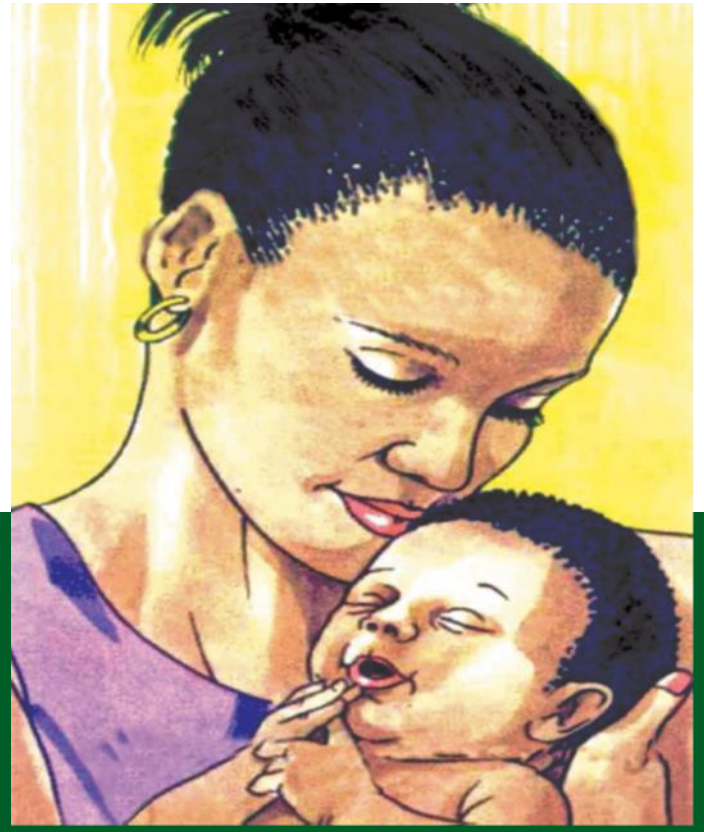

# Maternal Infections: Screening & Safety Across Pregnancy

17 September 2025

NDOH -Patient Safety Day Commemoration

# Maternal Infections: Screening & Safety Across Pregnancy

## NDOH – Patient Safety Day Commemoration

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# Overview

- Understanding Maternal sepsis
- SDG targets
- Impact of maternal sepsis
- Screening: status quo,  challenges,
- Call to action/ Recommendations
- Conclusion

**Define maternal sepsis, examine SDG targets, review the impact of maternal sepsis, screening: status quo,  challenges, and recommendations**

# Purpose of the presentation

- Raise Awareness
- Promote Early Screening
- Strengthen Patient Safety.
- Support Policy & Practice
- Empower Healthcare Workers

# What is Maternal sepsis?

- The previous communication, including research, guidelines & reports like SM and SB reports, consistently use the term “pregnancy-related sepsis” (PRS) to include the deaths that are caused by infections in the genital tract or in tissues involved in the birth process in viable pregnancies.
- In an attempt to standardise maternal sepsis definition, in line with the new Sepsis-3 definition for the general population, the WHO defines maternal sepsis as the

**“life-threatening organ dysfunction resulting from infection during pregnancy, childbirth, post-abortion, or postpartum”.**

- Non-pregnancy-related infections (NPRI) and septic miscarriage are part of this WHO new definition

# Question?

What’s the impact of maternal sepsis on the mother and her baby?

And

Why does it matter?

# Why This Matters

"Patient safety is a right. Infections are preventable, yet they remain a leading cause of maternal and neonatal harm as reflected in our SM and SB reports."

**Global commitment**: SDG 3.1 & 3.2:

| | |
|---|---|
| SDG target 3.1: T**o reduce the global maternal mortality ratio to less than 70 per 100,000 live births by 2030**. | SDG target 3.2 aims **to end preventable deaths of newborns and children under five years of age by 2030**.<br>• Specifically, by 2030, all countries are aiming to reduce the **neonatal mortality rate to at least 12 per 1,000 live births** and the **under-five mortality rate to at least 25 per 1,000 live births**. |

# In SA

- **Sepsis and severe infections remain a major cause of neonatal death**, particularly in hospital settings.
- According to the National Neonatal Sepsis Task Force, **bacterial infections directly account for approximately 13.1% of neonatal deaths among babies weighing more than 1 kg**.

