the National Laboratory Service, Johannesburg, South Africa

³ Notifiable Medical Conditions, Division of Public Health Surveillance and Response, National Institute for Communicable Diseases, a division of the National Laboratory Service, Johannesburg, South Africa

Corresponding author: *Susan Meiring, susanme@nicd.ac.za



Summary

Meningococcal disease is a devastating illness that may ultimately lead to death or the development of lifelong neurological complications. Globally, meningococcal disease incidence reached its lowest levels during the COVID-19 pandemic. Since 2021, South Africa has experienced an increase in invasive meningococcal disease (IMD) incidence. Winter through spring typically brings an increase in IMD episodes in South Africa. Meningococcal disease has epidemic potential. It is therefore important to monitor these increases through systematic surveillance. We report on surveillance findings of laboratory-confirmed IMD in South Africa from the start of the GERMS-SA programme in 2003 through September 2024. We document an ongoing increase in case numbers in 2023 and 2024 and urge clinicians to be on the alert for meningococcal cases, especially during the meningococcal season.

Introduction

Meningococcal disease is endemic in South Africa. Invasive Meningococcal Disease (IMD) episodes occur throughout the year, with seasonal increases in winter through spring. The causative bacterium *Neisseria meningitidis* colonises the human nasopharynx and is spread from person to person through respiratory droplets. The disease mostly occurs when the bacteria invade the bloodstream and cause meningitis or bacteraemia (IMD). Early symptoms include malaise and fever, followed by vomiting, general body aches, cold peripheries, and drowsiness/confusion. The classic purpuric rash is a late symptom of septicaemia and indicates a medical emergency.

Twelve serogroups have been identified, of which seven (A, B, C, W, X, Y, and Z) cause disease. The case fatality ratio from meningococcal disease in South Africa is approximately 17%, with 20% of survivors developing long-term complications.¹ Most IMD episodes are sporadic, with few clusters reported. Suspected and/or laboratory-confirmed meningococcal disease is a notifiable medical condition (NMC), requiring chemoprophylaxis among close contacts of cases to prevent outbreaks (Table 1). Notification to the NMC programme via the electronic app assists in the early detection of potential cases or clusters.

Table 1. Notifiable Medical Conditions (NMC) resources and contacts, South Africa.

Description	Link/Contact Information
NMC App	https://nmc.nicd.ac.za/Account/Login
NMC Resources (Case definitions, Acts, Training resources)	https://www.nicd.ac.za/nmc-overview/nmc-resources/
Meningococcal disease FAQs	https://www.nicd.ac.za/diseases-a-z-index/meningococcal-disease/
Meningococcal disease for healthcare workers	https://www.nicd.ac.za/diseases-a-z-index/meningococcal-disease/
Dr on Call Hotline	0800 212 552
Report an Outbreak	outbreak@nicd.ac.za
NMC Epidemiologist	brianb@nicd.ac.za matimbamakhubele@nicd.ac.za
NMC App Support	NMCAppSupport@nicd.ac.za
NICD: CRDM Reference Laboratory	011 386 3690; lindad@nicd.ac.za



Historically, meningococcal disease waxes and wanes over a period of 10–15 years.² Two events have impacted meningococcal disease incidence in South Africa over the past 20 years. From 2005, South Africa experienced a country-wide increase in meningococcal disease due to serogroup W, which caused sustained high rates of disease for over five years.^{3,4} Secondly, during the COVID-19 pandemic, many countries, including South Africa, reported a significant decrease in meningococcal disease and other respiratory droplet-transmitted bacterial pathogens due to the various containment measures implemented to reduce respiratory disease transmissions.⁵ Subsequently, since 2022, these bacterial pathogens are returning to pre-COVID pandemic levels.⁶

We report on surveillance findings of laboratory-confirmed IMD in South Africa from the start of the GERMS-SA programme in 2003 through September 2024, with a focus on the trends noted in the post-COVID-19 pandemic years (2021-2024).

