Guideline for the use of the Modified Obstetric Early Warning Scoring (MOEWS) system And for the Care of Women with Sepsis in Pregnancy and the Postnatal Period

Author/Owner	**Practice Educator Midwife**	
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1.0 Introduction

In the UK there were 23 maternal deaths attributed to sepsis between 2017-2019 (Saving Lives, Improving Mother's care - Confidential Enquiry into Maternal Deaths and Morbidity – 2021). Of these, 13 women (6% of total maternal deaths) died of genital /urinary tract sepsis including early pregnancy deaths (direct deaths) and 10 women died from other infections e.g. influenza, pneumonia etc. (indirect deaths).

The mortality rate for pregnancy related sepsis has continued to increase steadily, highlighting the importance of 'thinking sepsis, and not just COVID-19'.

The physiology of pregnancy allows women with sepsis to compensate remarkably well before deterioration is evident, by which point women can be critically unwell. Whilst it is recognised that pregnancy and birth are normal physiological events, there is potential for any woman to be at risk of deterioration. Therefore, all women require close observation and action where there are deviations from normal parameters.

The MBRRACE confidential enquiry – Saving lives, Improving Mothers care (2014) emphasised the need to recognise and act upon signs of ill health.

Performing basic observations (temperature, pulse rate, respiratory rate and blood pressure) can facilitate the prompt recognition of acute illness and/or rapid deterioration of a woman's condition.

Many maternity units have developed their own Modified Early Warning Score as the National Early Warning Score is inappropriate for use in pregnancy (Gopalan PD 2004). For pregnant patients the Modified Obstetric Early Warning System (MOEWS) chart (appendix 1) has been specifically produced to reflect the physiological adaptations of normal pregnancy and the early postnatal period.

The benefits of the Modified Obstetric Early Warning Score (MOEWS) include:

- Providing a standardised objective measure of clinical improvement or deterioration.
- Facilitating the early identification of women at risk of deterioration.
- Facilitating close observation of women recently discharged from critical or high dependency care to ward area.
- Enabling all maternity staff to escalate to senior staff in a timely way.
- Assisting in early diagnosis of complications.

2.0 Objective

This guidance provides staff with information on recognising and monitoring the obstetric patient using the MOEWS chart to minimise the risk of maternal death from sepsis.

It provides provide guidance on:

- How observations should be recorded and assessed. (MOEWS chart/ Appendix 1)
- Using the MOEWS to guide clinical decision making. (Protocol for escalation of the deteriorating patient/ Appendix 2)
- Diagnosing sepsis
- Management of sepsis and septic shock

3.0 Scope

This guideline should be followed by all staff caring for women who are pregnant and up to six weeks post-partum.

It applies to all antenatal, intrapartum and postnatal women. It also covers the peri-operative period in pregnant women undergoing elective or emergency surgical procedures either related or unrelated to their pregnancy.

4.0 MOEWS

The MOEWS chart must be used on all pregnant patients when attending or when admitted to hospital. See appendix 1

The chart should be used in conjunction with, not instead of, existing care pathway documentation, high dependency or epidural charts.

One MOEWS chart should follow the patient throughout each admission.

If more than one MOEWS chart is used keep these together so that a trend in observations can be seen.

A MOEWS should be performed on transfer to a new ward area.

4.1 Observations required

Observations required to calculate a MOEWS score are:

- Respiratory rate
- Oxygen saturations
- Oxygen requirements
- Temperature
- Heart rate
- Systolic blood pressure
- Diastolic blood pressure
- Level of consciousness (AVPU)
- Urine output
- Nausea
- Whether the patient 'looks unwell'

Observations should be documented in the appropriate box on the MOEWS chart.

A numerical value is assigned to each observation, and the total score calculated and recorded.

4.1.1 Respiratory rate

- Respiratory rate is the most sensitive indicator of deterioration and must be recorded as part of every MOEWS assessment.
- Changes may indicate sepsis, respiratory problems, cardiac problems or blood loss.
- Respiratory rate changes in labour occur due to pain and patient effort, particularly during the active second stage of labour. This needs to be taken into consideration when recording during labour.

4.1.2 Oxygen saturations and oxygen therapy

- If oxygen is being administered it must be prescribed, the flow rate should be recorded and oxygen saturations monitored.
- Oxygen saturations must be documented at each MOEWS assessment.
- If there is an unexplained abnormal oxygen saturation reading, equipment error may be considered and an alternative probe utilised.
- Some patients may require oxygen therapy to maintain normal oxygen saturations.
    - This may indicate respiratory failure, sepsis or bleeding
    - Oxygen flow rates of either 1-4L/min or >4L/min must be recorded on the MOEWS chart

4.1.3 Temperature

- A low temperature is as significant as a high temperature. Hypothermia is defined as a core temperature <36˚C.
- Hypothermic women should be warmed using blankets and warm fluids.
- Changes in temperature may indicate sepsis, major haemorrhage or a post transfusion reaction (particularly a large transfusion), and may be the first and only change on the MOEWS.

4.1.4 Heart rate

- Tachycardia can be an indication of infection, haemorrhage or pain

4.1.5 Blood Pressure

- A rise in blood pressure should be regarded as a sign of potential Pregnancy Induced Hypertension (PIH). Anti-hypertensives may need to be considered.
- A fall in blood pressure should be regarded as a late sign of deterioration.
- Consider trends in blood pressure, comparison to booking blood pressure readings and the overall clinical picture
- Women having epidural analgesia for labour should have their blood pressure monitored according to the epidural care pathway.
- An abnormal blood pressure on an automated machine must not be ignored and regarded as erroneous. If in doubt, a manual blood pressure should be taken.

4.1.6 Level of consciousness

- Neurological response should be initially assessed and documented on the MOEWS chart for all women using the AVPU score.
- If warranted, a Glasgow Coma Scale (GCS) score should be performed by a competent practitioner.
- An altered neurological status may represent intracranial problems, respiratory or cardiovascular compromise.
- Assessing neurological status using AVPU involves the following:
    - **Alert:** the patient is alert and orientated
    - **Voice:** the patient responds only to verbal commands
    - **Pain:** the patient is ONLY responsive to pain. The on-call Anaesthetist and on-call Obstetrician should be asked to review the patient immediately.
    - **Unresponsive:** if unresponsive, check for pulse and breathing. If pulse is present and the patient is breathing fast bleep the obstetrics registrar and obstetric anaesthetist. If no pulse/no breathing, then the 2222 should be called and adult cardiac arrest team requested.