- Total neonatal deaths from sepsis between 2020 and 2022 are not publicly consolidated;

However, several key insights emerge:

✓ Most neonatal sepsis cases are **hospital-acquired**, often due to **antimicrobial-resistant pathogens**.

✓ **Late-onset sepsis** is far more common than early-onset, accounting for **86.8% of cases** in one tertiary hospital study in Durban.

✓ Common pathogens include **coagulase-negative staphylococci**, **Klebsiella pneumoniae**, and **Acinetobacter baumannii**, many of which show resistance to first-line antibiotics.

# Causes of Maternal deaths for 2020, 2021,2022, and 2023

| Primary obstetric problem | Number MDs (%) 2020 N= 1197 | Number MDs (%) (2021) N=1489 | Number MDs (%) (2022) N=969 | Number MDs (%) 2023 N= 902 | Number MDs (%) (2020-2023) N=4557 |
|---|---|---|---|---|---|
| Medical and surgical disorders | **183 (15.3)** | **190 (12.8)** | **(140 (14.4)** | **152** | **665 (14.6)** |
| Non-pregnancy-related infections* | **322 (27)** | **561 (37.7)** | **180 (18** | **154 (17.1** | **1217 (26.7)** |
| Ectopic pregnancy | 36 (3) | 33 (2.2) | 34 (3.5) | 33(3.7) | 136 (3.0) |
| Miscarriage | 49 (4.1) | 54 (3.6) | 63 (6.5) | 52(5.8) | 218 (4.8) |
| Pregnancy-related sepsis | 63 (5.3) | 68 (4.6) | 56 (5.8) | 44(4.9) | 231 (5.0) |
| Obstetric haemorrhage | **200 (16.7)** | **237 (15.9)** | **162 (16.7)** | **146(16.2)** | **745 (16.3)** |
| Hypertensive disorders of pregnancy | **185 (15.5)** | **188 (12.6)** | **166 (17.1)** | **149(16.5)** | **748 (16.4)** |
| Anaesthetic complications | 21 (1.8) | 17 (1.1) | 39 (4.0) | 21(2.3) | 98 (2.2) |
| Adverse drug reactions | 13 (1.1) | 6 (0.4) | 7 (0.7) | 9(1.0) | 35 (0.8) |
| Embolism | 33 (2.8) | 43 (2.9) | 40 (4.1) | 55(6.1) | 171 (3.8) |
| Acute collapse - cause unknown | 15 (1.3) | 36 (2.4) | 21 (2.2) | 17(1.9) | 89 (2) |
| Miscellaneous | 4 (0.3) | 3 (0.2) | 8 (0.8) | 9(1.0) | 24 (0.5) |

# HIV status in DDPCP (2023)

| Primary obstetric problem | Positive | Negative | Declined test | Unknown | Total |
|---|---|---|---|---|---|
| **Coincidental cause** | 8 | 7 | 0 | 12 | 27 |
| **Medical and surgical disorders** | 53 | 81 | 0 | 18 | 152 |
| **Non-pregnancy-related infections** | 115 | 39 | 0 | 0 | 154 |
| **Ectopic pregnancy** | 9 | 3 | 0 | 21 | 33 |
| **Miscarriage** | 19 | 11 | 0 | 22 | 52 |
| **Pregnancy-related sepsis** | 15 | 24 | 0 | 5 | 44 |
| **Obstetric haemorrhage** | 50 | 81 | 0 | 15 | 146 |
| **Hypertension** | 41 | 92 | 0 | 16 | 149 |
| **Anaesthetic complications** | 4 | 16 | 0 | 1 | 21 |
| **Adverse drug reactions** | 1 | 7 | 0 | 1 | 9 |
| **Embolism** | 15 | 36 | 1 | 3 | 55 |
| **Acute collapse - cause unknown** | 5 | 11 | 0 | 1 | 17 |
| **Miscellaneous** | 3 | 4 | 0 | 2 | 9 |
| **Unknown** | 20 | 31 | 0 | 10 | 61 |
| **Total** | 358 (38.5%) | 443 (47.7%) | 1 (0.1%) | 127 (13.7%) | 929 (100.0%) |