Methods

GERMS-SA is a surveillance programme that has been systematically collecting data on laboratory-confirmed episodes of IMD in South Africa since 2003.⁷ All public- and private-sector laboratories are requested to report laboratory-confirmed episodes of *N. meningitidis* from normally sterile-site specimens (i.e., blood, cerebrospinal fluid, joint fluid, etc.), identified through culture or molecular methods, to the Centre for Respiratory Diseases and Meningitis, National Institute for Communicable Diseases (NICD), for confirmation and further characterisation. When isolates were available, meningococcal serogroups were determined phenotypically using latex slide agglutination with antisera for capsular polysaccharides A, B, C, W, X, Y, and Z, and this was confirmed using polymerase chain reaction (PCR).⁷ Genogrouping was performed on culture-negative specimens.

Surveillance audits are performed quarterly for public-sector laboratories in all provinces using the NICD Surveillance Data Warehouse (SDW) embedded in the National Health Laboratory Service's (NHLS) Corporate Data Warehouse (CDW). The audits were designed to obtain basic demographic and laboratory data from additional case patients with laboratory-confirmed disease not already reported to GERMS-SA by participating laboratories. Data from case patients, detected by audit, were only included in this report up until the first quarter of 2024 (ending 31 March 2024). This was because of the non-functioning of the NHLS CDW owing to a security breach that occurred in late June 2024 on the NHLS' information technology system.⁸

Results

The last peak in IMD in South Africa occurred in 2006, with an annual incidence of 1.4 episodes per 100 000 persons. In 2021, IMD was at its lowest incidence of 0.05 episodes per 100 000 (Figure 1). Currently, disease incidence remains relatively low at 0.18 episodes per 100 000 population, as reported in 2023. Incidence has, however, shown an increasing trend from 2021 but is not yet reaching pre-COVID-19 pandemic levels. Up until



week 38 of 2024, 99 laboratory-confirmed invasive meningococcal episodes have been reported (107 total episodes were reported in 2023). Of the 56 episodes from 2024 with known serogroups, serogroup B disease (n=21) remains dominant, followed by serogroups W (n=13), Y (n=13), and C (n=9). Since 2016, serogroup B has replaced serogroup W as the dominant serogroup, with serogroups W and Y fluctuating between second and third place.

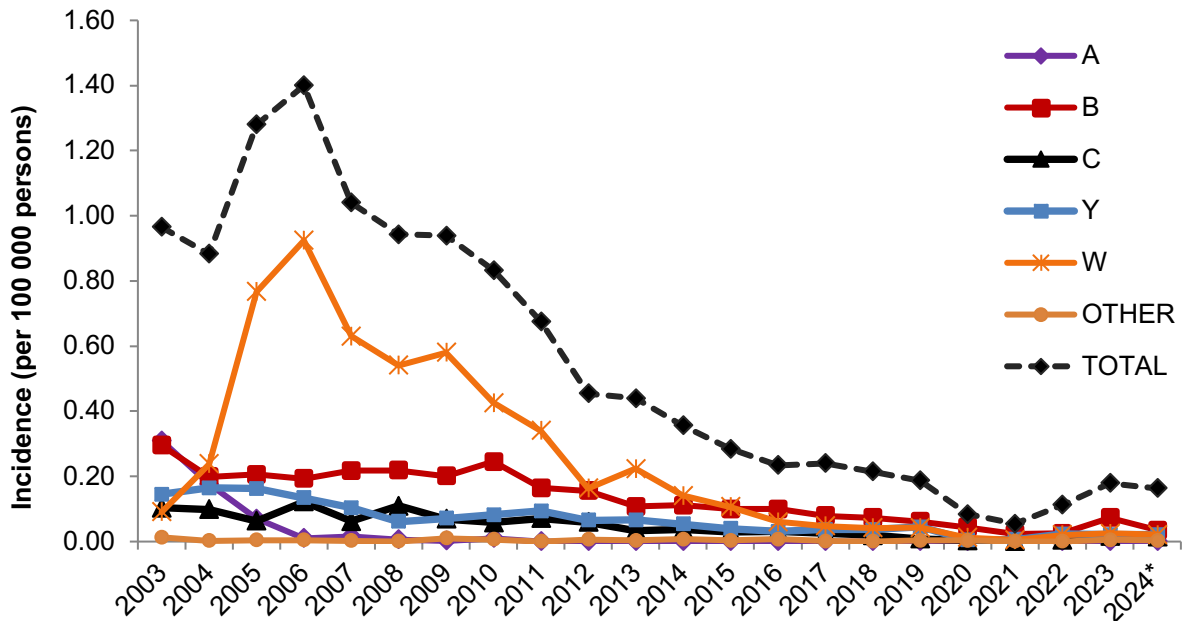


Figure 1. Incidence of laboratory-confirmed invasive meningococcal disease by serogroup and year, South Africa, 2003-2024*, as reported through the GERMS-SA surveillance programme.
*2024 data reported up until week 38.

