Sepsis: recognition, assessment and early management in children and adults - NICE guideline 51

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Chair, NICE Guideline Committee for Sepsis: the recognition, assessment and early management in children and adults
NICE Quality Standard 2017

Currently in national consultation review

Different group of people/process
TIME TO ACT
Severe sepsis: rapid diagnosis and treatment saves lives
Parliamentary Ombudsman’s Report 2013

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<thead>
<tr>
<th>Standard</th>
<th>Number at variance</th>
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<tr>
<td><strong>Clinical care</strong></td>
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<td>Timely history and examination on admission or referral.</td>
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<td>Investigations to determine:</td>
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<td>• Indices of perfusion</td>
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<td>• Indices of infection</td>
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<td>• Source of infection</td>
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<td>• Cultures of blood and other sites</td>
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<td>Regular physiological monitoring using track and trigger systems.</td>
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<td>Accurate recognition of severity of the illness.</td>
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<td>Basic resuscitation with:</td>
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<td>• Large-volume fluid therapy</td>
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<td>• Intravenous broad-spectrum antibiotics after taking cultures</td>
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<td>• Vasopressor therapy if required to maintain adequate haemodynamics and tissue perfusion.</td>
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<td>All of these actions to commence immediately on recognition of severe sepsis and to be completed within six hours.</td>
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<td>Source control to be performed as soon as possible after initial fluid resuscitation.</td>
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<thead>
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<th>Standard</th>
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<td><strong>Organisation of care</strong></td>
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<td>Adequate education and training of staff.</td>
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<td>Appropriate and timely senior medical input.</td>
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<td>Timely referral to critical care.</td>
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<td>Formation and documentation of a management plan.</td>
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<td>Handover according to protocol.</td>
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<td>Appropriate and timely referral for source control.</td>
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Multiple failings in:
- Clinical care
- Organisation of care
Scope

• Department of Health asked NICE: ‘to produce a guideline on Sepsis: the recognition, diagnosis and management of severe sepsis’

• Aim to focus on diagnosis, assessment and initial management

• Recognise that there are comprehensive critical care guidelines for children and adults.
Committee composition

• 2 consultants in paediatric immunology & infection (1 chair)
• 2 consultants in ICU 1 adult, 1 paediatric
• 2 consultants in ED 1 adult, 1 paediatric
• corporate matron in patient safety
• consultant in acute & critical care medicine
• GP
• acute physician
• paramedic
• 2 lay members.
• 2 co-opted experts: consultant in obstetrics consultant in medical microbiology.
Methods – standard NICE methodology

• The committee developed clinical questions, collected and appraised clinical evidence, and evaluated the cost effectiveness of proposed interventions and management strategies through literature review and economic considerations where possible.

• Quality ratings of the evidence based on GRADE methodology.

• Where standard methods could not be applied, a customised quality assessment was done.
Overall Quality of Evidence

• Limited evidence exists for the identification and early management of sepsis in primary care or the emergency department

• Only some of the critical care evidence was relevant or interpretable in a meaningful way for non-critical care settings.

• 137 Recommendations.
What is sepsis and what does this mean for the NHS?

• In sepsis the body’s immune and coagulation systems are switched on by an infection and cause one or more body organs to malfunction with variable severity – which can be life-threatening.

• Although the majority of people with infection do not have and will not develop sepsis, non-specific signs & symptoms can lead to late recognition of people who might have sepsis.

• Balance between the need to recognise and treat sepsis early and the need to avoid widespread antimicrobial resistance.
Guideline approach

• Pragmatic approach for patients with infection
  a) guidance for assessment of risk factors and identification of potential clinical signs and symptoms of concern
  b) followed by a detailed structured assessment
• Includes all settings: community, EDs and all hospital clinical areas
• General and specialist healthcare professionals
a) Identification of people requiring a structured assessment – THINK SEPSIS!

• Clinicians should “think sepsis!” in a similar way to thinking 'could this chest pain be cardiac in origin?'

• Not every patient with infection will have sepsis but if sepsis is not considered then the diagnosis can be missed….just like most people with chest pain are not suffering from a myocardial infarction.
Draft QS1: People with suspected sepsis are assessed to stratify risk of severe illness or death using a structured set of observations

• NG51 suggests using a structured set of observations to assess the risk of illness severity only in the context of a initial clinical risk assessment/risk factors for sepsis.
  • This is one of the critical steps to avoid over-use of broad spectrum antibiotics or overwhelming of NHS resources.
• Possible QS revision? “People with suspected sepsis are assessed to stratify risk of severe illness or death using a clinical risk assessment and a structured set of observations”.
Key Points in the History

• Non-specific, non-localised presentations and may not necessarily have a high temperature

• Pay particular attention to concerns expressed by the person and their family or carers, such as changes from usual behaviour

• Factors that increase the risk of sepsis e.g.
  • <1 year or >75 years, impaired immune systems, surgery in <6 weeks, current or recent pregnancy etc.
b) Structured assessment: why is this guideline needed if there are “new consensus sepsis definitions” (and what is the role of NEWS)?

