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The prevalence of Neisseria gonorrhoeae in KwaZulu-Natal: A retrospective cross-sectional analysis of laboratory-confirmed cases.

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Abstract

Background:

Neisseria gonorrhoeae remains a public health challenge in South Africa. This challenge is exacerbated by antimicrobial resistance and under-reporting, especially among women and neonates. Surveillance targets adult populations. Neonatal infections are rarely documented. Reliance on syndromic treatment without laboratory confirmation leads to undetected infections and the spread of resistant strains. This results in adverse long-term health outcomes and increased healthcare costs. Laboratory data from the National Health Laboratory Service provides a complementary source for surveillance.

Aim:

To describe the demographic, temporal, and facility-level distribution of laboratory-confirmed *N. gonorrhoeae* cases in KwaZulu-Natal during 2024.

Methods:

A retrospective cross-sectional analysis of all laboratory-confirmed cases of *N. gonorrhoeae* diagnosed at public healthcare facilities in KZN between January 2024 and December 2024. Data included patient age, sex, specimen source, healthcare facility, diagnosis date, and temporal trends were summarised using descriptive statistics. GeneXpert® CT/NG assay was used for laboratory confirmation.

Results:

Twenty-two laboratory-confirmed cases were identified. The median patient age was 26 years. Interquartile Range: 4 days–47 years, with neonates (<10 days old) comprising 27% (n = 6) of cases. Males accounted for 55% (n = 12). McCord's Hospital reported the highest proportion (45%) (n = 10) of cases, followed by Addington Hospital (18%) (n = 4). A temporal cluster occurred in July 2024, affecting 27% (n = 6) of cases. Most specimens were pus samples (81%; n = 18).

Conclusions:

The high proportion of neonatal cases indicates failures in antenatal screening and prevention of mother-to-child transmission, leading to ophthalmia neonatorum. Facility clustering suggests unequal diagnostic capacity across KZN. Reliance on syndromic management may mask the true burden and economic impact of the disease.

Recommendations:

Strategic integration of laboratory-confirmed data can complement syndromic approaches, improve surveillance strategies, and inform targeted public health interventions.

Keywords: *Neisseria gonorrhoeae, gonorrhoea, sexually transmitted infections, surveillance, neonatal infection, National Health Laboratory Services, antimicrobial resistance, KwaZulu-Natal, South Africa.*
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Introduction

Neisseria gonorrhoeae (*N. gonorrhoea)* is a major global public health concern, with over 82 million new infections reported annually (World Health Organisation, 2024). The burden is disproportionately concentrated in low- and middle-income countries, where limited diagnostic infrastructure and resource constraints complicate effective surveillance and control efforts. In South Africa, gonorrhoea ranks among the highly prevalent, sexually transmitted infections (STIs), with an estimated burden exceeding six million STI cases each year (Harryparsad et al., 2023). The STI disease burden is further complicated by the rapid emergence and spread of antimicrobial resistance (AMR), which threatens the effectiveness of available treatment options and raises concerns about future therapeutic strategies (Mitchev *et al.*, 2021).

In South Africa, gonorrhoea is predominantly managed through syndromic approaches, where patients presenting with recognised symptoms receive treatment without laboratory confirmation of the causative pathogen (Kularatne *et al.*, 2018). While this approach is pragmatic in resource-limited settings, it includes immediate treatment, reduces loss to follow-up sessions, and eliminates laboratory testing delays; it also has its limitations. Syndromic management frequently results in missed diagnoses, especially among asymptomatic individuals and those with atypical presentations. It also contributes to over-treatment and inappropriate use of antibiotics, all of which accelerate the development and transmission of antimicrobial-resistant strains (Lewis *et al.*, 2013). Reduced susceptibility to ceftriaxone, azithromycin, and ciprofloxacin has been documented, raising concerns about treatment efficacy and future therapeutic options (Lewis et al., 2013).

Beyond the clinical impact, the management of STIs, including gonorrhoea, places a considerable economic burden on South Africa's public health system (Lekodeba et al., 2025). With over six million STI cases reported annually, costs are absorbed through primary care services, laboratory diagnostics, and the treatment of complications such as infertility, pelvic inflammatory disease, and adverse pregnancy outcomes (Kufa et al., 2025). Syndromic management, while cost-effective in the short term, may lead to recurrent infections and long-term sequelae that escalate healthcare spending. Indirect costs, including lost productivity and psychosocial stress, further exacerbate the burden, particularly among women and young individuals (Peters, 2023).