Over the years, infants have had the highest IMD incidence (1.6 per 100 000 population in 2023) (Figure 2). Incidence decreased with age, with a smaller peak in adolescents and young adults (0.22 per 100 000 persons 15-24 years of age in 2023). All of the four dominant serogroups affect each age category each year. However, since 2019, over half of the disease episodes with known serogroups in infants were serogroup B (46/88).

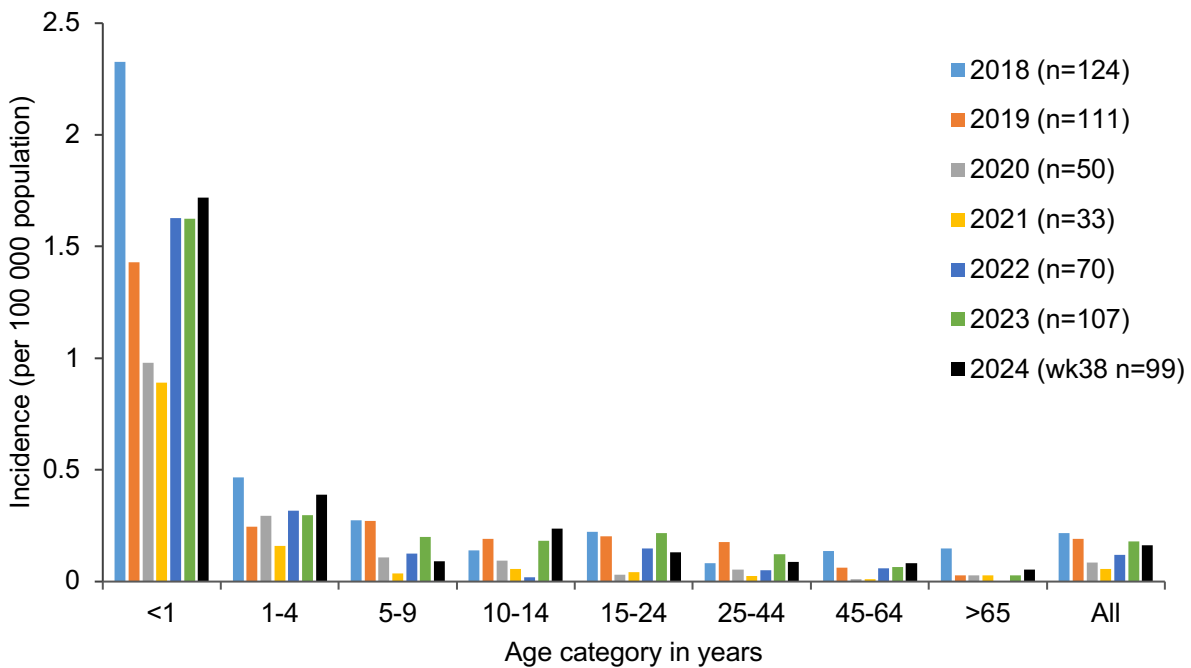


Figure 2. Incidence of laboratory-confirmed invasive meningococcal disease by age category and year, South Africa, 2018-2024*, as reported through the GERMS-SA surveillance programme.
*2024 data reported up until week 38.

IMD incidence varies geographically, with coastal provinces generally showing a higher incidence (Figure 3). IMD incidence in the Western Cape Province is higher than any other province (0.61 per 100 000 population in 2023) and was double that of any other province over the past few years. All provinces have shown the same upward trend in disease incidence since 2021, yet remain within the range of the early pre-COVID-19 years.

