

Risk factors for sepsis identified from the women who died in the 2003-2005 and 2006-2008 triennia are shown in table 1. Many of the women who died had one or more risk factors. Urinary tract infection and chorioamnionitis are common infections associated with septic shock in the pregnant patient.⁵

Table

Diagnostic criteria for sepsis and severe sepsis are provided in appendix 1 and features of toxic shock syndrome are listed in appendix 2.

Table Clinical features suggestive of sepsis. Modified from references 1 and 3.

1. Fever >38.3°C or hypothermia <36.0°C
2. Tachycardia >90 beats/min
3. Tachypnea >20 breaths/min or respiratory rate >10 breaths/min with shallow breathing
4. Altered mental status
5. Hypotension <90/60 mmHg or systolic blood pressure <90 mmHg
6. Lactate >2 mmol/L

What are the appropriate investigations when sepsis is suspected

Blood cultures are the key investigation and should be obtained prior to antibiotic administration. However, antibiotic treatment should be started without waiting for microbiology results.

Lactate should be measured within 4 hours of the suspicion of severe sepsis in order to guide fluid resuscitation. Lactate >2 mmol/L is indicative of tissue hypoperfusion.

It should be involved in the collaborative care of women with sepsis

If sepsis is suspected, regular observations should be made. The use of a MEOWS chart is recommended. There should be an urgent referral to the critical care team in severe or rapidly deteriorating cases and the involvement of a consultant obstetrician.

The expert advice of a consultant in obstetric or infectious disease physicians should be sought urgently when serious sepsis is suspected.

A MEOWS chart should be used for all maternity inpatients to identify seriously ill pregnant women and refer them to critical care and obstetric anaesthetic colleagues according to local guidelines.¹

Early, goal-directed resuscitation has been shown to improve survival for non-pregnant patients presenting with septic shock.⁶

In genital tract sepsis suspected promptly treatment with a combination of broad spectrum intravenous antibiotics may be essential

Administration of intravenous broad spectrum antibiotics are recommended within one hour of suspicion of severe sepsis in the woman, with or without septic shock, as part of the Surviving Sepsis Campaign Resuscitation Bundle.³

Empirically, broad spectrum antimicrobials active against Gram-negative bacteria, and capable of preventing exotoxin production from Gram-positive bacteria, should be used according to local microbiology policy, and therapy narrowed once the causative organism(s) has been identified.

The 2003–2005 CEMACH report¹ referred to the use of cefuroxime and metronidazole for genital tract sepsis. However, cefuroxime is no longer part of many hospital formularies because of the association with *C. difficile*. Neither agent provides any MSRA, *Pseudomonas* or extended-spectrum beta-lactamases (ESBL) cover (see appendix 3 for range of activity of common antibiotics). Information on antimicrobials which may aid in guiding choice is provided in table 5; however, hospital guidelines differ, and local guidance should be followed as the incidence of resistant organisms varies throughout the UK.

In addition to antimicrobial therapy, the source of sepsis should be sought and dealt with if possible: for example, by delivery of the baby.¹

Table 5 Antimicrobial choices and limitations of antimicrobial.

Antimicrobial	Activity
Cefuroxime	Gram-positive, Gram-negative, <i>Pseudomonas</i> [10]
Meropenem	Gram-positive, Gram-negative, <i>Pseudomonas</i> [11,12]
Imipenem	Gram-positive, Gram-negative, <i>Pseudomonas</i> [11,12]
Vancomycin	Gram-positive
Linezolid	Gram-positive
Clindamycin	Gram-positive
Metronidazole	Gram-negative anaerobes
Amoxicillin	Gram-positive, Gram-negative
Cefotaxime	Gram-positive, Gram-negative
Cefepime	Gram-positive, Gram-negative, <i>Pseudomonas</i>
Colistin	Gram-negative
Trimethoprim-sulfamethoxazole	Gram-positive, Gram-negative
Chloramphenicol	Gram-positive, Gram-negative
Tetracycline	Gram-positive, Gram-negative
Fluoroquinolones	Gram-positive, Gram-negative

be through a blood warming device, and hospital protocols for replacement therapy in haematology patients may be used.

How should the fetus be monitored and when and how should the baby be delivered

In a critically ill pregnant woman birth to 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 wherever conditions allow.