- qSOFA offers limited explanation on how to confirm or rule out sepsis in general clinical settings
- qSOFA gives mortality risk but “sepsis” includes all patients with BP<100 mmHg and RR>22
  
  (JAMA 2016; 315(8):801-810)

- **But** not all of these patients need antibiotics.
Structured assessment

• GC51 provides easy, structured risk assessment to help clinicians identify those most severely ill requiring immediate potentially life-saving treatment.

• Ensures that patients defined as sepsis by qSOFA are as a minimum assessed as moderate-high risk.

• Use of NEWS/PEWS needs context of suspicion of infection
What about NEWS/PEWS?

• Draft QS uses generic “use a structured set of observations” leaving NHSE/Trusts to decide what should be used in each setting

• Evidence for NEWS is in adult hospitalised patients, standardised across the UK

• At present limited evidence for specific NEWS use in sepsis in ED and no evidence for NEWS use in primary care.

• PEWS development has been hindered by non-standard implementation and revision in Trusts.

• The GC intention was for the NHS to use the most standardised set of observations possible in each clinical group of patients/setting to allow effective implementation/education, audit and research.
Structured assessment and management

a) initiating/escalating care
   • age-specific clinical criteria to gauge the risk of sepsis in those with infection
   • people at high risk of sepsis receive empirical broad spectrum antibiotics and intravenous fluid resuscitation in a suitable hospital environment

b) ensures appropriate de-escalation if sepsis is less likely and broad spectrum antibiotics not required
Draft QS2: People with suspected sepsis in acute hospital settings and at least 1 criteria indicating high risk of severe illness or death are reviewed by a senior clinical decision-maker within 1 hour of risk being identified.

- Sickest patients need treating as medical emergency
- Clinical judgement essential - sepsis cannot be diagnosed by numbers/algorithm, inexperience can lead to missed diagnosis or over-use of antibiotics or resources
- Time window needs to address sickest patients and create auditable, researchable NHS data
“Senior clinical decision maker” - 2 components

A) is recognised by draft QS at first presentation and non-high risk review timepoints

• **experienced enough clinician** to de-escalate (the majority) of people who do not have sepsis to other clinical pathways and avoid inappropriate use of broad spectrum antibiotics in people who meet risk assessment criteria in high or moderate risk patients, while rapidly treating patients with sepsis or suspected sepsis.

• is component of rationale to send sickest patients to ED and not give broad spectrum antibiotics in primary care.
“Senior clinical decision maker” - 2 components

B) not currently recognised by draft QS

• If a high risk patient fails to respond to initial management (antibiotics and intravenous fluids), **a consultant (in the relevant speciality) who can direct care**, in person or via the telephone depending on the context/clinical situation.

• For the NHS to not require senior responsibility would undermine the importance of treating high risk sepsis with the same urgency as any other medical emergencies with immediate treatment needs (cardiac, trauma etc).
Draft QS3: People with suspected sepsis in acute hospital settings and at least 1 criteria indicating high risk of severe illness or death have antibiotic treatment within 1 hour of risk being identified.

• Time window needs to address sickest patients and create auditable, researchable NHS data

• Evidence limited – so sickest patients to attend ED, not for GPs or paramedics to give antibiotics (which would likely cause overuse of antibiotics and time delays in primary care)

• Implications for ambulance delays are same as for any medical emergency (almost all UK <1 hr from ED)
Draft QS4: People with suspected sepsis in acute hospital settings, at least 1 criteria indicating high risk of severe illness or death, and with lactate > 2 mmol/litre, have an intravenous fluid bolus within 1 hour of risk being identified.

• NG51 uses lactate to guide fluid management and urgency of contacting consultant in deteriorating patient
Example: presentation to primary care

- Algorithm for rapid assessment of history/risk factors
- Structured clinical assessment indicates risk of death from sepsis, then:
  - High risk “blue light” transfer to hospital
  - Moderate-high risk assess for definitive diagnosis and decide whether can be treated safely out of hospital
  - Low risk safety net
Example: high risk in ED

- Requires immediate assessment by senior clinical decision maker
- Intravenous broad spectrum antibiotics within 1 hour
- Point of care lactate guides fluid therapy and involvement of critical care teams
- Senior clinical decision maker can “de-escalate” if either alternate diagnosis or if good response to initial therapy
Example: moderate risk in ED