4.1.7 Urine output

- In the majority of women urine output does not need to be routinely measured. However, it should be discussed with women at each MOEWS assessment whether reasonable volumes of urine have been voided.
- A fluid balance chart should be commenced in the following instances:
    - Women who score on the MOEWS chart

- Women with abnormal fluid losses such as vomiting, significant blood loss, haemorrhage, drains or diarrhoea
- Women with pre-eclampsia or eclampsia

4.1.8 Patients who 'looks unwell'

Women may look or feel unwell, but their MOEWS may not reflect this. Pregnant patients compensate very well to physiological stress, in particular cardiovascular stress. Looking or feeling unwell has been shown to be a precursor to physiological changes.

Staff must have a high index of suspicion when a woman reports feeling unwell

4.2 New symptoms

If the patient complains of new symptoms, a full MOEWS assessment must be performed. For example, if a woman reports the following symptoms:

- Pre-eclampsia symptoms - headache, dizziness, nausea and vomiting, visual disturbance
- Persistent abdominal pain - may indicate sepsis or bleeding
- Increase in PV blood loss - may indicate an antepartum or postpartum haemorrhage
- Offensive PV loss - may indicate infection or sepsis
- Shortness of breath / chest pain - may indicate a pulmonary embolism, pulmonary oedema, pneumonia or early Acute Respiratory Distress Syndrome

4.3 Frequency and documentation of MOEWS

Patients admitted to the antenatal/ postnatal ward will be allocated to either the low risk pathway or the high risk pathway for observations by the medical team admitting the patient. If possible, the woman's normal observations should be noted for comparison, especially if they have a chronic illness.

Minimum observation frequencies on these pathways are:

- Low risk pathway: one full set of observations recorded every 12 hours.
- High risk pathway: one full set of observations recorded every 4 hours

A MOEWS score of

- 1 requires observations to be undertaken 2-4 hourly and the person carrying out the observations must alert the midwife caring for the woman
- 2 requires observations to be undertaken 1-2 hourly and the midwife must decide if a medical review is needed
- 3-4 requires medical review within 30 minutes
- 5-6 or $\geq$3 in one category requires medical review within 15 minutes by senior obstetrician and obstetric anaesthetist
- $\geq$7 requires medical review immediately by both senior obstetrician and obstetric anaesthetist

Observations should be documented on the MOEWS chart in the antenatal, post-partum and peri-operative periods.
Intrapartum maternal and fetal observations should be recorded on the partogram; this should be documented in the care plan
Some patients will be monitored on different charts e.g. maternity enhanced care/ICU chart. This should be documented in the care plan.

5.0 Sepsis

5.1 Definition

Sepsis is a clinical syndrome caused by the body's immune and coagulation systems being switched on by infection.

Septic shock is a life-threatening condition that is characterized by low blood pressure despite adequate fluid replacement; and organ dysfunction or failure.

Potential complications of sepsis/septic shock include:

- Acute respiratory distress syndrome (ARDS)
- Disseminated Intravascular Coagulation (DIC)
- Acute renal failure
- Liver failure
- CNS dysfunction
- Cardiac failure
- Death

Women with certain clinical/medical factors are at greater risk of developing sepsis, these include but are not limited to:

- Women with impaired immunity (e.g. steroids, chemotherapy)
- Women who have had recent trauma/ surgery/ invasive procedure
- Women with indwelling lines / broken skin
- Women who have developed gestational diabetes

5.2 Prevention and early detection of sepsis

Pregnant women and women in the postnatal period (up to 6 weeks post-partum) are a high-risk group for sepsis.

They may present with non-specific, non-localized symptoms such as feeling unwell and will not necessarily have a raised temperature.

Family members may report changes in behaviour /mental state.

In the Antenatal Period

- Women must seek prompt medical advice if they develop fever, malaise, breathlessness, abdominal pain, diarrhoea, or hypothermia
- Relevant investigations including throat swabs in cases of suspected upper respiratory tract infection must be taken
- Women must be advised to seek prompt medical advice if they develop symptoms of fever, malaise, abdominal pain, abnormal vaginal discharge or diarrhoea after the following procedures:
    - Amniocentesis
    - Chorionic villus sampling
    - Insertion of a cervical suture
    - Amniotomy (AROM)
    - Prolonged rupture of membranes

In the Intrapartum period

Women in labour must have an obstetric review if they:

- Complain of unexpected abdominal pain with/without signs of fetal distress and/or diarrhoea
- Present with offensive liquor or vaginal discharge

- Present with a known infection requiring treatment

In the postnatal period

Women in the postnatal period must have an obstetric review if they:

- Develop signs of a wound infection (abdominal or perineal/genital tract)
- Present with offensive lochia and/or sub-optimal uterine involution
- Present with signs of mastitis
- Present with abdominal pain and/or diarrhoea
- Present with signs of a urinary tract infection
- Present with fever and general malaise associated with a sore throat or upper respiratory tract infection or following contact with another person with a sore throat or upper respiratory tract infection

If the woman is in the community they should be referred for an obstetric review in the Maternity Assessment Unit.
The above lists are not exhaustive.

5.3 Diagnosis of Sepsis

If sepsis is suspected, it is essential to identify the source of infection:

- Review clinical history
- Perform a thorough clinical examination to assess for infection
- Consider further imaging including X-ray, ultrasound, CT as appropriate.

If there is no likelihood of infection then sepsis is unlikely.
Consider an alternative diagnosis.