Surveillance efforts in South Africa have largely focused on adult populations and AMR monitoring through sentinel sites, while neonatal and paediatric infections remain under-reported (Mitchev et al., 2021). Neonatal gonorrhoea, typically presenting as ophthalmia neonatorum, is infrequently documented despite its serious implications for permanent visual impairment and systemic disease, yet it is seldom reported (Wi et al., 2019; Medina-Marino et al., 2022). This surveillance gap is particularly concerning given that neonatal infection represents a preventable consequence of inadequate antenatal screening and prophylaxis.

The National Health Laboratory Service (NHLS) provides comprehensive laboratory diagnostic services to over 80% of South Africa's population through its network serving public healthcare facilities. Routine laboratory data generated through NHLS operations represent a potentially valuable but underutilised resource for STI surveillance. Unlike syndromic data, laboratory-confirmed cases provide definitive diagnoses, enable specimen-specific analysis, and facilitate detection of unusual epidemiological patterns that may signal outbreaks or programmatic gaps.

This study presents a retrospective analysis of laboratory-confirmed *N. gonorrhoeae* cases in the KZN province for 2024, exploring the age distribution, hospital clustering, temporal trends, and assessing the utility of NHLS data in identifying surveillance gaps, particularly among neonates, and highlighting opportunities for strengthening STI control efforts.

Methodology

Study Design

A retrospective cross-sectional design was employed, and descriptive analysis was conducted using routinely collected laboratory surveillance data from the NHLS Academic Affairs Research Management System (AARMS). The study examined all laboratory-confirmed cases of *N. gonorrhoeae* infection diagnosed at public healthcare facilities in the KwaZulu-Natal (KZN) province between January 1, 2024, and December 31, 2024.

Study Setting

The study was conducted between January 1, 2024, and December 31, 2024, in KwaZulu-Natal (KZN), the second-most populous province in South Africa, with an estimated

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Original Article

population of approximately 12.2 million residents (19.4%) of the SA population (Inside the Numbers: SA Population Trends for 2025 | Statistics South Africa). The province has one of the highest burdens of HIV and STIs in the country (South African National HIV Prevalence, Incidence and Behaviour Survey, 2012). The review and analysis of laboratory data were carried out between July 3, 2025, and September 15, 2025, using records extracted from the NHLS, which provides laboratory diagnostic services to over 80% of the South African population through public healthcare facilities.
The review

Study population and sampling

The study included all laboratory-confirmed cases of *N. gonorrhoea* infection across all age groups diagnosed in the KZN province during the study period (January 1, 2024 - December 31, 2024). A total of 22 cases were identified and analysed. A census sampling technique was employed, whereby all cases meeting the inclusion criteria were included in the study.

Inclusion and exclusion criteria

All laboratory-confirmed *Neisseria gonorrhoeae* diagnosed cases detected by GeneXpert® CT/NG assay at NHLS-serviced public healthcare facilities in KZN, January 1, 2024, and December 31, 2024, regardless of age, sex, or specimen source. Cases without laboratory confirmation, for example, those that were syndromically managed without diagnostic testing, and duplicate entries were excluded from the study.

Laboratory Methods

All specimens were tested using the GeneXpert® CT/NG assay (Cepheid, Sunnyvale, CA, USA), a nucleic acid amplification test (NAAT) based on real-time polymerase chain reaction (PCR) technology. This assay provides simultaneous detection of *Chlamydia trachomatis* and *N. gonorrhoeae* with high sensitivity (>97%) and specificity (>99%) (Gaydos *et al.*, 2013). The test targets multiple genomic sequences and provides qualitative detection of bacterial DNA.

Data Collection

Data were extracted from the NHLS-AARMS database following approval (permission number PR2559191). Variables collected included: patient age (in years or days for neonates), biological sex, anatomical specimen source (e.g., urogenital swabs, pus, conjunctival swabs), healthcare facility of diagnosis, district location, and date of laboratory confirmation. Data were de-identified before extraction to ensure patient confidentiality.

Variable Definitions

Neonatal cases were defined as infections in infants aged ≤10 days, consistent with definitions of early neonatal infection (WHO and UNICEF, 2018). Temporal clusters were identified through visual inspection of monthly case distributions. Facility clustering was assessed by calculating the proportion of cases attributable to each healthcare institution.

