Prevention of Maternal and Newborn Sepsis Policy (Including Group B Streptococcus)

1. Background

Maternal and Newborn Sepsis

Maternal sepsis in Australia was the second highest cause of maternal mortality between 1973 and 2014 at 1.25 deaths per 100 000 women giving birth. Maternal sepsis as a cause of death is on the decline and was the 10th leading cause in 2016.

Maternal sepsis (all causes) accounts for nearly 25% of maternal deaths in the UK. Sepsis due to Group A streptococcus (GAS) is increasing.

It is estimated that 63-73% of maternal deaths due to sepsis are preventable. For each maternal death, there are another 50 women who experience life-threatening morbidity from sepsis. Severe maternal sepsis with acute organ dysfunction has a mortality rate of 20 to 40%, which increases to 60% if septic shock develops.

Importantly death and disability can be prevented by early recognition and response to signs of sepsis.

Table one: Leading causes of Maternal Sepsis

Antenatal	Intrapartum /immediate postnatal	Post-discharge
Septic abortion	Chorioamnionitis / intraamniotic infection	Pneumonia /influenza
Chorioamnionitis / intraamniotic infection	Endometritis	Pyelonephritis
Pneumonia /influenza	Pneumonia /influenza	Wound infection / necrotizing fasciitis
Pyelonephritis	Pyelonephritis	Mastitis
Appendicitis	Wound infection / necrotizing fasciitis	Cholecystitis

Source: California Maternal Quality Care Collaborative: Maternal Sepsis toolkit 2020

Newborn sepsis guidance is found in the KEMH Neonatology guideline Sepsis: Infection in the Neonate

Group B Streptococcus

Group B Streptococcus (GBS) is recognised as the most frequent cause of severe early-onset (less than 7 days of age) infection in newborn infants

GBS risks below are based on UK data and the UK colonisation rate of around 30%:

- There is a 1: 5000 chance of newborn early onset GBS disease (EOGBSD) in women at term without risk factors
- Those same women have a 1: 39,682 chance of newborn death or disability from EOGBSD (this would equate to one newborn in every nine years in WACHS)
- 88% of newborns affected by EOGBSD will make a full recovery with prompt treatment:
    - 1 in 19 (5%) die
    - 1 in 14 (7.4%) suffer long term disability

In Western Australia, the GBS colonisation rates are 21% for non-Aboriginal and 19% for Aboriginal women when screened at 36 weeks gestation (*data source: Pathwest 2017*)

2. Policy Statement

Adoption of Risk-Based Management of GBS and Sepsis

WACHS will now adopt the risk-based approach to prevention of EOGBSD and sepsis in the maternal and newborn setting rather than the current KEMH approach of universal GBS screening and risk based management because:

- A minority of women carry GBS, and in the majority of cases, their babies are born safely and without developing an infection
- Screening women late in pregnancy does not accurately predict which babies will develop GBS infection. At 35-37 weeks gestation:
    - 17 - 25% of GBS positive women will be negative at birth
    - 5 - 7% of GBS negative women will be positive at birth
- 75% of the babies born in WA who develop EOSGBSD are born prematurely and before GBS screening occurs (*data source: Pathwest 2017*)
- 60% of babies with EOGBSD have one or more known risk factors
- 90% of babies show signs of EOGBSD within 12 hours of birth
- Intrapartum antibiotic prophylaxis (IAP) fpr all GBS carriers means a large number of women receive unnecessary treatment. This may result in increased short and long term adverse outcomes for both mother and baby
- All newborns born in WACHS at 35 weeks (or more) now have their risks of developing sepsis calculated at birth
- The Royal Australian and New Zealand College of Obstetricians and Gynaecologist (RANZCOG) recommends all maternity services have an established plan for prevention of EOGBS and accepts either the clinical risk management approach or universal screening

Information for antenatal women

All women should have discussed with them antenatally the information on GBS colonisation and their risks of neonatal infection outlined in the WA Health Pregnancy, Birth and Beyond Book (**found on page 38**).