5.4 Management of Sepsis

The UK Sepsis Trust recommends use of the Maternal Sepsis Screening Tool if a patient looks unwell or MOEWS has triggered.
This can be used for women who are currently pregnant and up to six weeks postpartum. (See Appendix 3 or 4 depending on woman's location)
The same observations taken to calculate a MOEWS score are categorised as either red, amber or no flag for maternal sepsis

Red flags for maternal sepsis

- Objective evidence of new or altered mental state
- Systolic BP $\leq$90mmHg (or drop of >40 from normal)
- Heart rate $\geq$130 per minute
- Respiratory Rate $\geq$25 per minute
- Needs oxygen to keep SpO_2 $\geq$92%
- Non-blanching rash/mottled/ashen/cyanotic
- Lactate >2 mmol/L (may be raised in and immediately after normal delivery)
- Not passed urine in 18 hours (0.5ml/kg/h if catheterised)

The presence of any one **RED FLAG** prompts the immediate completion of the SEPSIS SIX PATHWAY
All actions must be completed within one hour:

1. Ensure senior clinician attends

Not all patients with red flags will need 'Sepsis 6' urgently.
A senior decision maker may seek alternative diagnoses/de-escalate care

2. Oxygen if required
   Start if O_2 saturation <92%.
   Aim for O_2 saturations of 94-98%.
   If at risk of hypercarbia, aim for saturations of 88-92%
3. Send bloods including cultures, blood glucose, lactate, FBC, U&E, CRP and clotting.
   Lumbar puncture if indicated
4. Give IV antibiotics - maximum dose broad spectrum therapy.
   Consider local policy/allergy status/antivirals.
   Think source control - evaluate need for imaging/specialist review.
   If source amenable to drainage, ensure achieved as soon as possible, but always within 12 hours
5. Give IV fluids - in divided fluid boluses of 500ml.
   NICE recommends using lactate to guide further fluid therapy
6. Monitor - use MOEWS.
   Measure urine output: this may require a urinary catheter.
   Repeat lactate at least once per hour if clinical condition changes.

If Red flags persist after one hour – escalate to consultant immediately

Amber Flags for maternal sepsis

- Acute deterioration in functional ability
- Respiratory rate 21-24
- Heart rate 100-129 or new dysrhythmia
- Systolic BP 91-100
- Has had invasive procedure in last 6 weeks (e.g. Caesarean Section, forceps delivery, Evacuation of Retained Products of Conception, cerclage, Chorionic Villus Sampling, miscarriage, termination)
- Temperature <36C
- Has diabetes or gestational diabetes
- Close contact with Group A Streptococcus infection
- Prolonged rupture of membranes
- Bleeding / wound infection
- Offensive vaginal discharge
- Non reassuring CTG/fetal tachycardia >160
- Behavioural/mental status change

Any ONE AMBER FLAG requires further review including:

1. Send full set of bloods
2. Ensure senior clinical review within 60 minutes
3. Give antimicrobials if needed
4. Plan for escalation and source control (if applicable) within 3 hours

Antibiotic administration

Before giving antibiotics: take blood cultures and urine, sputum, vaginal swabs, breast milk, throat swabs etc.

Where the source of infection is clear use local antibiotic guidance.

Antibiotic therapy must be reviewed in consultation with microbiologist depending on the patient's clinical need/ culture results.

For women with a suspected infection but no clear diagnosis:

- Start broad spectrum antibiotics immediately
    - Co-amoxiclav and metronidazole
    - Clindamycin and gentamicin if penicillin allergic
- Clindamycin is the antibiotic of choice for Group A streptococcal infection (GAS), add this to the antibiotic regime if GAS is suspected or the patient is very unwell.
- In cases of Severe sepsis: Tazocin and Clindamycin (Discuss with microbiology)
- In cases of Septic Shock: Tazocin, Clindamycin and gentamicin (Discuss with microbiology)
- If meningococcal infection is suspected (fever and purpuric rash) give Ceftriaxone

Treat the source if applicable:

- Drainage of abscess, evacuation of retained products of conception etc.
- Management of a woman in the antenatal or intrapartum period may involve delivery of the baby, especially if chorioamnionitis is the cause of sepsis
- The decision to deliver the baby will be made by a senior obstetrician based on the whole clinical picture including the source and severity of sepsis, gestation, fetal wellbeing, stage and progress of labour, parity, response to treatment.
- If a preterm delivery is anticipated consider the use of corticosteroids for fetal lung maturity.
- Avoid epidural or spinal anaesthesia in women with sepsis

5.5 Acute Kidney Injury (AKI)

Acute Kidney injury must be considered if a woman has a creatinine level of > 90 micromols/l (as well as other criteria). This will be flagged as an AKI alert on the ICE system. The result must be reviewed by the obstetric team for further investigation.

A joint discussion between the Obstetric Consultant and Obstetric Anaesthetist must take place for:

- Any concerns regarding an ICE alert
- Cases where a rare pregnancy related AKI might exist
- Any non-pregnancy AKI cause

If concerns remain, contact the Renal SPR on call at Northern General Hospital, Sheffield via Switchboard, for advice.

If a patient is deteriorating consider involving the Critical Care team early.

If an AKI is present (Urine output < 0.5mls/kg/hr / elevated creatinine) manage as per the table below:

STOP-AKI	Immediate AKI RESPONSE
Sepsis	Start Sepsis Six care bundle / Identify and treat source Oxygen/ hourly urine output / lactate/ cultures / IV antibiotics / consider fluids
Toxins	Stop/Adjust nephrotoxins e.g. gentamicin, NSAIDS, contrast prophylaxis if CT contrast scan
Optimise BP	Assess volume status / Assess BP parameters in obstetric context Critical Care or Renal advice if deteriorating / need vasopressors
Prevent Harm	Treat complications / Identify AKI cause and investigate / Review medications / Obstetric Fluid Management Plan
Antenatal – the patient will require enhanced care. Monitor heart rate, blood pressure, respiratory rate, oxygen saturation, fluid balance and chest auscultation at least every hour	
Intrapartum – monitor all observations as listed hourly: heart rate, blood pressure, respiratory rate, oxygen saturation, fluid balance and chest auscultation	
Continue to monitor fluid balance and renal function until the AKI has recovered	

5.6 Management of septic shock

Septic shock is a life-threatening condition that is characterised by low blood pressure, despite adequate fluid replacement; and organ dysfunction or failure.

Management requires transfer to enhanced care and immediate review by the Anaesthetist and Obstetrician (Registrar or Consultant).

Consider the following rescue measures and document all observations on the maternity enhanced care chart:

A: Establish airway patency; apply 15l/min oxygen via reservoir mask.

B: Check respiratory rate.
Attach SpO_2 monitoring.
Check ABGs including lactate. Serum lactate will identify patients with hypoperfusion but without hypotension.

