Frimley Health
NHS Foundation Trust

Management of Sepsis in Pregnancy and Puerperium

Key Points

- Sepsis can lead to rapid deterioration and death in pregnancy and puerperium.
- Always suspect sepsis in all sick pregnant women until proven otherwise.
- Use Modified Early Obstetric Warning Score (MEOWS) chart for all pregnant women in hospital.
- Early recognition and treatment of sepsis are crucial to reduce mortality and morbidity.
- Use Sepsis Six care bundle.
- Involve Obstetrics & Gynaecology, Microbiology, Anaesthetic and Critical Care teams.
- If you suspect your patient may have Sepsis, find the Sepsis Navigator on the More Activities Menu from within the Patient's chart in EPIC.

Version: 2.0
Date Issued: 4 April 2024
Review Date: March 2027
Key words: Sepsis, sepsis assessment tool, maternal sepsis, sepsis screening, MEOWS

Abbreviations

CTG	Cardiotocography
CT scan	Computerized tomography scan
GAS	Group A Streptococcus
MEOWS	Modified Early Obstetric Warning Score
MRSA	Methicillin-resistant staphylococcus aureus
NSAIDs	Non-steroidal anti-inflammatory drugs

Contents

1. Aim of Guideline

1.1 Reduce maternal morbidity and mortality arising due to sepsis

1.2 By identifying at risk patients and picking up septic patients early

1.3 Prevent progression of sepsis to severe sepsis

2. Background

2.1 Sepsis is one of the leading causes of maternal mortality in the UK.

"The mortality rate for pregnancy related sepsis has continued to increase steadily and is now statistically significantly higher than at its nadir in 2012-14". [MBRRACE-UK report 2023]

2.2 Pregnant women are vulnerable to infection. The physiological changes of pregnancy increase their risk of developing serious complications from an infection.

2.3 The onset of sepsis may be insidious and if not treated promptly and aggressively can progress rapidly to a very morbid state even resulting in death within 12 to 24 hours.

2.4 Early recognition and treatment improves outcomes and decreases mortality.

3. Definitions

3.1 **Sepsis** is defined as life-threatening organ dysfunction caused by a dysregulated host response to infection.

3.2 **Septic Shock** is the condition when sepsis becomes severe enough to cause circulatory and cellular/metabolic dysfunction associated with a higher risk of mortality.

3.3 **Maternal sepsis** is sepsis occurring during pregnancy, childbirth, post-abortion, or postpartum period (World Health Organisation 2017).

4. Recognition of Sepsis

4.1 Identifying the septic patient

- If a person presents with signs or symptoms that indicate possible infection, think **'could this be sepsis'**?
  Use **Sepsis Assessment Tool (see Appendix 1 and section 5.3).**
- People with sepsis may have non-specific, non-localised presentations, for example feeling very unwell but without an elevated temperature.
- Pay particular attention to concerns expressed by the person and their family or carers, for example, changes from usual behaviour.
- Assess women who might have sepsis with extra care if they cannot give a good history (for example, people with English as a second language or people with communication problems).
- Identify factors that increase risk of sepsis (see section 4.2)
- Use a structured set of observations (see section 4.3) to assess women in a face-to-face setting to stratify risk if sepsis is suspected.
- Use an early warning score to assess women with suspected sepsis in acute hospital settings.

4.2 Risk Factors

4.2.1 Unrelated to pregnancy

- Impaired immune systems because of illness or drugs
- Diabetes (gestational or otherwise) or other comorbidities
- Obesity
- Anaemia
- Socioeconomic deprivation
- History of pelvic inflammatory disease
- Ethnic minority group

4.2.2 Related to pregnancy

- Close contact with people with group A streptococcal infection
- Cervical cerclage
- Amniocentesis and other invasive intrauterine procedures
- Continued vaginal bleeding or an offensive vaginal discharge
- Intrauterine death