Statistical Analysis

Data from NHLS were received in an Excel spreadsheet, and Microsoft Excel was used to perform descriptive statistics. Continuous variables (e.g., age) were summarised using medians and interquartile ranges (IQR). Categorical variables (e.g., sex, facility, specimen type) were expressed as frequencies and percentages. Temporal and facility-level trends were examined visually.

Ethical considerations

Ethical approval was obtained from the Mangosuthu University of Technology Institutional Research Ethics Committee (REF: RD 5/43/2025) on 03 July 2025. Permission to access and use the anonymised routine surveillance data was obtained from the NHLS (Permission Number: PR2559191). Patient confidentiality was maintained throughout as no personal identifiers were used in the analysis.

Results

A total of 22 laboratory-confirmed cases of *N. gonorrhoeae* were identified in KZN in 2024. The demographic and clinical characteristics are summarised in Table 1. The median age of patients was 26 years, with a wide interquartile range from 4 days to 47 years, indicating a bimodal age distribution. A significant proportion of cases (27.3%, n = 6) involved neonates aged less than 10 days. Males accounted for 54.5% (n = 12) of the cases.

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Table 1: Demographic and Clinical Characteristics of Laboratory-Confirmed N. gonorrhoeae Cases (N=22)

Characteristic	Category	Frequency (n)	Percentage (%)
Age Group	Neonate (<10 days)	6	27.3
	Paediatric (10 days - 17 yrs)	2	9.1
	Adult (≥18 yrs)	14	63.6
Sex	Male	12	54.5
	Female	10	45.5
Specimen Source	Pus	18	81.8
	Urogenital Swab	3	13.6
	Other	1	4.5

Age and Sex Distribution

Adults aged 18 years and older comprised most cases at 63.6% (n=14), consistent with the expected epidemiology of sexually transmitted infections. However, neonatal cases aged 10 days or less represented an unexpectedly high proportion, at 27.3% (n = 6), of the total. An additional two cases (9.1%) occurred in paediatric patients aged between 10 days and 18 years. The median age among adult cases only was 30 years (IQR: 24-42 years). Males accounted for 54.5% (n=12) of all confirmed cases, while females represented 45.5% (n=10). Among neonatal cases specifically, the sex distribution was equal, with three males and three females. Among adult and paediatric cases combined (n = 16), males comprised 56.3% (n = 9) and females 43.8% (n = 7).

Facility-Level Distribution

Cases were reported from seven different public healthcare facilities across KZN (Figure 1). The distribution was markedly uneven, with McCord's Hospital accounting for the largest proportion at 45.5% (n=10) of all cases. Addington Hospital reported the second-highest number of cases at 18.2% (n, at 45.5% (n = 104). The remaining five facilities each contributed between 4.5% (n=1) and 9.1% (n=2) of total cases: King Edward VIII Hospital (9.1%, n=2), Mahatma Gandhi Memorial Hospital (9.1%, n=2), Edendale Hospital (4.5%, n=1), Ngwelezane Hospital (4.5%, n=1), and Prince Mshiyeni Memorial Hospital (4.5%, n=1). The concentration of cases at McCord's Hospital was particularly notable, representing nearly half of all laboratory-confirmed infections in the province during the study period. This pattern likely reflects institutional factors, including diagnostic capacity, testing practices, and clinician awareness, rather than true geographic clustering of disease burden.

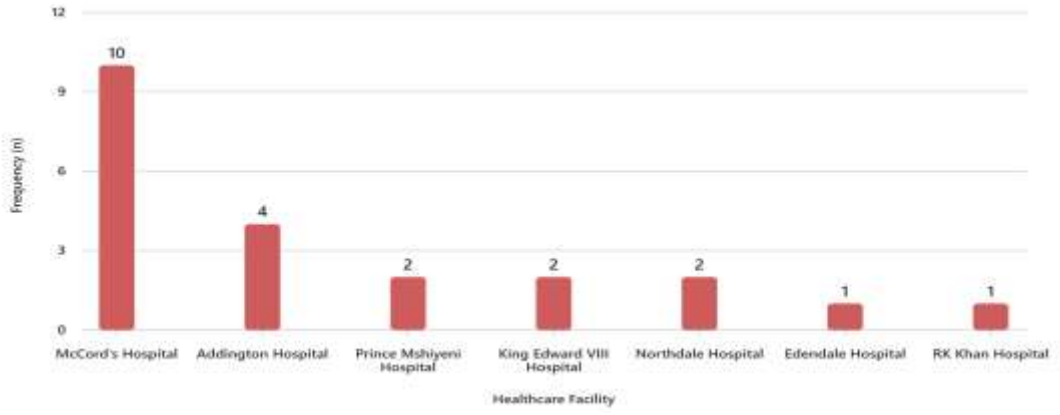

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Figure 1: Facility-Level Distribution of Laboratory-Confirmed Cases (N=22)