GBS positive status is not:

- a preclusion from water-birth or home-birth (if offered IAP)
- an indication for induction of labour

Vaginal cleansing and vaginal seeding

There is currently insufficient evidence to advocate either vaginal cleansing to prevent newborn sepsis or vaginal seeding to improve the newborn microbiome after intrapartum antibiotics or caesarean birth. There have been reported cases of neonatal infections including Herpes and GBS from vaginal seeding[1]

Maternal risk factors for neonatal sepsis

- previous baby with GBS disease:
    - a positive GBS screen this pregnancy gives a 1:400 risk of neonatal EOGBSD
    - a negative result this pregnancy gives a 1:5000 risk of neonatal EOGBSD
- incidental discovery during pregnancy of GBS carriage through bacteriological investigation (vaginal swab or mid-stream urine)
- preterm birth
- suspected maternal intrapartum infection including chorioamnionitis
- intrapartum pyrexia: 38 – 38.9 degrees on two occasions 30 minutes apart **or** one occasion of 39 or more

Women who should be offered intrapartum antibiotic prophylaxis (IAP)

- GBS bacteriuria in current pregnancy (growth of greater than 105 cfu/ml)
- Previous infant with EOGBSD
- Incidental GBS carrier detection this pregnancy (except elective caesarean with intact membranes)
- Preterm labour (less than 37 weeks) with or without prolonged rupture membranes
- Prolonged ruptured membranes (more than 18 hours)
- **Follow the GBS prophylactic antibiotic regime in the** KEMH Clinical Practice Guideline for GBS

Women who should be offered therapeutic intrapartum antibiotics (TIA)

- Pyrexia 38 – 38.9 degrees on two occasions 30 minutes apart **or** one occasion of 39 or more
- Suspected maternal infection, including Chorioamnionitis

[1] https://www.bmj.com/content/352/bmj.i227

- Persistent fetal tachycardia – for more than 30 minutes after first aid measures have been instigated
- See ***Table Two*** below: Intravenous TIA regime

Table two: Intravenous Therapeutic Intrapartum Antibiotic (TIA) Regime
1. Amoxycillin 2gm 6 hourly, **and** 2. Gentamicin 5mg/kg/day (max 480mg), **and** 3. Metronidazole 500mg 12 hourly **If Penicillin anaphylaxis:** 1. Clindamycin 600mg 8 hourly **or** Vancomycin (**see dosing below**) 12 hourly, **and** 2. Gentamicin 5mg/kg per day (max 480 mg), **and** 3. Metronidazole 500mg 12 hourly **If Penicillin allergy:** 1. Cefazolin 2gm 8 hourly **or** Ceftriazone 2gm daily, **and** 2. Gentamicin 5mg/kg/day (max 480mg), **and** 3. Metronidazole 500mg 12 hourly **If Vancomycin, dosing as below:** • Loading dose: IV infusion 25mg/kg to a maximum of 1.5g twice daily • *Maintenance:* IV infusion15mg/kg twice daily (1 – 1.5g, twice daily) round doses to closest 250mg • Doses above 1.5g are to be prescribed at the direction of a clinical microbiologist or infectious diseases physician

Women who decline offer of antibiotics:

- A non-standard management sticker should be completed by the Obstetric doctor / midwife and filed in the medical record

MATERNAL Sepsis

Table three: Risks for, and red flags of, sepsis

Risk factors for maternal sepsis	Maternal red flags to consider sepsis
• Obesity • Impaired glucose tolerance / diabetes • Impaired immunity / immunosuppressant medication • Anaemia • Vaginal discharge • History of pelvic infection • History of GBS infection • Amniocentesis or other invasive	• Re-presentation to hospital within 48 hours • Diarrhoea or vomiting - *may indicate exotoxin production (early toxic shock)* • Fever or rigors • Cough / sputum / breathlessness / flu-like symptoms • Unexplained abdominal pain / distension

Risk factors for maternal sepsis	Maternal red flags to consider sepsis
procedures • Cervical cerclage • Prolonged spontaneous rupture of membranes • Caesarean (particularly emergency) • Retained products of conception • GAS infection in close contacts / family members • Minority ethnic groups	• Line associated infection / redness / swelling / pain • Myalgia / back pain / general malaise / headache • Dysuria / frequency / odour • New onset of confusion or altered cognition • Recent epidural / spinal / surgery / cellulitis / wound infection • Immunocompromised / chronic illness • Possible breast infection • **Possible intrauterine infection -** prolonged ruptured membranes / prolonged labour / fetal tachycardia / retained products • Rash

Table four: Maternal clinical indicators of sepsis:

SEPTIC SHOCK unless otherwise proven	Suspect sepsis
SBP < 70mmHg Lactate ≥ 4mmol/L Base excess less than minus 5.0 Altered consciousness **or** new onset confusion	Respirations < 10 or ≥ 25 per minute SpO2 < 95% SBP < 90mmHg Heart Rate ≤ 50 or ≥ 120 per minute Temperature <35.5° C or >37.5° C **Obtain a blood gas** Lactate of ≥ 2mmol/L is significant in sepsis

Clinical management of maternal sepsis (or suspected)

Women with presumed sepsis are at high risk of deterioration despite initial resuscitation with intravenous antibiotics and fluids. These women require a management plan in with the Consultant Obstetrician, Duty Anaesthetist and on-call KEMH Clinical Microbiologist or, if required, Intensive Care specialist

Consider other causes of deterioration (such as hypovolaemia/haemorrhage, concealed abruption, pulmonary embolus/DVT, or pre-eclampsia) until sepsis is confirmed or if the patient does not respond to treatment as expected

Management of suspected maternal sepsis / signs of septic shock:

- Collect blood cultures before commencing IV antibiotics (but do not delay antibiotics to do so) see ***Table five*** below
- Collect FBC, U & E, CRP/ PCT, LFT's, coags, glucose and lactate
    - Lactate of ≥ 2 mmol/L after fluid resus is significant
    - BGL of > 7.7 mmol/L in the absence of diabetes is significant

- Commence sepsis IV antibiotic regime – *see **Table five** below*
- Commence fluid resuscitation
    - aim for SBP > 90 mm/hg and reassess vitals post
- If pregnant – assess fetal status
- Undertake septic screen – urine and breast milk; swabs: vaginal, wounds and throat

Table five: Maternal Sepsis IV Antibiotic (SIA) regimes

Septic shock – within 60 mins	Suspect sepsis – within 2 hours
Meropenem 1gram Stat, **or** **If suspect Group A Strep** add Clindamycin 600mg **If penicillin anaphylaxis:** Gentamicin as per KEMH Gentamicin guideline; **and** Clindamycin 600mg Stat	Piperacillin-Tazobactam 4.5 grams, **or** **If suspect Group A Strep** add Clindamycin 600mg **If penicillin anaphylaxis:** Gentamicin as per KEMH Gentamicin guideline; **and** Clindamycin 600mg Stat **Penicillin allergy:** Ceftriaxone 2g, **and** Metronidazole 500mg

NEWBORN sepsis

- All newborns over 35 weeks or more should have their risk of sepsis calculated at birth with their first set of observations using the KEMH Neonatal Sepsis Risk Calculator and recorded on the MR75 WACHS Newborn Care Plan.
- A management plan for newborn care should be made in accordance with the individual newborn's sepsis risk score and the responsible Paediatric doctor (if indicated) as per the KEMH neonatal sepsis risk calculator.

Table six: Clinical indicators of newborn sepsis (red flags)

SEPSIS	Suspect sepsis
Respiratory distress starting more than 4 hours after birth Seizures Need for mechanical ventilation in a term baby Signs of shock	• Altered behaviour or responsiveness • Altered muscle tone (i.e. floppy) • Feeding difficulties (i.e. feed refusal) or intolerance - vomiting, excessive gastric aspirates & abdo distension • Abnormal heart rate (bradycardia or tachycardia) • Sign of respiratory distress • Temperature abnormality (less than 36°C or

SEPSIS	Suspect sepsis
	higher than 38°C) unexplained by environmental factors • Hypoxia (i.e. central cyanosis or ↓ SaO2) • Jaundice within 24 hours of birth • Apnoea • Signs of neonatal encephalopathy • Need for cardio-pulmonary resuscitation • Need for mechanical ventilation in a preterm baby • Persistent fetal circulation (persistent pulmonary hypertension) • Unexplained excessive bleeding, thrombocytopenia, or abnormal coagulation (INR greater than 2.0) • Oliguria persisting beyond 24 hours after birth • Altered glucose homeostasis (hypo or hyperglycaemia) • Metabolic acidosis (base deficit of 10 mmol/litre or greater) • Local signs of infection (i.e. skin or eye)

Clinical management of newborn sepsis (or suspected)

As per KEMH Neonatalogy Clinical guidelines:

- Neonatal Sepsis: General Management and Treatment
- Sepsis: Infection in the Neonate
- Sepsis: Neonatal screening procedures

Discharge Information for parents of the newborn

All parents should have discussed, and be provided, with information on the signs of possible newborn infection and when they should seek medical help ((as per WA Health Pregnancy, Birth and Beyond Booklet **page 38**).