4.2.3 During vaginal delivery

- Prolonged labour
- Prolonged rupture of membranes
- Vaginal trauma
- Forceps or ventouse delivery
- Episiotomy

4.2.4 During surgical interventions

- Caesarean section, especially, if complications occur
- Manual removal of placenta
- Retained products of conception after miscarriage
- Surgical termination of pregnancy
- Laparoscopy

4.3 Presentation of Maternal Sepsis

4.3.1 Symptoms

- Fever - can be a sign of more serious infection, including puerperal sepsis, chorioamnionitis or other genital tract sepsis, wound or breast infection, pyelonephritis, or pneumonia, which may lead to systemic sepsis.
- Sore throat – can indicate a Group A streptococcal infection.
- Pain – All complaints of pain are potentially serious and must be investigated thoroughly. Special emphasis on perineal and breast pain.
- Abdominal pain, diarrhoea, and vomiting – These symptoms can be suggestive of a variety of significant disease processes during pregnancy and the puerperium.
- Breathlessness – Breathlessness after delivery is very uncommon and needs a full investigation to rule out serious underlying disease. Although it is more common in pregnancy, as the result of physiological changes, it can also be the presenting symptom of serious medical conditions, including pneumonia which may have associated cough, fever and raised inflammatory markers.

- Productive cough
- Urinary symptoms
- Impending sense of doom

4.3.2 Signs

Suggestive signs of sepsis may include but are not limited to:

- Altered mental status
- Acute deterioration in functional ability
- Respiratory rate 21-24 OR strenuous breathing
- Persistent tachycardia more than100 beats per minute OR new arrhythmia
- Systolic B.P. less than 100 mmHg
- Not passed urine in last 12-18 hours
- Temperature less than 36°C or greater than 38°C
- Abnormal or absent foetal movements or heartbeat
- Fetal tachycardia
- Spontaneous rupture of membranes or significant vaginal discharge
- Uterine or renal angle pain and tenderness
- Failure to respond to treatment

5. Management of Maternal Sepsis

Start the sepsis screening tool (Appendix 1; for EPIC guidance see section 5.3) if the patient looks unwell or physiology is abnormal (e.g., triggers on MEOWS)

5.1 All antenatal and postnatal patients must have their observations reviewed on **MEOWS**. This includes any women having a positive pregnancy test.
Please see the Recognition of Deterioration in Pregnant or Recently Delivered Women: The Use of the Modified Early Obstetric Warning System (MEOWS) guideline for further information.

5.2 For management of sepsis, see tool in Appendix 1. The step-by-step guidance on how to manage sepsis on EPIC is given at:
https://ourplace.xfph-tr.nhs.uk/media/29904/ob-sepsis-documentation-for-maternity-patients.pdf

5.3 If you suspect your patient may have Sepsis, on EPIC, find the Sepsis Navigator on **'the More Activities Menu**' from within the Patient's chart.

5.4 **Sepsis screening**

You can complete the Sepsis Screening questions directly under the **'Vitals'** section on your Flowsheets.

5.5 If you have not already completed the *Sepsis Screen* on the **Vitals** Flowsheet, you will need to answer these questions on the '**Sepsis Screening'** Section in the *Sepsis Navigator.*