Temporal Distribution

Confirmed cases were distributed across eight months of the study period. A notable temporal cluster was observed in July 2024, during which six cases were confirmed, accounting for 27.3% (n = 6) of all cases for the year, as seen in Figure 2. The cluster occurred at McCord's Hospital (n = 4) and Addington (n = 2). The cause of the cluster is unclear; it may reflect an increase in testing, a localised outbreak, or batch processing of specimens.

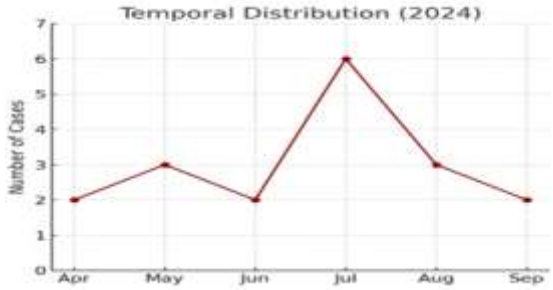

Figure 2: Temporal distribution of cases

Specimen Sources

Pus specimens predominated, accounting for 81.8% (n=18) of all samples tested. Other specimen sources included vaginal swabs (9.1%, n=2), urethral swabs (4.5%, n=1), and conjunctival swabs (4.5%, n=1). The distribution is presented in Figure 3.

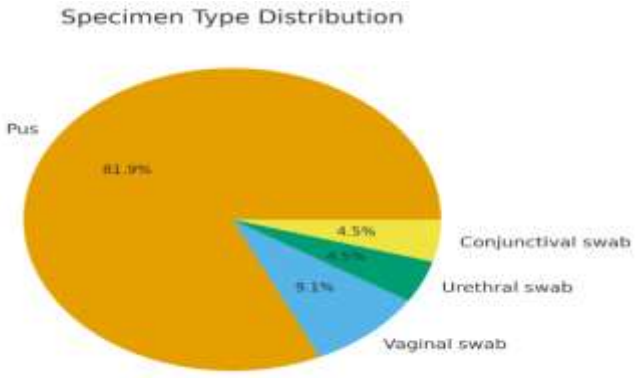

Figure 3: Specimen sources used for analysis

Discussion

The study aimed to determine the prevalence of *Neisseria gonorrhoea* in KZN for the year 2024. The results provided insights into the epidemiological distribution of this STI and revealed gaps in surveillance and control strategies. Despite the small sample size, three key findings emerged from this study. There was a high proportion of neonatal infections, marked facility-level clustering of cases, and temporal variation in case detection. These findings highlight the limitations of syndromic management as the sole approach to STI control and the potential value of integrating routine laboratory data into surveillance systems.

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Neonatal Infections

Over a quarter of cases occurred in neonates, which is particularly noteworthy and represents a deviation from expected epidemiological patterns. Neonatal gonococcal infection, typically manifesting as ophthalmia neonatorum, is considered a preventable condition in settings with adequate antenatal screening and prophylaxis protocols.

The presence of six confirmed cases suggests missed opportunities in antenatal STI screening and prophylaxis, pointing to gaps in maternal health service delivery. This finding aligns with the study conducted by Nyemba and colleagues, who reported associations between untreated maternal STIs and adverse neonatal outcomes. (Nyemba *et al.*, 2022).

The finding raises more concerns by providing evidence of vertical transmission that reached clinical detection. Given that South Africa's Prevention of Mother-to-Child Transmission (PMTCT) programme has achieved considerable success in HIV prevention, the apparent gaps in gonococcal screening represent a missed opportunity for programmatic integration. This may be due to factors such as the fact that antenatal screening protocols in South Africa do not routinely include testing for Neisseria gonorrhoea in asymptomatic pregnant women; instead, it relies on syndromic management when symptoms are reported. Secondly, even when there is suspected infection during pregnancy, the absence of test-of-cure protocols means persistent or reinfected cases may go undetected until neonatal manifestations occur. Thirdly, although ocular prophylaxis for neonates is widely recommended as a standard policy, its effectiveness may be undermined by inconsistent implementation and the rising prevalence of antibiotic-resistant strains.