C: Check pulse rate.
Check peripheral perfusion: capillary refill time <2 seconds and warmth of the extremities.
Check urine output and fluid balance status.
Check BP (remember sepsis can produce significant vasodilatation and patients may be profoundly hypotensive but have warm peripheries)
Establish intravenous access with 2 X large bore cannulae.
Send blood for FBC, U&Es, Coagulation, LFTs, CRP, G&S, blood cultures.
Give an intravenous fluid bolus of 500mls or 20ml/kg of a crystalloid solution
Check temperature and instigate measures to normalise temperature.
Arterial line may be required for blood pressure monitoring and blood gas sampling

D: Check blood glucose
Check level of consciousness
Nurse the woman in a left lateral tilt if she is pregnant
Fetal monitoring (if applicable)

Escalation to Critical Care

Involve the Critical Care team **early** in the management of severe sepsis and septic shock.

Criteria of patients who need Critical Care admission:

- Hypotension or raised serum lactate levels despite fluid resuscitation and requiring vasopressor support
- Pulmonary oedema or requiring airway protection or ventilation
- Requiring renal dialysis
- Significantly decreased level of consciousness
- Multi-organ failure
- Uncorrected acidosis
- Severe Hypothermia

Neonatal Care

Refer to the following guidelines when developing neonatal care plans:

- Guideline for the Prevention of Early-onset Neonatal Group B Streptococcal Disease
- Guideline for the Prevention of Early Onset Neonatal infection

6.0 Roles and responsibilities

6.1 Midwives

All observations must be completed on initial assessment and documented on a MOEWS chart.

All observations must be completed as a minimum 12 hourly or as indicated by the MOEWS score.

Take appropriate action according to each score.

Consider the possibility of sepsis in maternity patients with risk factors for sepsis, or signs and symptoms of infection or deterioration.

Escalate in a timely manner if sepsis is suspected from clinical picture and /or clinical observations.

6.2 Obstetricians

Timely review of patients when requested and further escalation if needed.

Obstetric Consultant to review urgent and high risk cases.

Consider the possibility of sepsis in maternity patients with risk factors for sepsis, or signs and symptoms of infection or deterioration

Respond in a timely manner if sepsis is suspected from the clinical picture or clinical observations.

Instigate management plans and escalate accordingly.

Early involvement of obstetric doctors, anaesthetists and if required critical care outreach team.

6.3 Anaesthetists

Timely review of patients when requested.

Facilitate timely transfer to Critical Care if needed.

7.0 Associated documents and reference

Knight M, et al (2020) of MBRRACE-UK. Saving Lives, Improving Care - Lessons learned to inform future maternity care from the UK and Ireland Confidential Enquiries into Maternal Deaths and Morbidity 2016-18

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Singh S, McGlennan A, England A, Simons R. A validation study of the CEMACH recommended modified early obstetric warning system (MOEWS)*. Anaesthesia 2012, 67, 12–18

The Sepsis Manual: 5th Edition, The UK Sepsis Trust, www.sepsistrust.org/professional-resources/clinical/

Royal College of Obstetricians & Gynaecologists (RCOG) Roles and responsibilities of the consultant providing acute care in obstetrics and gynaecology May 2022

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MBRRACE – UK. Saving Lives, Improving Mothers' Care. Surveillance of maternal deaths in the UK 2017-19 and lessons learned to inform maternity care from the UK and Ireland Confidential Enquiries into Maternal deaths and Morbidity 2017-19 (2021) [online] www.npeu.ox.ac.uk/mbrrace-uk

National Institute for Health and Care Excellence: Clinical guideline 121 intrapartum care for women with existing medical conditions or obstetric complications and their babies (2019) [online] www.nice.org.uk

National Institute for Health and Care Excellence. Clinical guidance 51. Sepsis: recognition, diagnosis and early management (2016 , Last Updated 2017) [online] www.nice.org.uk

RCOG Green Top Guidelines 64 a and 64 b. Sepsis in Pregnancy and bacterial Sepsis following pregnancy.

8.0 Training and resources

Training will be delivered as outlined in the Maternity Training Needs Analysis. This is updated on an annual basis.

9.0 Monitoring and audit

Any adverse incidents relating to the guideline for Modified Obstetric Early Warning Score (MOEWS) will be monitored via the incident reporting system. Any problems will be actioned via the case review and root cause analysis action plans. The action plans are monitored by the risk midwife to ensure that improvements in care are made.

The trends and any root cause analysis are discussed at the monthly risk meetings to ensure that appropriate action has been taken to maintain safety.

The guideline for Modified Obstetric Early Warning Score (MOEWS) will be audited in line with the annual audit programme, as agreed by the CBU. The audit action plan will be reviewed at the monthly risk management meetings on a quarterly basis and monitored by the risk midwife to ensure that improvements in care are made.

10.0 Equality and Diversity

The Trust is committed to an environment that promotes equality and embraces diversity in its performance as an employer and service provider. It will adhere to legal and performance requirements and will mainstream equality, diversity and inclusion principles through its policies, procedures and processes. This guideline should be implemented with due regard to this commitment.

To ensure that the implementation of this guideline does not have an adverse impact in response to the requirements of the Equality Act 2010 this policy has been screened for relevance during the policy development process and a full equality impact assessment is conducted where necessary prior to consultation. The Trust will take remedial action when necessary to address any unexpected or unwarranted disparities and monitor practice to ensure that this policy is fairly implemented.

This guideline can be made available in alternative formats on request including large print, Braille, moon, audio, and different languages. To arrange this please refer to the Trust translation and interpretation policy in the first instance.