5.6 Once you open the **Sepsis Treatment Orders** set, select the appropriate orders and complete any required fields.

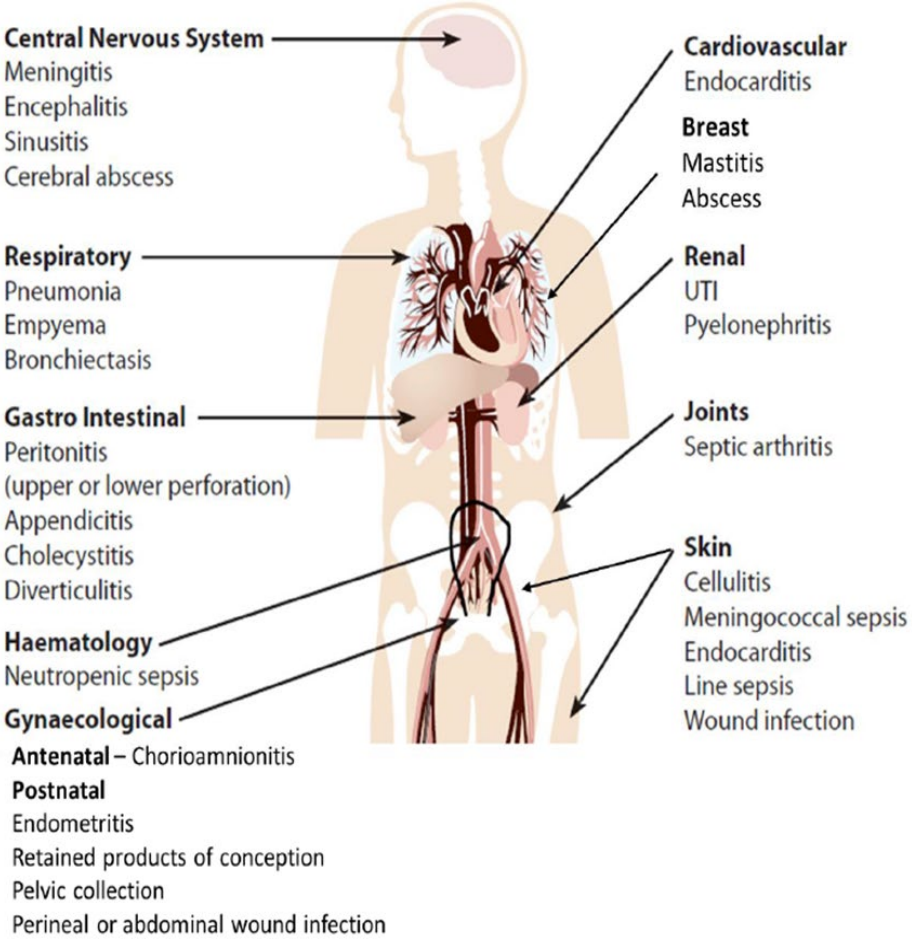
5.7 Provide prompt treatment Next, click on Launch Checklist in the table of contents of the Sepsis Navigator. You will see the Sepsis Timer has started and the checklist items in the sidebar. As orders are placed, lab results are obtained, or medications given, the red items will drop off your checklist.

5.8 Refer to the Frimley Health Adult Antimicrobial Guidelines on the intranet and via EPIC. To access maternity specific antibiotic advice and treatment, click on Body Systems and then on Obstetrics and Gynaecology.
https://viewer.microguide.global/guide/1000000134/content/adult-root

6. Source Control

6.1 A specific anatomical diagnosis of infection should be sought. It should be confirmed or excluded as rapidly as possible. Intervention for source control should be undertaken as soon as possible, within the first 12 hr after the diagnosis, if feasible.

6.2 Possible diagnoses are given in the figure below.



6.3 Various imaging modalities may be used for diagnosis, such as Chest X-Ray, Ultrasound scan, CT scan.

6.4 Review the results of any investigations requested at the earliest opportunity.

6.5 If the uterus is considered to be the primary focus of infection, retained products should be excluded by clinical examination alone.
Ultrasound examination may be considered in certain circumstances.

Exploration of the uterine cavity should be considered if retained products are suspected/confirmed.

6.6 Hysterectomy may be indicated if the woman is critically ill and could be life saving.

6.7 Non-steroidal anti-inflammatory drugs (NSAIDs) should be avoided for pain relief in sepsis as they impede the ability of polymorphs to fight Group A Streptococcus (GAS) infection.

7. Fetal Monitoring

7.1 During the intrapartum period, *continuous electronic fetal monitoring* is recommended in the presence of *maternal pyrexia*.
(Defined as a temperature > 37.5 °C on two occasions 1 hour apart or 30 minutes apart if maternal tachycardia > 120 bpm is also present) and this should also apply to sepsis without pyrexia.