The implications of these neonatal cases extend well beyond their immediate clinical management. Ophthalmia neonatorum, when inadequately treated, can lead to irreversible visual impairment, making it a preventable yet significant contributor to childhood blindness. Moreover, neonatal infections serve as sentinel indicators of a broader, undiagnosed burden of maternal sexually transmitted infections. This hidden prevalence poses significant reproductive health risks, including pelvic inflammatory disease, ectopic pregnancy, and infertility, which carry long-term social and economic implications. From a public health perspective, these findings underscore the need for strengthened antenatal screening programs, improved adherence to prophylactic protocols, and surveillance systems capable of detecting trends in antimicrobial resistance. Future research should focus on evaluating the effectiveness of current prophylactic strategies in the context of rising antibiotic resistance and exploring integrated interventions that address both maternal and neonatal outcomes.

Facility-level disparities in diagnostic capacity

Nearly half of all cases were reported from McCord's Hospital, and this raises questions regarding equity in diagnostic access and surveillance capacity across KZN health facilities. The clustering likely represents differential diagnostic capacity rather than the actual epidemiological concentration. This suggests that the actual gonorrhoea burden is underestimated in facilities with limited laboratory infrastructure.

This interpretation aligns with the findings of Jacobs et al. (2019), who reported marked heterogeneity in bacteriological diagnostic capacity across district hospitals in sub-Saharan Africa, with significant implications for clinical management and the containment of antimicrobial resistance. (Jacobs *et al.*, 2019). Similarly, Mfuh et al. (2023) highlighted that inadequate diagnostic infrastructure remains a significant barrier to the effective implementation of public health interventions across the continent. (Jacobs *et al.*, 2019; Mfuh, Abanda and Titanji, 2023). In South Africa, although the NHLS provides extensive coverage, the deployment and utilisation of molecular diagnostic platforms such as GeneXpert vary considerably between facilities. These disparities are influenced by factors including equipment availability, technical expertise, clinician awareness, and specimen transport logistics.

The predominance of McCord's Hospital in our dataset may also reflect institutional factors such as heightened clinical suspicion leading to frequent diagnostic testing, better specimen handling protocols, or established relationships between clinical and laboratory staff that facilitate appropriate test ordering. Conversely, facilities with fewer cases may be managing equivalent or higher burdens of infection through syndromic treatment alone, which can contribute to both underdiagnosis and the potential amplification of antimicrobial resistance.

These differences have programmatic implications. Implementing standardised protocols that clearly define indications for laboratory confirmation, alongside equitable

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Original Article

allocation of diagnostic resources, would enhance surveillance sensitivity and yield more representative epidemiological data. Furthermore, identifying facilities with apparent diagnostic gaps provides an opportunity for targeted capacity-building interventions, including training, infrastructure support, and improved specimen transport systems. Such measures are critical for strengthening diagnostic equity and informing evidence-based antimicrobial stewardship strategies.

Temporal Clustering and Surveillance Implications

A temporal cluster was observed in July 2024, accounting for 27,3% of all cases, which warrants consideration of potential explanations. This may reflect a localised outbreak event that might be linked to social or behavioural factors during that period. Alternatively, it may reflect diagnostic or operational artefacts, such as increased clinical awareness, temporary changes in specimen collection practices, or batch processing of samples that artificially inflated case detection within a single month.

The lack of genomic sequencing data limits our ability to characterise this cluster. Whole-genome sequencing would clarify whether these cases involved transmission of genetically related strains, supporting an outbreak hypothesis, or were coincidental sporadic infections. Moreover, antimicrobial susceptibility data, which were not available for this analysis, would provide critical information about potential selection and transmission of resistant strains.

Specimen sources and clinical presentation

The predominance of pus swabs (81,8%) in the dataset reflects both the severity of clinical presentations prompting laboratory investigation and institutional testing practices. Pus samples originate from overt infections such as urethral discharge, cervical discharge, or neonatal conjunctivitis. In contrast, the limited number of urogenital swabs from asymptomatic individuals or those with mild symptoms is indicative of the fact that laboratory confirmation is commonly reserved for clinically apparent cases, consistent with the syndromic management approach.

This observation has implications for understanding the true extent of the infection burden. Asymptomatic and minimally symptomatic infections, which comprise a substantial proportion of gonococcal cases, particularly in women, are unlikely to undergo laboratory confirmation under current practices. Consequently, laboratory-based surveillance is subject to ascertainment bias, underrepresenting the prevalence of infection. Addressing this gap requires the strategic implementation of targeted screening programs in high-risk populations to complement syndromic management and improve the accuracy of epidemiological data.