The main categories (**Causes of Maternal deaths**) associated with infection are NPRI, PRS, and EP losses (miscarriages)

However, this doesn't mean that infection has no impact on the other causes of MDs like haemorrhage, hypertension, etc.

HIV positivity >38%

- The **Non-Pregnancy Related Infections (NPRI) category** of maternal deaths constitutes deaths from

✓ Tuberculosis (TB),

✓ Pneumonias,

✓ Meningitis,

✓ malaria, and

✓ Gastroenteritis from a variety of infectious causes,

including HIV and COVID-19(new infection)

# PRS

- The **Pregnancy Related Sepsis (PRS) category** of maternal deaths constitutes deaths

✓ from sepsis after vaginal delivery,

✓ after caesarean section,

✓ suffered bowel trauma during caesarean section, and

✓ deaths caused by chorioamnionitis.

# CS

- The CSR in SA is higher than the WHO-recommended rate of 10-15%, and
- The proportion of deaths in SA after CS due to PRS is on average 46% for the last four trienniums (latest 2020- 2022).
- The SA CDR on average is 27.36 for the last three trienniums and
- The overall case fatality rates (CFR) per 100,000 CD were 167, 132, and 155.9 over the same three triennia, respectively.

# PRS

- For PRS, the CFR was 14.12, 10.02, and 12.0 for 2014-2016, 2017-2019, and 2020-2022, respectively.

- Bowel trauma contributed 10% of all PRS deaths, with a CFR of 2.5 per 100000 CD for the 2020-2022 triennium. There is a great concern regarding deaths from bowel injury at CS.

# EP losses

- Amongst the **Early pregnancy losses**,

✓ 68% of women who died from ectopic pregnancy were HIV positive,
✓ 55% of women who died from miscarriages were HIV infected.
✓ 64% of **miscarriage deaths** were classified as septic miscarriage
✓ The final cause of miscarriage deaths was septic shock in 56% of cases

# Overview of Infections & Complications

| Stage | Common Infections | Maternal Complications | Neonatal Impact |
|---|---|---|---|
| **Antenatal** | HIV, syphilis, TB, UTIs, STIs | Anemia, preterm labor, miscarriage | Congenital infections, growth restriction |
| **Intrapartum** | Chorioamnionitis, GBS, sepsis | Fever, prolonged labor, emergency C-section | Neonatal sepsis, birth asphyxia |
| **Postpartum** | Endometritis, wound infections, mastitis | Hemorrhage, sepsis, delayed recovery | Breastfeeding issues, early-onset sepsis |

- **Infections don’t just cause illness; they trigger a cascade of complications that can be fatal if not managed.”**
- **Multiple types of microbes including Viral, bacterial, parasitic, etc**

- Risks per timing of pregnancy…:

# Antenatal Stage – Risks & Impact

**Maternal Complications:**

- Preterm labor
- Miscarriage
- Anemia
- Placental insufficiency

**“Antenatal infections silently shape outcomes. Early screening and treatment are critical.”**

→ **Impact on the fetus:**

* Low birth weight
* Intrauterine growth restriction
*Congenital anomalies (e.g. syphilis, CMV)
*Stillbirth

# Intrapartum Stage – Risks & Impact

- **Maternal Complications:**
  - Chorioamnionitis
  - Maternal Fever and Sepsis
  - Prolonged labor
  - Emergency interventions

→ **Impact on Neonate:**

- Neonatal sepsis
- Birth asphyxia
- Meconium aspiration
- Prematurity

- **Labor is a tipping point.**
- **Infections here can escalate rapidly, affecting both mother and baby.”**