7.2 *Changes in CTG*, such as changes in baseline variability or new onset decelerations, must also prompt reassessment of maternal mean arterial pressure, hypoxia and acidaemia. These changes may serve as an *early warning sig*n for derangements in maternal end-organ systems. (please refer to fetal monitoring guideline).

Delivery in Sepsis

7.3 *The effects of maternal sepsis on foetal wellbeing include the direct effect of infection in the foetus, the effect of maternal illness/shock and the effect of maternal treatment.*

7.4 The risk of neonatal encephalopathy and cerebral palsy is increased in the presence of intrauterine infection.

7.5 In a critically ill pregnant woman, birth of the baby may be considered if it would be beneficial to the mother or the baby or to both. A decision on the timing and mode of birth should be made by a senior obstetrician following discussion with the woman if her condition allows.

7.6 If preterm delivery is anticipated, cautious consideration should be given to the use of antenatal corticosteroids for foetal lung maturity in the woman with sepsis.

7.7 Attempting delivery in the setting of maternal instability increases the maternal and foetal mortality rates unless the source of infection is intrauterine.

7.8 The decision on mode of delivery should be individualised by the consultant obstetrician with consideration of severity of maternal illness, duration of labour, gestational age and viability.

7.9 Epidural/spinal anaesthesia should be avoided in women with sepsis and a general anaesthetic will usually be required for caesarean section.

8. Prophylaxis for Contacts

8.1 When a mother has been found to have invasive GAS (Group A streptococcal) infection in the peripartum period, the neonatologist should be informed, and prophylactic antibiotics administered to the baby.

8.2 Close household contacts of women with group A streptococcal infection should be warned to seek medical attention should symptoms develop, and the situation may warrant antibiotic prophylaxis.

8.3 Healthcare workers who have been exposed to respiratory secretions of women with group A streptococcal infection should be considered for antibiotic prophylaxis.

9. Infection Control Issues

9.1 Group A β-haemolytic Streptococcus and MRSA are easily transmitted via the hands of healthcare workers and via close contact in households.

9.2 Local infection control guidelines should be followed for hospital–specific isolation and contact precautions.

9.3 Invasive group A streptococcal infections are notifiable and the infection control team and the consultant for communicable diseases should be informed, and advice sought.

9.4 Women suspected of or diagnosed with group A Streptococcus sepsis should be isolated in a single room with ensuite facilities to minimise the risk of spread to other women.

9.5 Continued due attention to hand hygiene is essential to prevent cross contamination and cross-infection by staff or patients.

9.6 When more than one case of sepsis is diagnosed at the same time with the same micro-organism, urgent consideration should be given to the possibility of a contaminated area in the Maternity Unit and/or carriage of the microorganism by staff members. In such circumstances, senior medical and midwifery staff must be informed and there must be close liaison with the Microbiology department and Infection Control team.

10. Indications for Transfer to ITU

[Adapted from Plaat and Wray (2008)]

10.1 *Cardiovascular*: Hypotension or a venous lactate level of >4 mmol/l despite fluid resuscitation (lactate >2 mmol/l should prompt outreach referral)

10.2 *Respiratory*: Pulmonary oedema, Mechanical ventilation, Airway protection

10.3 *Renal*: Renal dialysis

10.4 *Neurological*: Significantly decreased conscious level

10.5 *Miscellaneous*: Multi-organ failure, Uncorrected acidosis, Hypothermia

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Appendix 1 - Sepsis Screening Tool

SEPSIS SCREENING TOOL ACUTE ASSESSMENT

PREGNANT OR UP TO 4 WEEKS POST-PREGNANCY

PATIENT DETAILS:

DATE: **TIME:**
NAME:
DESIGNATION:
SIGNATURE:

01 START THIS CHART IF THE PATIENT LOOKS UNWELL OR PHYSIOLOGY IS ABNORMAL (e.g. MEOWS)

RISK FACTORS FOR SEPSIS INCLUDE:

- ☐ Impaired immunity (e.g. diabetes, steroids, chemotherapy)
- ☐ Recent trauma / surgery / invasive procedure
- ☐ Indwelling lines / IVDU / broken skin

02 COULD THIS BE DUE TO AN INFECTION?

YES

LIKELY SOURCE:

- ☐ Respiratory
- ☐ Breast abscess
- ☐ Urine
- ☐ Abdominal pain / distension
- ☐ Infected caesarean / perineal wound
- ☐ Chorioamnionitis / endometritis

NO → **SEPSIS UNLIKELY, CONSIDER OTHER DIAGNOSIS**

03 ANY RED FLAG PRESENT?

YES

- ☐ Objective evidence of new or altered mental state
- ☐ Systolic BP ≤ 90 mmHg (or drop of >40 from normal)
- ☐ Heart rate ≥ 130 per minute
- ☐ Respiratory rate ≥ 25 per minute
- ☐ Needs O_2 (40% or more) to keep SpO_2 ≥ 92%
- ☐ Non-blanching rash / mottled / ashen / cyanotic
- ☐ Lactate ≥ 2 mmol/l*
- ☐ Not passed urine in 18 hours (<0.5ml/kg/hr if catheterised)

*lactate may be raised in & immediately after normal delivery

YES → **RED FLAG SEPSIS**

START **SEPSIS SIX**

04 ANY AMBER FLAG PRESENT?

NO

- ☐ Acute deterioration in functional ability
- ☐ Family report mental status change
- ☐ Respiratory rate 21-24
- ☐ Heart rate 100-129 or new dysrhythmia
- ☐ Systolic BP 91-100 mmHg
- ☐ Has had invasive procedure in last 6 weeks (e.g. CS, forceps delivery, ERPC, cerclage, CVs, miscarriage, termination)
- ☐ Temperature < 36°C
- ☐ Has diabetes or impaired immunity
- ☐ Close contact with GAS
- ☐ Prolonged rupture of membranes
- ☐ Wound infection
- ☐ Offensive vaginal discharge
- ☐ Not passed urine in 12-18 h (<0.5ml/kg/hr if catheterised)

YES →

* **SEND FULL SET OF BLOODS INCLUDING VBG**
IMMEDIATE REVIEW BY ST3 OR ABOVE

IF ANTIMICROBIALS ARE NEEDED, ADMINISTER AS SOON AS DECISION MADE BUT ALWAYS WITHIN 3 HOURS

I have prescribed antimicrobials ☐

This patient does not require antimicrobials as:

- I don't think this patient has an infection ☐
- Patient already on appropriate antimicrobials ☐
- Escalation is not appropriate ☐
- Other_____

NAME: **GRADE:**
DATE: **TIME:** ☐☐:☐☐

NO AMBER FLAGS = ROUTINE CARE /CONSIDER OTHER DIAGNOSIS
Interpret physiology in context of individual patient
ALWAYS REASSESS IF PATIENT DETERIORATES

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* Bloods to include lactate, FBC, U&Es, CRP, LFTs, clotting.

SEPSIS SCREENING TOOL - THE SEPSIS SIX

PREGNANT
OR UP TO 4 WEEKS POST-PREGNANCY

PATIENT DETAILS:	DATE: TIME:
	NAME:
	DESIGNATION:
	SIGNATURE:

COMPLETE ALL ACTIONS WITHIN ONE HOUR

01 ENSURE ST3+ ATTENDS, CALL CONSULTANT

TIME ☐☐:☐☐

NOT ALL PATIENTS WITH RED FLAGS WILL NEED THE 'SEPSIS 6' URGENTLY.
A SENIOR DECISION MAKER MAY SEEK ALTERNATIVE DIAGNOSES/ DE-ESCALATE CARE.