Generalizability of the study findings

The small sample size (n = 22) limits statistical power and the generalizability of the findings. The current study represents only laboratory-confirmed cases, which reflects a small fraction of the true disease burden in KZN. The reliance on laboratory-confirmed cases alone excludes a vast majority of infections managed syndromically without laboratory testing, which is a predominant approach in South African public health facilities.

The marked concentration of cases in facilities such as McCord's and Addington hospitals may likely reflect the diagnostic capacity, testing practices, and institutional protocols rather than the true geographic or facility-specific disease prevalence. Facilities with limited access to GeneXpert® technology would be underrepresented in this dataset. The high proportion of neonatal cases may be more generalizable to similar tertiary hospital settings than to primary healthcare facilities or district hospitals. Data from a single calendar year (2024) limits the ability to identify long-term trends, seasonal patterns, or year-to-year variation in disease burden. The temporal cluster observed in July 2024, while noteworthy, cannot be contextualized within multi-year surveillance data.

Conclusion

This retrospective analysis, despite its limitations, provides a valuable snapshot of diagnosed gonorrhoea in KZN and serves as proof of concept for the utility of routine laboratory data in STI control programmes. The unexpectedly high proportion of neonatal infections indicates systematic failures in antenatal screening and PMTCT transmission. Marked facility clustering, with nearly half of all cases reported from a single institution, suggests substantial disparities in diagnostic access and testing practices across the province. These findings highlight the limitations of relying exclusively on syndromic management and underscore the complementary value of strategic laboratory confirmation.

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Original Article

In conclusion, moving beyond syndromic management to a more integrated approach that includes strategic laboratory confirmation is essential for accurately defining the burden of gonorrhoea, protecting the most vulnerable, such as neonates, and mitigating the growing threat of antimicrobial resistance in South Africa.

Limitations

Several limitations must be considered when interpreting these results. The reliance on laboratory-confirmed cases alone likely underestimates the true burden due to syndromic management and diagnostic gaps, as most cases are managed syndromically without undergoing laboratory investigation. (Kularatne *et al.*, 2018).

The lack of associated clinical, behavioural, and AMR data restricts a deeper understanding of transmission dynamics, risk factors, and the potential for resistant strains to spread. (Jacobs *et al.*, 2019). The researchers could not assess HIV co-infection status, previous STI history, sexual behaviour patterns, or treatment outcomes. The absence of maternal data for the neonatal cases also limits the ability to identify the specific breakdown in the PMTCT cascade.

Furthermore, the reliance on routinely collected surveillance data means that the study cannot account for variability in testing practices, clinician decision-making, and facility-level protocols likely influenced which patients underwent laboratory confirmation. These result in the introduction of selection bias, which limits the ability to make causal inferences.

Recommendations

Routine *Neisseria gonorrhoeae* screening should be integrated into antenatal care protocols to prevent mother-to-child transmission and reduce the incidence of neonatal infections. Diagnostic capacity must be standardized across healthcare facilities by ensuring equitable access to molecular platforms such as GeneXpert and strengthening specimen transport systems. Real-time laboratory-based surveillance using NHLS data is essential for detecting temporal clusters and guiding rapid public health responses. Test-of-cure protocols for pregnant women treated for STIs should be implemented to prevent persistent or recurrent infections. Linking laboratory-confirmed cases with antimicrobial resistance profiling and genomic sequencing will enable monitoring of resistance trends and inform treatment guidelines. Finally, targeted capacity-building initiatives, including healthcare worker training on STI diagnostic protocols and adherence to neonatal prophylaxis measures, will enhance programmatic effectiveness and reduce the burden of gonorrhoea in KwaZulu-Natal.

Implications for Healthcare Systems

These findings have several implications for strengthening STI control in South Africa. Routine integration of *N gonorrhoea* screening into antenatal care protocols must be considered. Molecular testing platforms that are already in place in most facilities could be leveraged for STIs without additional expenditure on infrastructure. Standardising diagnostic capacity across facilities and strengthening real-time surveillance to detect outbreaks and guide interventions will enhance early detection, improve resource allocation, and enable timely, evidence-based public health responses.