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

During the intrapartum period continuous electronic fetal monitoring is recommended. Changes in cardiotocography (CTG) such as decreased baseline variability or new onset decelerations must prompt reassessment of maternal mean arterial pressure, hypoxia and acid-base status.

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

The effects of maternal sepsis on fetal wellbeing include the direct effect of infection in the fetus, the effect of maternal illness/shock and the effect of maternal treatment. The risk of neonatal encephalopathy and cerebral palsy is increased in the presence of intrauterine infection.¹⁵

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 


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


The Health Protection Agency have produced detailed guidelines for the investigation, control and prevention of the spread of group A streptococcal infection in healthcare settings in the United Kingdom.²²

As well as the specific recommendation for group A streptococcal disease, any baby of a mother found to have sepsis in the peripartum period should be discussed with neonatology colleagues so that prophylactic antibiotic administration to the baby can be considered.²²

Evidence level 4

Local infection control issues should be considered

Group A β -haemolytic *Streptococcus* and MRSA are easily transmitted via the hands of health care workers and vertical contact households. Local infection control guidelines should be followed or hospital specific isolation and contact precautions 

Invasive group A streptococcal infections are notable and the infection control team and the consultant or community paediatrician should be notified 

Women suspected of or diagnosed with group A *Streptococcus* sepsis should be isolated in a single room with en suite facilities to minimise the risk of spread to other women. Local advice from infectious control colleagues should always be sought.

Unmet needs

- The existence of locally based guidelines for the investigation and management of genital tract sepsis in the maternity unit.
- The use of a version of a MEOWS chart to aid the identification of seriously ill pregnant women¹ in the maternity unit.
- The proportion of pregnant women with suspected severe sepsis who had serum lactate measured within six hours of presentation.

A ENDIX 2

Staphylococcal and streptococcal toxic shock syndrome clinical disease definition.^{12,23}

Staphylococcal toxic shock ²⁴	Streptococcal toxic shock syndrome ^{12,24}
<p>[Culture of Staphylococcus aureus from a normally sterile site]</p> <p>[Systemic hypotension]</p> <p>[Myocardial depression]</p> <p>[Renal dysfunction]</p> <p>[Diffuse erythematous macular rash]</p> <p>[Desquamation of skin]</p> <p>[Toxic shock syndrome score ≥ 15]</p> <hr/> <p>[Culture of Staphylococcus aureus from a normally sterile site]</p> <p>[Myocardial depression]</p> <ul style="list-style-type: none"> • Systemic hypotension • Myocardial depression • Renal dysfunction • Diffuse erythematous macular rash • Desquamation of skin • Toxic shock syndrome score ≥ 15] <p>[Desquamation of skin]</p> <p>[Toxic shock syndrome score ≥ 15]</p>	<p>[Culture of Streptococcus pyogenes or Streptococcus pneumoniae from a normally sterile site]</p> <p>[Systemic hypotension]</p> <p>[Myocardial depression]</p> <p>[Renal dysfunction]</p> <p>[Diffuse erythematous macular rash]</p> <p>[Desquamation of skin]</p> <p>[Toxic shock syndrome score ≥ 15]</p> <hr/> <p>[Culture of Streptococcus pyogenes or Streptococcus pneumoniae from a normally sterile site]</p> <p>[Systemic hypotension]</p> <p>[Myocardial depression]</p> <p>[Renal dysfunction]</p> <p>[Diffuse erythematous macular rash]</p> <p>[Desquamation of skin]</p> <p>[Toxic shock syndrome score ≥ 15]</p> <ul style="list-style-type: none"> • Systemic hypotension • Myocardial depression • Renal dysfunction • Diffuse erythematous macular rash • Desquamation of skin • Toxic shock syndrome score ≥ 15] <p>[Desquamation of skin]</p> <p>[Toxic shock syndrome score ≥ 15]</p>

A ENDIX 3

Antibiotic spectra for obstetrics and gynaecology.

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At least one meta-analysis, systematic review or randomised controlled trial rated as 1++ and directly applicable to the target population; or
directly to the target population; or

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Conflicts of interest: none declared.

The final version is the responsibility of the Guidelines Committee of the RCOG.

The guidelines review process will commence in 2015 unless evidence requires an earlier review.

DISCLAIMER

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