NAME: GRADE:

02 OXYGEN IF REQUIRED

TIME ☐☐:☐☐

START IF O2 SATURATIONS LESS THAN 92% - AIM FOR O2 SATURATIONS OF 94-98%
IF AT RISK OF HYPERCARBIA AIM FOR SATURATIONS OF 88-92%

03 SEND BLOODS INCLUDING CULTURES

TIME ☐☐:☐☐

BLOOD CULTURES, VBG, BLOOD GLUCOSE, LACTATE, FBC, U&Es, LFTs, CRP AND CLOTTING
LUMBAR PUNCTURE IF INDICATED, CONSIDER RAPID PATHOGEN ID

04 GIVE IV ANTIBIOTICS, CONSIDER DELIVERY

TIME ☐☐:☐☐

MAX. DOSE BROAD SPECTRUM THERAPY (CONSIDER ESCALATION IF ALREADY ON ANTIBIOTICS)
CONSIDER: LOCAL POLICY / ALLERGY STATUS / ANTIVIRALS
EVALUATE NEED FOR IMAGING/ SPECIALIST REVIEW TO HELP IDENTIFY SOURCE
IF SOURCE AMENABLE TO DRAINAGE ENSURE ACHIEVED ASAP BUT ALWAYS WITHIN 12H

05 GIVE IV FLUIDS

TIME ☐☐:☐☐

IF LACTATE → 2mmol/L OR SBP ← 90 mmHg GIVE 500mL over 15 min AND CALL ITU
REPEAT IF NO IMPROVEMENT.

06 MONITOR

TIME ☐☐:☐☐

USE EARLY WARNING SCORE e.g. MEOWS. MEASURE URINARY OUTPUT: THIS MAY REQUIRE A URINARY CATHETER. REPEAT LACTATE HOURLY IF INITIAL LACTATE HIGH OR CLINICAL CONDITION CHANGES

RED FLAGS AFTER ONE HOUR – ESCALATE TO CONSULTANT NOW

Monitor at least every 30 mins using early warning score e.g. MEOWS

RECORD ADDITIONAL NOTES HERE:

e.g. allergy status, arrival of specialist teams, de-escalation of care, delayed antimicrobial decision making, variance

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Full version control record

Version:	2.0
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Library check completed:	21 December 2023
Professional Midwifery Advocate:	Angeliki Karava-Sood, Lead Midwife for Quality, Audit and Patient Experience, WPH
Ratified at:	Cross Site Obstetrics Clinical Governance meeting, 27 March 2024
Date Issued:	4 April 2024
Review Date:	March 2027
Pharmaceutical dosing advice and formulary compliance checked by:	Ruhena Ahmad, Pharmacist, WPH; 19 January 2024
Key words:	Sepsis, sepsis assessment tool, maternal sepsis, sepsis screening, MEOWS

This guideline has been registered with the trust. However, clinical guidelines are guidelines only. The interpretation and application of clinical guidelines will remain the responsibility of the individual clinician. If in doubt, contact a senior colleague or expert. Caution is advised when using guidelines after the review date. This guideline is for use in Frimley Health Trust hospitals only. Any use outside this location will not be supported by the Trust and will be at the risk of the individual using it.

Version History

Version	Date	Guideline Lead(s)	Status	Comment
1.0	Dec 2019	V. Paul	Final	First cross site version, approved at cross site O&G CG meeting
2.0	March 2024	V. Paul, Z. Kesoglou	Final	Approved at Cross Site Obstetrics Clinical Governance, 27/03/2024

Related Documents

Document Type	Document Name
Guideline	FHFT Sepsis Screening Tool (2023) Version 16
Guideline	Recognition of deterioration in pregnant or recently delivered women: The use of the modified early obstetric warning system (MEOWS)
Guideline	Adult Antimicrobial Guidelines
Guideline	Sepsis documentation for maternity patients