The economic implications of syndromic management appear to be cost-effective; however, the downstream costs of untreated maternal infections, neonatal complications, infertility, and the amplification of antimicrobial resistance may ultimately exceed the investment required for strategic laboratory confirmation. Lekodeba and colleagues (2025) have begun to address these questions through cost-effectiveness modelling of point-of-care testing; their work should inform policy decisions. Linkage of laboratory data with clinical outcomes and antimicrobial resistance profiles would provide the comprehensive surveillance needed to guide evidence-based interventions.

Future research directions

This study demonstrates the value of integrating NHLS laboratory data into routine STI surveillance. Key system-level recommendations include enhancing antenatal STI screening and neonatal prophylaxis protocols. Standardising diagnostic capacity across facilities and strengthening real-time surveillance to detect outbreaks and guide interventions.

Based on these findings, the following points are proposed: Enhanced Maternal and Neonatal Health Integration: Pilot studies are needed to evaluate the feasibility and impact of integrating routine antenatal screening for *N. gonorrhoeae* (e.g., via NAAT testing of urine samples) into existing PMTCT programmes. Simultaneously, audits of neonatal prophylaxis compliance should be conducted. Strengthened Laboratory Surveillance: The NHLS data system should be leveraged to develop a near-real-time, automated STI surveillance dashboard that flags unusual

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case clusters (temporal, geographic, or demographic) for rapid response. Standardised Diagnostic Protocols: Guidelines should be revised to mandate laboratory confirmation for specific syndromes, such as all cases of ophthalmia neonatorum and persistent or recurrent urethritis/vaginitis, to improve case detection and AMR monitoring. Expanded Research**:** Future studies should link laboratory data with clinical records to gather data on symptoms, treatment outcomes, and maternal information. Furthermore, all gonococcal isolates should be subjected to antimicrobial susceptibility testing to monitor AMR trends in the province.

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Conflict of interest
The author declares no conflict of interest.

Data Availability Statement
The data analysed in this study were obtained from the National Health Laboratory Service Academic Affairs Research Management System under permission number PR2559191. Due to patient privacy and confidentiality requirements, the raw data cannot be made publicly available.

Author Biography
Nonhlanhla Phumzile Ngobese is a registered Bachelor of Health Science student in Medical Laboratory Science at Mangosuthu University of Technology, majoring in Clinical Pathology. She is a committed and driven scholar whose academic excellence was recognised when she received the award for Best Presentation during the *Laboratory Practice I* student symposium for their work titled *"Breast Cancer."* Khethiwe Nomcebo Bhengu is a Medical Laboratory Scientist and Lecturer in Clinical Pathology at Mangosuthu University of Technology, and a Scientist affiliated with the University of KwaZulu-Natal. Before her academic appointment, she served as Laboratory Manager for the Biomedical Science Department's training laboratory, which received accreditation from the Health Professions Council of South Africa (HPCSA) for its training programs. Her research focuses on infectious diseases, immunology, sexually transmitted infections, and non-communicable diseases, with a commitment to advancing diagnostic science and improving health outcomes in resource-limited settings. ORCID: https://orcid.org/0000-0003-2393-3519

Author Contributions
N.P.N. was responsible for data collection, cleaning, and analysis, and drafted the initial version of the manuscript. K.N.B. conceptualised the study and provided supervision throughout all stages of the research. K.N.B. critically reviewed the manuscript and offered mentorship and guidance to the research team.

List of Abbreviations
AARMS: Academic Affairs Research Management System
AMR: Antimicrobial Resistance
CT/NG: Chlamydia trachomatis / Neisseria gonorrhoeae
GERMS-SA: Group for Enteric, Respiratory, and Meningeal disease Surveillance in South Africa
HIV: Human Immunodeficiency Virus
IQR: Interquartile Range
KZN: KwaZulu-Natal
NAAT: Nucleic Acid Amplification Test
NHLS: National Health Laboratory Service
PCR: Polymerase Chain Reaction
PMTCT: Prevention of Mother-to-Child Transmission
SA: South Africa
STI: Sexually Transmitted Infection
WHO: World Health Organization

References
1. Gaydos, C.A. et al. (2013) "Performance of the Cepheid CT/NG Xpert rapid PCR test for detection of *Chlamydia trachomatis* and *Neisseria gonorrhoeae*," *Journal of Clinical Microbiology*, 51(6), pp. 1666–1672. Available at: https://doi.org/10.1128/JCM.03461-12;W.
2. Harryparsad, R. *et al.* (2023) "Prevalence and incidence of sexually transmitted infections among South African women initiating injectable

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Original Article

and long-acting contraceptives," *PloS one*, 18(11). Available at: https://doi.org/10.1371/JOURNAL.PONE.0294285.