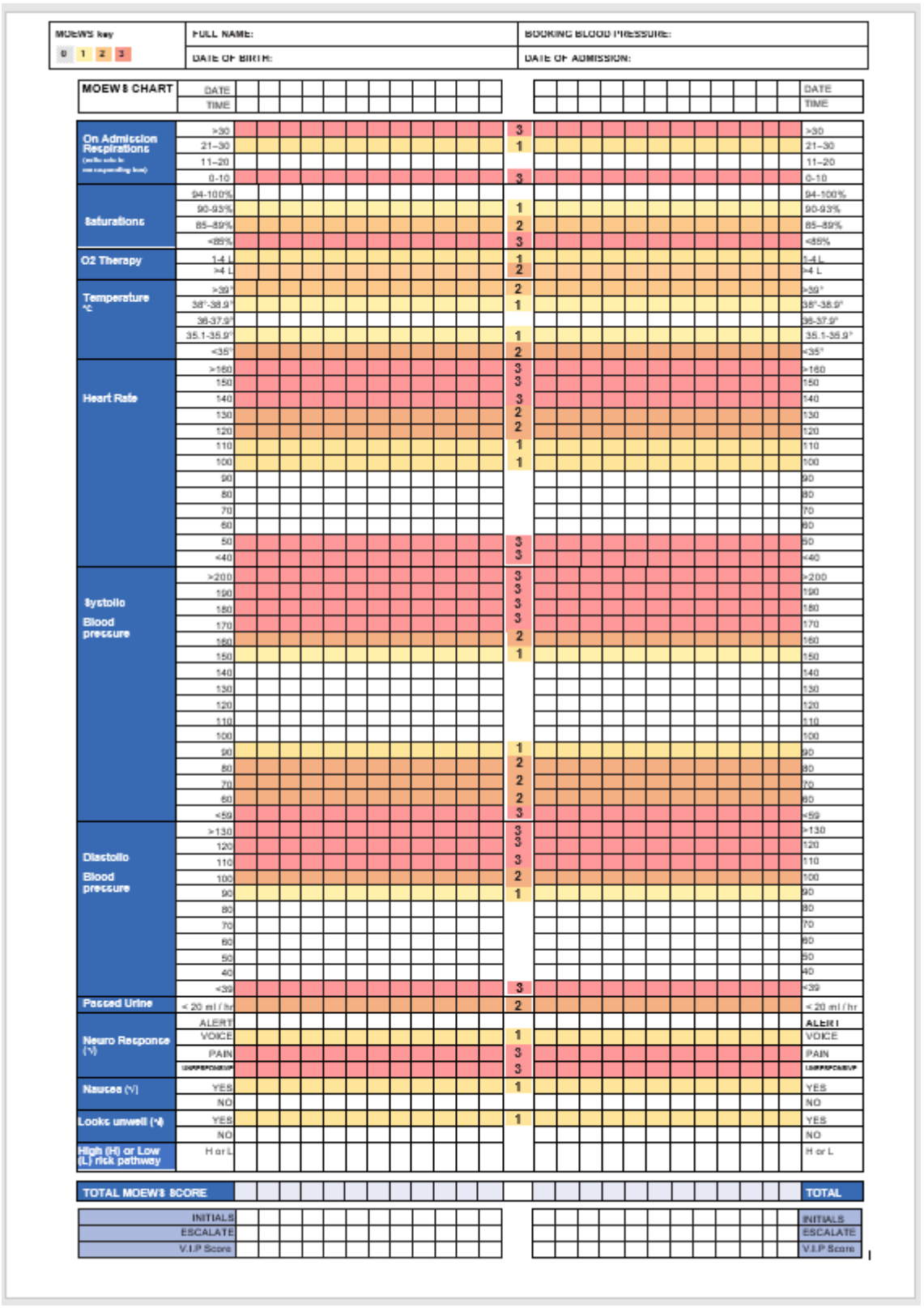
The Trust will endeavor to make reasonable adjustments to accommodate any employee/patient with particular equality, diversity and inclusion requirements in implementing this guideline. This may include accessibility of meeting/appointment venues, providing translation, arranging an interpreter to attend appointments/meetings, extending policy timeframes to enable translation to be undertaken, or assistance with formulating any written statements.

10.1 Recording and Monitoring of Equality & Diversity

The Trust understands the business case for equality, diversity and inclusion and will make sure that this is translated into practice. Accordingly, all guidelines will be monitored to ensure their effectiveness.

Monitoring information will be collated, analysed and published on an annual basis as part of Equality Delivery System. The monitoring will cover the nine protected characteristics and will meet statutory employment duties under the Equality Act 2010. Where adverse impact is identified through the monitoring process the Trust will investigate and take corrective action to mitigate and prevent any negative impact.

Appendix 1 MOEWS chart and Scoring System



MOEWS key	FULL NAME:	BOOKING BLOOD PRESSURE:
0 1 2 3	DATE OF BIRTH:	DATE OF ADMISSION:

MOEWS CHART	DATE / TIME																									DATE / TIME
On Admission Respirations	>30													3												>30
	21–30													1												21–30
	11–20																									11–20
	0-10													3												0-10
Saturations	94-100%																									94-100%
	90-93%													1												90-93%
	85–89%													2												85–89%
	<85%													3												<85%
O2 Therapy	1-4 L													1												1-4 L
	>4 L													2												>4 L
Temperature °C	>39°													2												>39°
	38°-38.9°													1												38°-38.9°
	36-37.9°																									36-37.9°
	35.1-35.9°													1												35.1-35.9°
	<35°													2												<35°
Heart Rate	>160													3												>160
	150													3												150
	140													3												140
	130													2												130
	120													2												120
	110													1												110
	100													1												100
	90																									90
	80																									80
	70																									70
	60																									60
	50													3												50
	<40													3												<40
Systolic Blood pressure	>200													3												>200
	190													3												190
	180													3												180
	170													3												170
	160													2												160
	150													1												150
	140																									140
	130																									130
	120																									120
	110																									110
	100																									100
	90													1												90
	80													2												80
	70													2												70
	60													2												60
	<59													3												<59
Diastolic Blood pressure	>130													3												>130
	120													3												120
	110													3												110
	100													2												100
	90													1												90
	80																									80
	70																									70
	60																									60
	50																									50
	40																									40
	<39													3												<39
Passed Urine	< 20 ml / hr													2												< 20 ml / hr
Neuro Response (V)	ALERT																									ALERT
	VOICE													1												VOICE
	PAIN													3												PAIN
	UNRESPONSIVE													3												UNRESPONSIVE
Nausea (V)	YES													1												YES
	NO																									NO
Looks unwell (•)	YES													1												YES
	NO																									NO
High (H) or Low (L) risk pathway	H or L																									H or L
TOTAL MOEWS SCORE																										TOTAL
INITIALS																										INITIALS
ESCALATE																										ESCALATE
V.I.P Score																										V.I.P Score