# Postpartum Stage – Risks & Impact

- **Maternal Complications:**
  - Endometritis
  - Wound infections (C-section, episiotomy)
  - Mastitis
  - Postpartum sepsis

→ **Impact on Baby:**

- Difficulty breastfeeding
- Neonatal infections from contact
- Poor bonding and nutrition

- **"Postpartum care is often overlooked. Yet it's when many infections emerge, threatening recovery and infant health."**
- **Majority of women die postpartum (>90% - PRS)**

# Screening -Key Criteria

The implementation of infection screening during pregnancy is shaped by four major factors:

- **Epidemiological**: Prevalence and transmission risk of infections like HIV, syphilis, hepatitis B, tuberculosis, and STIs in the population.
- **Economic**: Cost-effectiveness of screening programs, especially in resource-constrained settings.
- **Therapeutic**: Availability and accessibility of effective treatments once infections are diagnosed.
- **Test Performance**: Sensitivity, specificity, and feasibility of diagnostic tool(especially point-of-care tests).

- In South Africa, these criteria are deeply influenced by the country's public health priorities, which focus on:

✓ Reducing maternal and neonatal mortality,
✓ Preventing mother-to-child transmission (MTCT) of infections, and
✓ Improving access to early antenatal care

# Why the First Trimester Matters Most?

- It is increasingly recognized as the optimal window for initiating infection screening and building individualized care pathways.

# Timing is crucial:

- **Embryonic Risk Evaluation**: Early detection of infections like syphilis or HIV allows for timely intervention to prevent congenital anomalies, miscarriage, or MTCT
- **Diagnostic Planning**: First-trimester visits enable molecular testing for STIs (e.g., *Chlamydia*, *Gonorrhea*, *Trichomonas*) with same-day treatment options now being trialed in South Africa
- **Primary/Secondary Prevention**: Initiating antiretroviral therapy (ART) for HIV-positive mothers or penicillin for syphilis early in pregnancy drastically reduces transmission risk and improves outcomes
- **Ultrasound Accuracy**: Early gestational dating via crown-rump length measurement improves the precision of follow-up scans and helps detect structural anomalies or growth restrictions

# Screening & Prevention

- STI screening (beyond syndromic approach)
- BANC Plus for continuity of care
- HIV, syphilis, hepatitis B, TB at booking
- Repeat testing at every visit and delivery (New MCR)

**“Screening isn’t just protocol, it’s protection. Especially for asymptomatic infections like chlamydia and gonorrhoea.”**

# Vertical Transmission Prevention of Communicable Infections

| | | | | |
|---|---|---|---|---|
| HIV test at **1st ANC visit** | Date: ___/___/___ | Positive ☐ | Negative ☐ | |
| Retested at **20 weeks** | Date: ___/___/___ | Positive ☐ | Negative ☐ | |
| Retested at **26 weeks** | Date: ___/___/___ | Positive ☐ | Negative ☐ | |
| Retested at **30 weeks** | Date: ___/___/___ | Positive ☐ | Negative ☐ | |
| Retested at **34 weeks** | Date: ___/___/___ | Positive ☐ | Negative ☐ | |
| Retested at **38 weeks** | Date: ___/___/___ | Positive ☐ | Negative ☐ | |
| Retested during **delivery admission** | Date: ___/___/___ | Positive ☐ | Negative ☐ | |
| PrePP offered Yes ☐ | Accepted Yes ☐ No ☐ | Date initiated: ___/___/___ | | |

**Woman living with HIV**

| | | | |
|---|---|---|---|
| ARV regimen TLD1 ☐ TLD2 ☐ Other: | | Date started ___/___/___ | |
| Viral load at first visit- if already on ARVs *(C#Antenatal)* | Date ___/___/___ | Result ___ | c/mL |
| VL at 3 months after ARV start - if new HIV diagnosis *(C#Antenatal)* | Date ___/___/___ | Result ___ | c/mL |
| Repeat VL - if any VL> 50c/mL *(C#Antenatal)* | Date ___/___/___ | Result ___ | c/mL |
| VL at delivery - all women LHIV *(C#Delivery)* | Date ___/___/___ | Result ___ | c/mL |
| CD4 Date: ___/___/___ | CD4 result ___ Cells/ul | CrAg: ___ | |