The midwife should document this has been completed on the MR75 WACHS Newborn Care Plan discharge checklist and cover the below information for parents:

- not feeding well or not keeping milk down
- grunting, noisy breathing, moaning, seeming to be working hard to breathe when you look at their chest or tummy, or not breathing at all
- be very sleepy and/or unresponsive
- be crying inconsolably
- be unusually floppy
- have a high or low temperature and/or their skin feels too hot or cold
- have changes in their skin colour (including paler, less pink, grey tone or blotchy)
- have an abnormally fast or slow heart rate or breathing rate

3. Definitions

EOGBSD	Early onset Group B Streptococcal disease
GAS	Group A Streptoccus
GBS	Group B Streptococcus
IAP	Intrapartum antibiotic prophylaxis
SaO2	Oxygen saturation level
TIA	Therapeutic intrapartum antibiotics

4. Roles and Responsibilities

Midwives, Obstetric and Paediatrics doctors are to provide advice to women antenatally and parents on discharge about GBS and signs of infection requiring medical advice

Midwives and Obstetric doctors are to screen women on admission in labour for risk factors for sepsis and treat accordingly

Midwives and Paediatric doctors are to complete and document the KEMH Neonatal Sepsis Risk Calculator at birth with a management plan if indicated.

All Staff are required to work within policies and guidelines to make sure that WACHS is a safe, equitable and positive place to be.

5. Compliance

Failure to comply with this policy may constitute a breach of the WA Health Code of Conduct (Code). The Code is part of the Integrity Policy Framework issued pursuant to section 26 of the *Health Services Act 2016* (WA) and is binding on all WACHS staff which for this purpose includes trainees, students, volunteers, researchers, contractors for service (including all visiting health professionals and agency staff) and persons delivering training or education within WACHS.

WACHS staff are reminded that compliance with all policies is mandatory.

6. Records Management

Health Record Management Policy

Records Management Policy

7. Evaluation

Maternity managers are to evaluate this policy by regularly monitoring and reporting, to their local Maternity clinical governance committee, their documented compliance rates with:

- information provided antenatally to women about their risk factors for infection
- of the maternal risk factors on admission intrapartum
- of the neonatal sepsis risk score at birth
- information provided to parents on discharge of newborn signs of infection

8. Standards

National Safety and Quality Health Service Standards
1.1b/c, 1.7a, 1.27a, 5.5, 6.1, 6.11, 8.8, 8.10

9. References

Gibbs R, Bauer M, Olvera L, Sakowski C, Cape V, Main E.(2020) Improving Diagnosis and Treatment of Maternal Sepsis: A Quality Improvement Toolkit. Stanford, CA: California Maternal Quality Care Collaborative

Hughes RG, Brocklehurst P, Steer PJ, Heath P, Stenson BM on behalf of the Royal College of Obstetricians and Gynaecologists. Prevention of early-onset neonatal group B streptococcal disease. Green-top Guideline No. 36. BJOG 2017;124:e280–e305.
Royal College of Obstetricians and Gynaecologist (UK) Green-top Guideline No. 36, Prevention of Early- onset Neonatal Group B Streptococcal Disease, September 2017.

KEMH Maternal Sepsis Pathway

10. Related Forms

MR75 WACHS Newborn Care Plan
WA Health Pregnancy, Birth and Your Baby booklet - Order via Statewide Obstetric Support Unit (SOSU)
MR140D Newborn Observation and Response Chart (N-ORC)
MR140B Maternal Observation and Response Chart (M-ORC)

11. Related Policy Documents

Neonatal Sepsis: General Management and Treatment
Sepsis: Infection in the Neonate
Sepsis: Neonatal screening procedures
KEMH Maternal Sepsis Pathway

12. Policy Framework

Clinical Governance, Safety and Quality

This document can be made available in alternative formats on request for a person with a disability

Contact:	WACHS Coordinator of Midwifery (K. Reynolds)		
Directorate:	Nursing and Midwifery Services	**EDRMS Record #**	ED-CO-20-22240
Version:	1.00	**Date Published:**	26 March 2020