Score	3	2	1	0	1	2	3
Resp rate breaths/ min	≤ 10			11- 20	21-30		> 30
O2 Sats %	< 85	85-89	90-93	94 -100			
O2 req(lt)					1-4	>4	
Temp °C		< 35	35 -35.9	36 -37.9	38- 38.9	≥39	
Heart Rate bpm	<50			50 - 99	100-119	120-139	≥ 140
Systolic BP mmHg	<60	60 - 89	90 - 99	100 -149	150-159	160-169	> 170
Diastolic BP mmHg	<40			40 - 89	90 - 99	100-109	≥ 110
AVPU	P/U		V	A			
Urine ml/hr		<20					
Nausea			Yes	No			
Looks unwell				No	Yes		
Total Score							

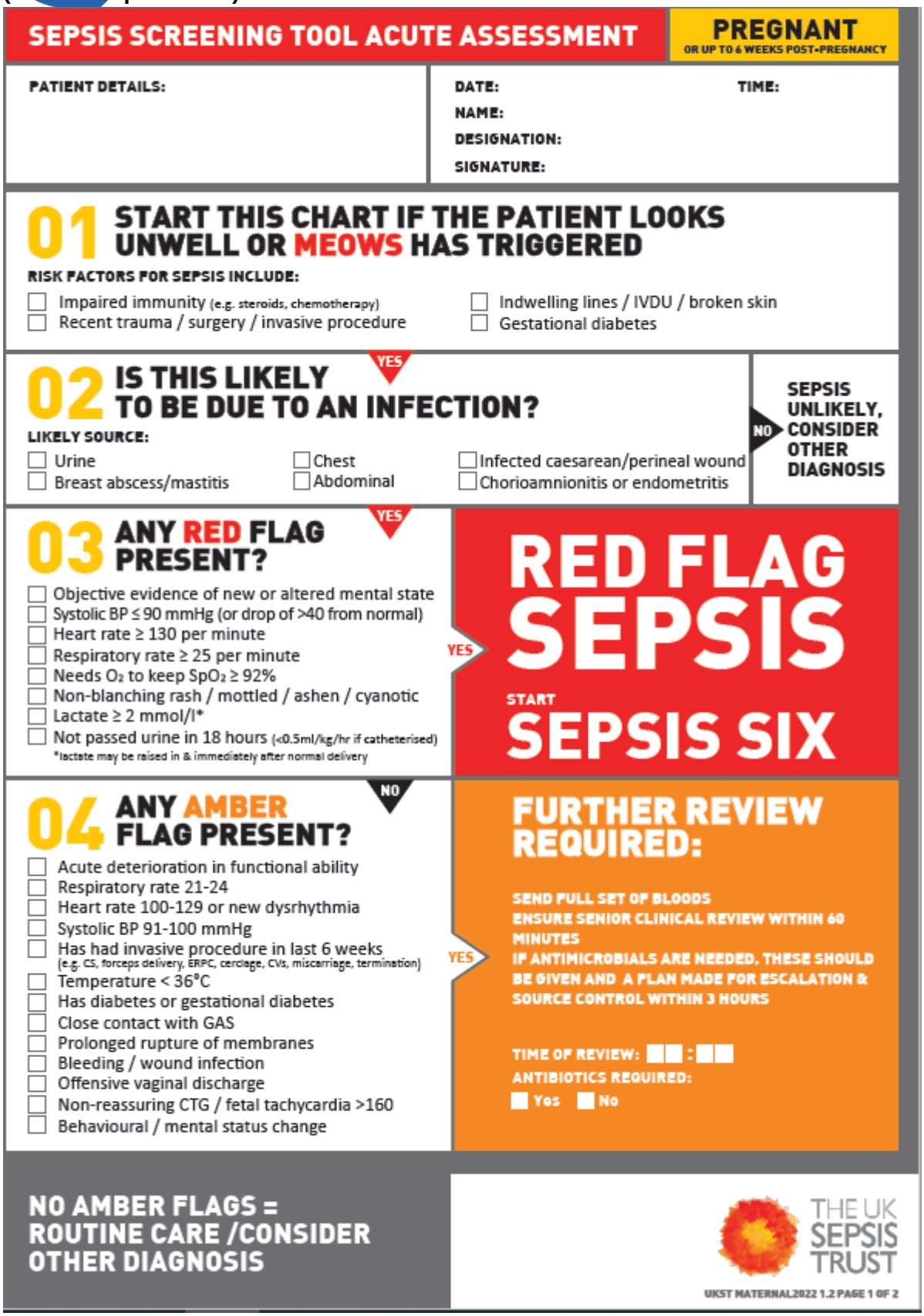
Appendix 2: Protocol for escalation of the deteriorating patient

Low risk
1-2
	A score of 1 or 2 is low risk
	• Inform a registered Midwife
	• Increase observation frequency
	  ○ Score1: 2-4 hourly
	  ○ Score 2:1-2 hourly
	• Clinical judgement must be used to consider whether increased observation frequency is sufficient at this stage
	• If concerns are present, escalate to a Tier One Doctor or above
	• If score increases, act as per relevant risk actions below

Medium risk **3-4**	**A score of 3 or 4 is medium risk** • Midwife to inform Tier One Doctor or above and request review within **30 minutes** • If no review within 30 minutes escalate to Tier Two Doctor • Midwife to inform Labour Ward Coordinator • If no improvement after initial treatment, inform Anaesthetist and Senior Obstetrician • Consider transfer to Labour Ward for closer monitoring and care
High risk **5-6** **OR a score of 3 in one parameter**	**A score of 5-6, or a score of 3 in 1 parameter is high risk** • Midwife to inform Tier Two Doctor or above, and Anaesthetist and request review within **15 minutes** • If no review within 15 minutes escalate to Consultant • Transfer to Labour Ward for closer monitoring and care, when safe
Urgent risk **7 or more**	**A score of 7 or above is an urgent risk** • Contact Senior Obstetrician and Anaesthetist and ask to review immediately • 2222 bleep obstetric emergency team if not immediately available in the clinical area. • If the fetus is compromised, also consider 2222 for the Neonatal Emergency team • If out of hours, Consultant to be informed to attend as per RCOG Roles and responsibilities of a Consultant 2022 • Contact Critical Care • Inform Birthing Centre Coordinator • Transfer to Birthing Centre/Critical Care as appropriate, when safe

- Where a doctor is unavailable to review escalate to the next level of seniority.
- Escalate concerns using the principles of SBAR communication to the relevant person.
- All MOEWS scores, requests for review and further actions should be documented in the notes, including times.