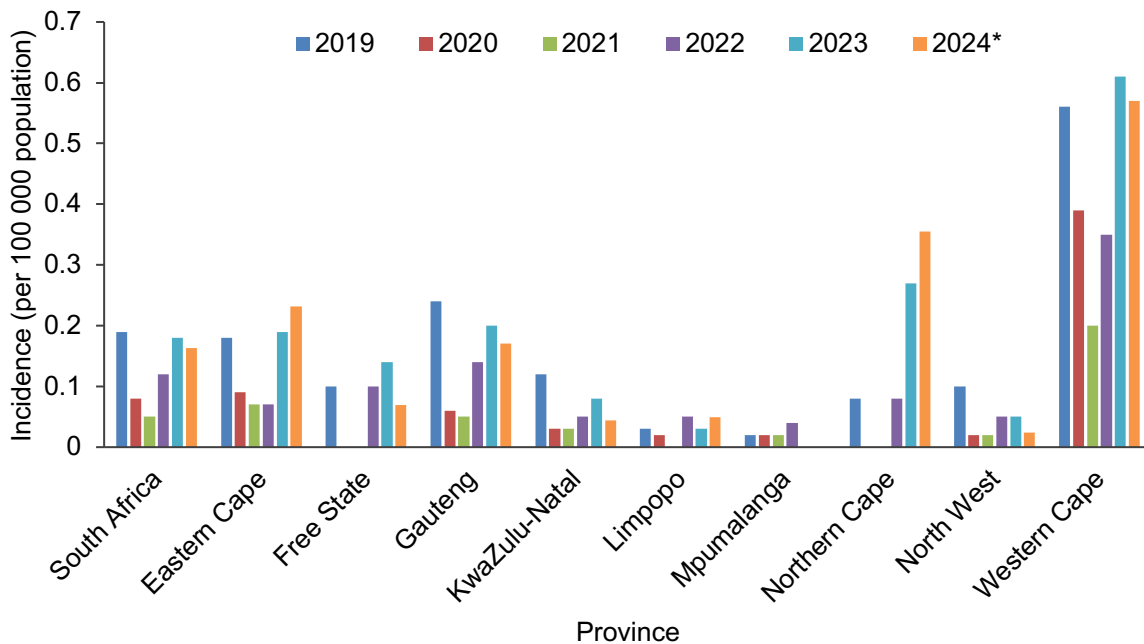


Figure 3. Incidence of laboratory-confirmed invasive meningococcal disease by province and year, South Africa, 2018-2024*, (n=470) as reported through the GERMS-SA surveillance programme.
*2024 data reported up until week 38.



The numbers of laboratory-confirmed IMD episodes reported through GERMS-SA were higher from January through May 2024 compared to 2023, but then declined for the months following June 2024, likely due to the failure of the automated systems for reporting laboratory-confirmed public sector episodes (Figure 4). To date, all episodes of meningococcal disease reported through GERMS-SA in 2024 have been sporadic episodes, with limited epidemiological links between patients and varied serogroups in those with available data.