**Tuberculosis: screen for TB symptoms at every antenatal visit, regardless of HIV status**

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **1st visit** | ☐Pos | ☐Neg | **20 weeks** | ☐Pos | ☐Neg | **26 weeks** | ☐Pos | ☐Neg | **30 weeks** | ☐Pos | ☐Neg |
| **34 weeks** | ☐Pos | ☐Neg | **36 weeks** | ☐Pos | ☐Neg | **38 weeks** | ☐Pos | ☐Neg | **40 weeks** | ☐Pos | ☐Neg |
| **Labour** | ☐Pos | ☐Neg | **TB NAAT test** | ☐Pos | ☐Neg | Date | **Urine LAM** | ☐Pos | ☐Neg | Date | |
| Treatment DS-TB ☐ Date started ___ | | | DR-TB ☐ Date started ___ | | | | TPT offered ☐ | | TPT deferred ☐ | | |

**Syphilis (test at booking and every four weeks- align with BANC+ visits)**

| | | | |
|---|---|---|---|
| Syphilis test at **1st ANC visit** | Date: ___/___/___ | Positive ☐ | Negative ☐ |
| Retested at **20 weeks** | Date: ___/___/___ | Positive ☐ | Negative ☐ |
| Retested at **26 weeks** | Date: ___/___/___ | Positive ☐ | Negative ☐ |
| Retested at **30 weeks** | Date: ___/___/___ | Positive ☐ | Negative ☐ |
| Retested at **34 weeks** | Date: ___/___/___ | Positive ☐ | Negative ☐ |
| Retested at **38 weeks** | Date: ___/___/___ | Positive ☐ | Negative ☐ |
| Retested during **delivery admission** | Date: ___/___/___ | Positive ☐ | Negative ☐ |
| **Laboratory syphilis confirmation:** | Date: ___/___/___ | Positive ☐ | Negative ☐ |
| **Syphilis titre:** | ___ | | |
| 1st dose Bicillin IMI administered on | Date: ___/___/___ | Allergic to penicillin- refered for desensitisation | |
| 2nd dose Bicillin IMI administered on | Date: ___/___/___ | to ___ | hospital |

# Key Infections Screened During Pregnancy-SA

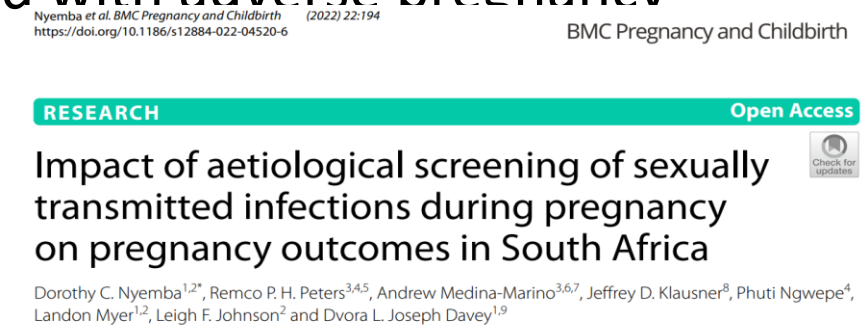
- **HIV**: Screened at the 1st antenatal visit and again throughout pregnancy (If negative) using rapid tests.
- **Syphilis**: Dual HIV/syphilis rapid testing is now standard at the first visit and repeated.
- **Hepatitis B (HBV)**: Screening is recommended, especially for HIV-pos pregnant women due to higher risk of vertical transmission. Universal HBV screening is not yet standard in public facilities.
- **Sexually Transmitted Infections (STIs)**:
  - Includes *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, and *Trichomonas vaginalis*.
  - Point-of-care diagnostic testing and same-day treatment are now integrated into first antenatal visits, particularly for HIV-positive women.