Appendix 3 – Sepsis Screening Tool Acute Assessment and Sepsis Six (The UK Sepsis Trust)



SEPSIS SCREENING TOOL ACUTE ASSESSMENT

PREGNANT OR UP TO 6 WEEKS POST-PREGNANCY

PATIENT DETAILS:

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

01 START THIS CHART IF THE PATIENT LOOKS UNWELL OR MEOWS HAS TRIGGERED

RISK FACTORS FOR SEPSIS INCLUDE:

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

02 IS THIS LIKELY TO BE DUE TO AN INFECTION?

YES

LIKELY SOURCE:

- ☐ Urine
- ☐ Breast abscess/mastitis
- ☐ Chest
- ☐ Abdominal
- ☐ Infected caesarean/perineal wound
- ☐ Chorioamnionitis or 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 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
- ☐ 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 gestational diabetes
- ☐ Close contact with GAS
- ☐ Prolonged rupture of membranes
- ☐ Bleeding / wound infection
- ☐ Offensive vaginal discharge
- ☐ Non-reassuring CTG / fetal tachycardia >160
- ☐ Behavioural / mental status change

YES → **FURTHER REVIEW REQUIRED:**

SEND FULL SET OF BLOODS
ENSURE SENIOR CLINICAL REVIEW WITHIN 60 MINUTES
IF ANTIMICROBIALS ARE NEEDED, THESE SHOULD BE GIVEN AND A PLAN MADE FOR ESCALATION & SOURCE CONTROL WITHIN 3 HOURS

TIME OF REVIEW: ☐☐:☐☐
ANTIBIOTICS REQUIRED:
☐ Yes ☐ No

NO AMBER FLAGS = ROUTINE CARE /CONSIDER OTHER DIAGNOSIS

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SEPSIS SCREENING TOOL - THE SEPSIS SIX

PREGNANT
OR UP TO 6 WEEKS POST-PREGNANCY

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

COMPLETE ALL ACTIONS WITHIN ONE HOUR

01 ENSURE SENIOR CLINICIAN ATTENDS — TIME ☐☐:☐☐

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

02 OXYGEN IF REQUIRED — TIME ☐☐:☐☐

START IF O_2 SATURATIONS LESS THAN 92% - AIM FOR O_2 SATURATIONS OF 94-98%IF AT RISK OF HYPERCARBIA AIM FOR SATURATIONS OF 88-92%

03 SEND BLOODS INCLUDING CULTURES — TIME ☐☐:☐☐

BLOOD CULTURES, BLOOD GLUCOSE, LACTATE, FBC, U&Es, CRP AND CLOTTING LUMBAR PUNCTURE IF INDICATED

04 GIVE IV ANTIBIOTICS, THINK SOURCE CONTROL — TIME ☐☐:☐☐

MAXIMUM DOSE BROAD SPECTRUM THERAPY, CONSIDERLOCAL POLICY / ALLERGY STATUS / ANTIVIRALS
EVALUATE NEED FOR IMAGING/ SPECIALIST REVIEW
IF SOURCE AMENABLE TO DRAINAGE ENSURE ACHIEVED AS SOON AS POSSIBLE BUT ALWAYS WITHIN 12H

05 GIVE IV FLUIDS — TIME ☐☐:☐☐

GIVE IN DIVIDED FLUID BOLUSES OF 500ml
NICE RECOMMENDS USING LACTATE TO GUIDE FURTHER FLUID THERAPY

06 MONITOR — TIME ☐☐:☐☐

USE MEOWS. MEASURE URINARY OUTPUT: THIS MAY REQUIRE A URINARY CATHETER
REPEAT LACTATE AT LEAST ONCE PER HOUR IF CLINICAL CONDITION CHANGES

RED FLAGS AFTER ONE HOUR – ESCALATE TO CONSULTANT NOW

RECORD ADDITIONAL NOTES HERE:

e.g. allergy status, arrival of specialist teams, de-escalation of care, intentional delayed antimicrobial decision making, variance from Sepsis 6