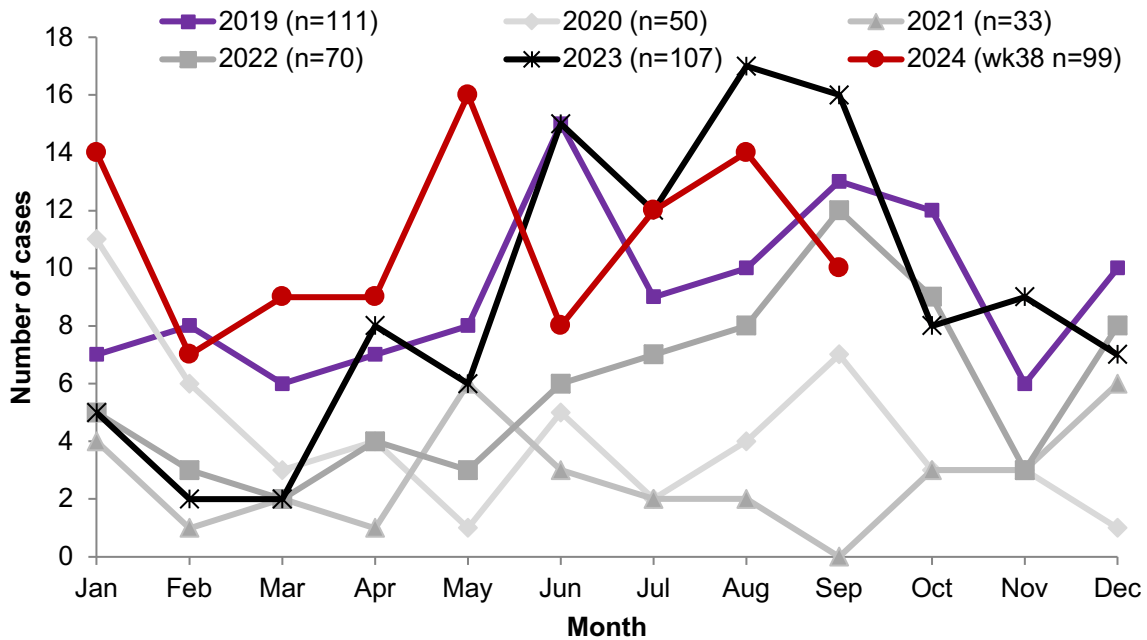


Figure 4. Number of laboratory-confirmed invasive meningococcal disease episodes reported through GERMS-SA by month, South Africa, 2019-2024* (n=470).

*2024 data reported up until week 38.

Discussion

Although meningococcal disease has increased over the last three years, until September 2024, this rise in cases is in keeping with the usual seasonality and expected historical trends. Serogroup B remains the dominant serogroup causing IMD, with no concerning increases in other serogroups detected over the last three years. The disease continues to occur in all age categories and in a similar distribution, with infants having the highest incidence of disease and a smaller peak occurring in young adults. The Western Cape Province experiences a higher incidence of meningococcal disease than the other provinces. However, the pattern of disease (seasonality, serogroups detected, and ages affected) matches that of the other well-populated provinces, such as Gauteng and the Eastern Cape.

The GERMS-SA surveillance programme has been systematically collecting IMD data for over 20 years, even during the COVID-19 pandemic, and is therefore well situated to report trends over time. However, GERMS-SA



only reports laboratory-confirmed episodes of meningococcal disease from sterile-site specimens such as blood, cerebrospinal fluid, joint fluid, etc. The true incidence of meningococcal disease occurring in South Africa is therefore likely underestimated, due to persons not having specimens taken to confirm disease or cultures being negative due to antibiotics being given prior to specimen collection.

Annual IMD incidence up until week 38 of 2024 is already equivalent to that of 2023 in its entirety, and we expect a few more episodes from this period to be reported through our audit processes. IMD case numbers from April through September 2024 are incomplete due to the non-functionality of the information technology system, as mentioned above.⁸ This incident affected the electronic reporting of IMD episodes from 21 June 2024 and has delayed the quarterly audit processes for the second and third quarters of 2024. These processes are used to ensure complete data capturing of the surveillance programme. However, our GERMS-SA laboratory-based surveillance episodes are continually verified against the national Notifiable Medical Conditions (NMC) system. NMC-reported cases have increased in 2024 compared to 2023. Up until week 38 of 2024, 151 episodes of meningococcal disease (54 clinically suspected and 97 laboratory-confirmed) had been reported through the NMC, whereas in 2023, 153 episodes (48 clinically suspected and 105 laboratory-confirmed) were reported for the entire calendar year.

Conclusion

Although South Africa has seen a year-on-year increase in IMD since 2021, IMD incidence falls within that of the years immediately pre-COVID-19, when IMD was considered to occur at low levels. However, IMD can cause epidemics and outbreaks, particularly when new virulent strains are introduced into a vulnerable population. Therefore, close monitoring and immediate reporting of all suspected episodes is essential at this time.