3. *Inside the Numbers: SA Population Trends for 2025 | Statistics South Africa* (no date). Available at: https://www.statssa.gov.za/?p=18613 (Accessed: November 6, 2025).
4. Jacobs, J. *et al.* (2019) "Diagnostic Bacteriology in District Hospitals in Sub-Saharan Africa: At the Forefront of the Containment of Antimicrobial Resistance," *Frontiers in Medicine*, 6, p. 459158. Available at: https://doi.org/10.3389/FMED.2019.00205/FULL.
5. Kufa, T. *et al.* (2025) "Microbiological sentinel surveillance of sexually transmitted infection syndromes in South Africa, 2021-2024 Public Health Bulletin South Africa 2."
6. Kularatne, Ranmini S *et al.* (2018) "Adult gonorrhoea, chlamydia and syphilis prevalence, incidence, treatment and syndromic case reporting in South Africa: Estimates using the Spectrum-STI model, 1990-2017," *PLoS ONE*, 13(10), p. 205863. Available at: https://doi.org/10.1371/journal.pone.0205863.
7. Lekodeba, N. *et al.* (2025) "Cost, cost-effectiveness and budget impact analysis of near point-of-care GeneXpert testing for STIs in South Africa: leveraging current capacity to address high prevalence of Chlamydia trachomatis, Neisseria gonorrhoeae and Trichomonas vaginalis," *medRxiv*, p. 2024.12.13.24319006. Available at: https://doi.org/10.1101/2024.12.13.24319006.
8. Lewis, D.A. *et al.* (2013) "Phenotypic and genetic characterisation of the first two cases of extended-spectrum-cephalosporin-resistant *Neisseria gonorrhoeae* infection in South Africa and association with cefixime treatment failure," *Journal of Antimicrobial Chemotherapy*, 68(6), pp. 1267–1270. Available at: https://doi.org/10.1093/jac/dkt034.
9. Medina-Marino, A. *et al.* (2022) "Sexually transmitted infection screening to prevent adverse birth and newborn outcomes: study protocol for a randomized-controlled hybrid-effectiveness trial," *Trials*, 23(1). Available at: https://doi.org/10.1186/S13063-022-06400-Y.
10. Mfuh, K.O., Abanda, N.N., and Titanji, B.K. (2023) "Strengthening diagnostic capacity in Africa as a key pillar of public health and pandemic preparedness," *PLOS Global Public Health*, 3(6), p. e0001998. Available at: https://doi.org/10.1371/JOURNAL.PGPH.0001998.
11. Mitchev, N. *et al.* (2021) "Antimicrobial Resistance Mechanisms, Multilocus Sequence Typing, and NG-STAR Sequence Types of Diverse Neisseria gonorrhoeae Isolates in KwaZulu-Natal, South Africa," *Antimicrobial Agents and Chemotherapy*, 65(10), pp. e00759-21. Available at: https://doi.org/10.1128/AAC.00759-21.
12. Nyemba, D.C. *et al.* (2022) "Impact of aetiological screening of sexually transmitted infections during pregnancy on pregnancy outcomes in South Africa," *BMC Pregnancy and Childbirth 2022 22:1*, 22(1), pp. 1–11. Available at: https://doi.org/10.1186/S12884-022-04520-6.
13. Peters, R. (2023) "Towards STI control in South Africa."
14. *South African National HIV Prevalence, Incidence and Behaviour Survey, 2012* (no date). Available at: https://repository.hsrc.ac.za/handle/20.500.11910/2490 (Accessed: November 6, 2025).
15. WHO and UNICEF (2018) "Reaching Every Newborn National 2020 Milestones," (March 2018), p. 110. Available at: https://www.healthynewbornnetwork.org/hnn-content/uploads/Final-Country-Progress-Report-v9-low-res.pdf (Accessed: November 6, 2025).
16. Wi, T.E.C. *et al.* (2019) "Diagnosing sexually transmitted infections in resource-constrained settings: challenges and ways forward," *Journal of the International AIDS Society*, 22 (Suppl 6). Available at: https://doi.org/10.1002/JIA2.25343.
17. World Health Organisation (2024) *Gonorrhoea (Neisseria gonorrhoeae infection)*. Available at: https://www.who.int/news-room/fact-sheets/detail/gonorrhoea-(neisseria-gonorrhoeae-infection) (Accessed: June 1, 2025).

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