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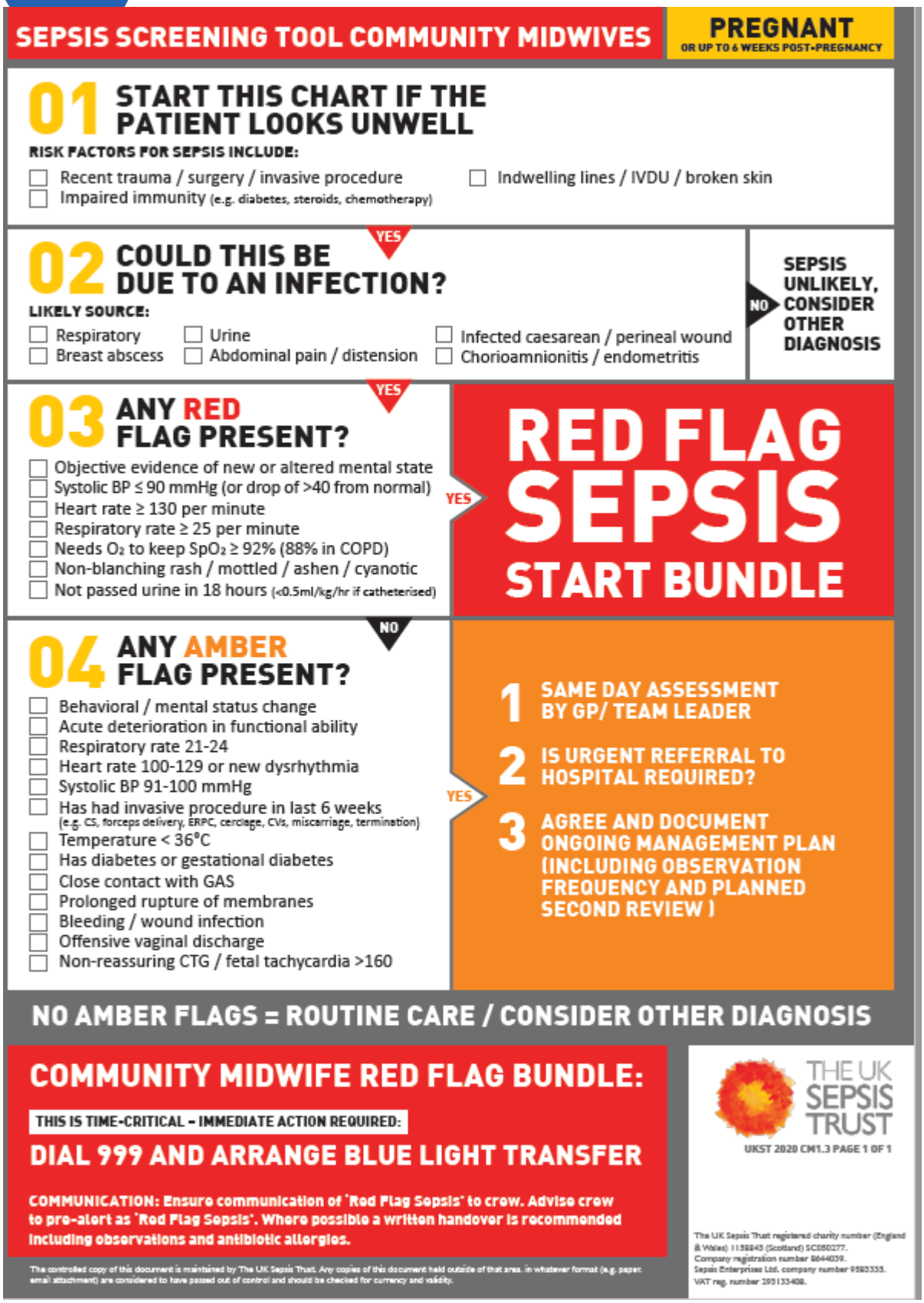
Appendix 4 -Sepsis screening tool for community midwives (The UK Sepsis Trust)



SEPSIS SCREENING TOOL COMMUNITY MIDWIVES

PREGNANT
OR UP TO 6 WEEKS POST-PREGNANCY

01 START THIS CHART IF THE PATIENT LOOKS UNWELL

RISK FACTORS FOR SEPSIS INCLUDE:

- ☐ Recent trauma / surgery / invasive procedure
- ☐ Impaired immunity (e.g. diabetes, steroids, chemotherapy)
- ☐ 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 to keep SpO_2 ≥ 92% (88% in COPD)
- ☐ Non-blanching rash / mottled / ashen / cyanotic
- ☐ Not passed urine in 18 hours (<0.5ml/kg/hr if catheterised)

YES → **RED FLAG SEPSIS START BUNDLE**

04 ANY AMBER FLAG PRESENT?

NO

- ☐ Behavioral / mental status change
- ☐ Acute deterioration in functional ability
- ☐ 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 gestational diabetes
- ☐ Close contact with GAS
- ☐ Prolonged rupture of membranes
- ☐ Bleeding / wound infection
- ☐ Offensive vaginal discharge
- ☐ Non-reassuring CTG / fetal tachycardia >160

YES →

1. SAME DAY ASSESSMENT BY GP/ TEAM LEADER
2. IS URGENT REFERRAL TO HOSPITAL REQUIRED?
3. AGREE AND DOCUMENT ONGOING MANAGEMENT PLAN (INCLUDING OBSERVATION FREQUENCY AND PLANNED SECOND REVIEW)

NO AMBER FLAGS = ROUTINE CARE / CONSIDER OTHER DIAGNOSIS

COMMUNITY MIDWIFE RED FLAG BUNDLE:

THIS IS TIME-CRITICAL – IMMEDIATE ACTION REQUIRED:

DIAL 999 AND ARRANGE BLUE LIGHT TRANSFER

COMMUNICATION: Ensure communication of 'Red Flag Sepsis' to crew. Advise crew to pre-alert as 'Red Flag Sepsis'. Where possible a written handover is recommended including observations and antibiotic allergies.

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Company registration number 8644039.
Sepsis Enterprises Ltd. company number 9503335.
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Appendix 5
Glossary of terms

MOEWS – Modified Obstetric Early Warning Score

Appendix 6 (must always be the last appendix)
Maintain a record of the document history, reviews and key changes made (including versions and dates)

Version	Date	Comments	Author

Review Process Prior to Ratification:

Name of Group/Department/Committee	Date
Reviewed by Maternity Guideline Group	
Reviewed at Women's Business and Governance meeting	
Approved by CBU 3 Overarching Governance Meeting	
Approved at Trust Clinical Guidelines Group	
Approved at Medicines Management Committee (if document relates to medicines)	N/A

Trust Approved Documents (policies, clinical guidelines and procedures)
Approval Form

Please complete the following information and attach to your document when submitting a policy, clinical guideline or procedure for approval.

Document type (policy, clinical guideline or procedure)	Guideline
Document title	Guideline for the use of the Modified Obstetric Early Warning Scoring (MOEWS) system And for the Care of Women with Sepsis in Pregnancy and the Postnatal Period
Document author (Job title and team)	Obstetric Registrar
New or reviewed document	Reviewed
List staff groups/departments consulted with during document development	Obstetrics Midwifery
Approval recommended by (meeting and dates):	CBU3 overarching governance meeting 22/02/2023
Date of next review (maximum 3 years)	22/02/2026
Key words for search criteria on intranet (max 10 words)	Observation Scoring Infection Unwell Escalation MEOWS Deterioration
Key messages for staff (consider changes from previous versions and any impact on patient safety)	
I confirm that this is the FINAL version of this document	**Name: Jade Carritt** **Designation: Governance Midwife**

FOR COMPLETION BY THE CLINICAL GOVERNANCE TEAM

Approved by (group/committee): CBU3 Overarching Governance meeting **Date approved: 22/02/2023** **Date Clinical Governance Administrator informed of approval: 23/02/2023** **Date uploaded to Trust Approved Documents page: 27/02/2023**