**Updates in the 2024 Guidelines**
**Incl. TB (esp if HIV pos)**
**Expanded Syphilis Protocols: Clearer guidance and more frequent screening to reduce congenital syphilis.**

# Case Study – STI Screening

Evaluated the association between any STI at the first ANC visit and a composite adverse pregnancy outcome (miscarriage, stillbirth, preterm birth, early neonatal death, or low birthweight)

- 37% STI prevalence
- Treated STIs at the first ANC visit were not associated with adverse pregnancy outcomes overall
- Syndromic Mx misses asymptomatic cases
- HIV-positive women are at higher risk
- Need for etiological testing




**"This study shows why universal STI screening is essential, especially for asymptomatic cases."**

# Key Challenges in Maternal Infection Screening in South Africa

**1. Limited Access to Etiological STI Testing**

- Most facilities still rely on **syndromic management**, which misses **asymptomatic infections** like chlamydia and gonorrhoea.
- Lack of **point-of-care diagnostics** for STIs and bacterial infections delays treatment.

**2. Inconsistent Implementation of Screening Protocols**

- While guidelines recommend **HIV, syphilis, hepatitis B, and TB screening**, adherence varies widely across provinces and facilities.
- Repeat testing is often not done due to **staff shortages or poor record-keeping**.

**3. Workforce Constraints**

- There is a shortage of trained midwives and nurses to conduct thorough screenings.
- High patient loads reduce time for **individualized care and counselling**.

...

**4. Resource Limitations**

- Many clinics lack **laboratory capacity** for confirmatory tests.
- Stock-outs of **test kits** and **antibiotics** are common in rural and peri-urban areas.

**5. Stigma and Poor Health-Seeking Behavior**

- **Late Antenatal Booking**: Many women still present after the 1st trimester due to socioeconomic barriers, rural access issues, and lack of awareness
- Women may avoid disclosing symptoms due to **fear of judgment**, especially for STIs.
- Cultural beliefs and **gender-based violence** also deter early antenatal visits.

## 6. Weak Postnatal Surveillance

- Postpartum infections like **endometritis and wound sepsis** are underreported.
- Lack of structured follow-up within 72 hours postpartum contributes to missed diagnoses.

## 7. Fragmented Data Systems

- Poor integration between **ANC records, lab results, and referral systems** leads to missed opportunities for early intervention.
- Infections identified in one facility may not be communicated to the next level of care**.**

# However,

- Sepsis can strike at any Stage. Sepsis doesn't wait.
- Vigilance is needed from booking to postnatal care to protect both mother and baby.

| Stage | Common Triggers | Potential Outcomes |
|---|---|---|
| **Antenatal** | UTIs, untreated STIs | Organ dysfunction, miscarriage |
| **Intrapartum** | Poor hygiene, prolonged labor | ICU admission, maternal shock |
| **Postpartum** | Retained products, surgical wounds | Neonatal death, delayed recovery |

# Recommendations

- Promote early antenatal booking
- Expand point-of-care testing in rural clinics
- Integrate STI screening into first visits
- Strengthen supply chains for diagnostics
- Train midwives in first-trimester ultrasound
- Build individualized care pathways
- Align with national public health goals
- Monitor outcomes and adjust strategies

# Safety Interventions

**“Safety is everyone’s responsibility—from policy to practice.”**

| For Policymakers: | For Healthcare Workers: |
| --- | --- |
| • Fund rapid diagnostics<br>• Expand BANC Plus<br>• Strengthen referral systems | • Follow IPC protocols<br>• Use checklists<br>• Educate patients<br>• Monitor postpartum signs |

# Summary & Conclusions

- Maternal infections remain a preventable yet persistent threat across all stages of pregnancy.
- Early screening, respectful care, and consistent implementation of national guidelines are key to reducing maternal and neonatal harm.
- By strengthening surveillance, empowering healthcare workers, and investing in diagnostics, we move closer to safer pregnancies and healthier futures.

# I Thank you all!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