Recommendations

- IMD is a devastating illness with high mortality and morbidity. Clinicians should therefore suspect IMD in any patient with fever and general malaise with rapid deterioration of their condition, with or without a petechial rash. Blood or cerebrospinal fluid should be sent for culture, preferably prior to commencing antibiotics, although antibiotics should not be delayed while awaiting patient transfer or further investigation. All clinically suspected meningococcal episodes are to be reported to the NMC system within 24 hours, and chemoprophylaxis should be offered to close contacts of cases to prevent further episodes. Laboratory staff are urged to send all invasive meningococcal isolates to the NICD for serogrouping and further characterisation. Culture-negative specimens from suspected episodes can also be sent to NICD for molecular detection of meningococcus or other bacterial/viral pathogens.
- Whilst the meningococcal vaccine is not part of the routine infant immunisation programme, individuals at high risk of disease (i.e., those with asplenia, complement deficiency, and haematological malignancies) should be vaccinated with the quadrivalent conjugate vaccine targeting serogroups A, C, W, and Y. Other persons for whom the vaccine should be considered include young infants,



adolescents staying in hostel accommodations, mine workers, and laboratory workers in direct contact with meningococcal isolates.⁹

- It is essential for all suspected IMD episodes to be reported through the NMC programme and isolates sent to the GERMS-SA laboratory-based surveillance programme so that the pattern of disease can be closely monitored for any emerging serogroups or outbreak detection.

Funding

The GERMS-SA surveillance programme is funded by NICD/NHLS core funding.

Acknowledgements

GERMS-SA thanks private and public sector laboratory staff throughout South Africa for their ongoing participation in the surveillance programme.

Ethical considerations

Ethics approval for the surveillance programme has been granted by the Human Research Ethics Committee (Medical), University of Witwatersrand (clearance number M1809107).

Conflict of interest

SM has been an external expert for the GSK advisory board for an enquiry into the landscape for a MenB vaccine in South Africa. No remuneration received.

CC has received grants to the organisation from Sanofi Pasteur, US Centers for Disease Control and Prevention, the Taskforce for Global Health, the Bill and Melinda Gates Foundation, and Wellcome Trust not related to this work.

BB is supported by funding from the United States Agency for International Development (USAID), under award number 72067422F00001.

All other authors have no conflicts of interest to declare.



References

1. Meiring S, Cohen C, de Gouveia L, et al. Case-fatality and sequelae following acute bacterial meningitis in South Africa, 2016 through 2020. *Int J Infect Dis* 2022; **122**: 1056–66.
2. Bennett JE, Dolin R, Blaser MJ. Mandell, Douglas, and Bennett's Principles and Practice of Infectious Diseases. 2014 DOI:10.1016/s1473-3099(10)70089-x.
3. von Gottberg A, du Plessis M, Cohen C, et al. Emergence of endemic serogroup W135 meningococcal disease associated with a high mortality rate in South Africa. *Clin Infect Dis* 2008; **46**: 377–86.
4. Meiring S, Cohen C, De Gouveia L, et al. Declining Incidence of Invasive Meningococcal Disease in South Africa: 2003-2016. *Clin Infect Dis* 2019; **69**: 495–504.
5. Brueggemann AB, Jansen van Rensburg MJ, Shaw D, et al. Changes in the incidence of invasive disease due to *Streptococcus pneumoniae*, *Haemophilus influenzae*, and *Neisseria meningitidis* during the COVID-19 pandemic in 26 countries and territories in the Invasive Respiratory Infection Surveillance Initiative: *Lancet Digit Heal* 2021; **3**: e360–70.
6. Shaw D, Abad R, Amin-Chowdhury Z, et al. Trends in invasive bacterial diseases during the first 2 years of the COVID-19 pandemic: analyses of prospective surveillance data from 30 countries and territories in the IRIS Consortium. *Lancet Digit Heal* 2023; **5**: e582–93.
7. Quan V, Govender NP, Maluleka C, et al. GERMS-SA Annual Report 2022. Last accessed 24/10/2024 <https://www.nicd.ac.za/wp-content/uploads/2024/02/NICD-GERMS-Annual-Report-2022.pdf>
8. Mngadi Z, Arcangeli J, Britz R. National Health Laboratory Service hit by cyber attack. *South African Gov News Agency* 2024. Last accessed 24/10/2024 <https://www.sanews.gov.za/south-africa/national-health-laboratory-service-hit-cyber-attack>
9. Meiring S, Hussey G, Jeena P, Parker S, von Gottberg A. Recommendations for the use of meningococcal vaccines in South Africa. *South African J Infect Dis* 2017; **32**: 82–6.