• Specifies clinical parameters and blood tests to be carried out

• Requires assessment of patient and test results by clinician within 1 hour

• Requires senior clinical decision maker review within 3 hours if meets $\geq 2$ moderate-high risk criteria to decide re broad spectrum antibiotics if not moved to high risk pathway
Links to other NICE Guidance

- 22 related NICE guidelines (+ 2 in development)
- Rule out and/or treat high risk sepsis then follow other guidance if relevant
- Guideline committee took other Guidelines into account (eg intravenous fluids)
- Full alignment of guideline pathways for clarity is under discussion by NICE (eg Feverish illness in under 5s)
Information for People with Sepsis

• Information in emergency setting for patients and their carers
  eg ensuring a care team member is nominated to give information to families and carers during resuscitation

• Information for those assessed for but not diagnosed with sepsis

• Information when discharged home following sepsis
Training

• All healthcare staff and students
  • primary and community care (including those working in care homes)
  • hospital staff

• Regular, appropriate training in
  • assessing people’s clinical condition
  • identifying, assessing and managing sepsis
• Draft QS5: People who have been seen by a healthcare professional and assessed as at low risk of sepsis are given information about symptoms to monitor and how to access medical care.
Research Recommendations

• Epidemiology of the incidence, presentation and management of sepsis in the UK

• Use of early warning scores (NEWS, PEWS) in primary care and ED

• Derivation and validation of clinical decision rules to rule sepsis in/out at presentation to hospital

• Clinical and cost effectiveness of new point of care tests against NHS standards of care
Implementation

• NICE
• UK Sepsis Trust
• Health Education England
• NHS England
• …..AHSNs, Royal Colleges etc
<table>
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<tr>
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<tbody>
<tr>
<td>Saul Faust (Chair)</td>
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<td>Enitan Carrol</td>
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<td>Simon Nadel</td>
<td>Adjunct Professor of Paediatric Intensive Care</td>
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<td>Corporate Matron, Patient Safety</td>
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<td>Jenny O'Donnell</td>
<td>Lay member</td>
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<td>Rachel Rowlands</td>
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<td>Mark Simmonds</td>
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<tr>
<td>Alison Tavare</td>
<td>General Practitioner</td>
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<td>Louella Vaughan</td>
<td>Senior Clinical Research Lead, Northwest London CLAHRC</td>
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<tr>
<td>James Wenman</td>
<td>Clinical Development Manager (Paramedic)</td>
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<tr>
<td>Catherine White</td>
<td>Lay member</td>
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# NGC Technical Team Members

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<tr>
<th>Name</th>
<th>Role</th>
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<tbody>
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<td>Health Economist (from March 2015)</td>
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<td>Document Editor/Process Assistant (from August 2015)</td>
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<td>Senior Health Economist (from August 2015)</td>
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<td>Angela Cooper</td>
<td>Senior Research Fellow (from April 2015)</td>
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<td>Andreas Freitag</td>
<td>Research Fellow (from June 2015)</td>
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<td>Head of Information Science (from September 2014)</td>
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<td>Senior Health Economist (July 2014-April 2015)</td>
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<td>Project Manager (July 2014-June 2015)</td>
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<td>Senior Health Economist (April 2015-August 2015)</td>
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<td>Bethany King</td>
<td>Document Editor/Process Assistant (August 2014-July 2015)</td>
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<td>Norma O’Flynn</td>
<td>Guideline Lead and Clinical Director</td>
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<td>Natalie Pink</td>
<td>Project Manager (May – July 2015)</td>
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<td>Nancy Pursey</td>
<td>Senior Project Manager (from August 2015)</td>
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<tr>
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<td>Senior Research Fellow</td>
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<tr>
<td>Julie Robinson</td>
<td>Information Scientist (July-September 2014)</td>
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<tr>
<td>Ashwini Sreekanta</td>
<td>Research Fellow (from June 2015)</td>
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</table>
Thank you
1. Risk factors for sepsis

- Age 75+
- Age under 1
- Frail with complex comorbidities
- Trauma
- Surgery
- Invasive procedure
  - Within last 6 weeks
- Impaired immunity
- Indwelling lines or catheters
- Intravenous drug users
- Any breach of skin integrity:
  - Cuts
  - Burns
  - Blisters
  - Skin infections
- Pregnant
- Pregnant in last 6 weeks
  - Particularly if:
    - Gestational diabetes / Diabetes
    - Required invasive procedure such as caesarean section
    - Forceps delivery
    - Removal of retained products of conception
    - Prolonged spontaneous rupture of membranes
    - Close contact with someone with group A streptococcal infection
    - Have continued bleeding or offensive vaginal discharge

from bmj.com
Visual summary
NICE sepsis guidance

How to assess risk and identify appropriate level of monitoring and management for suspected sepsis

Person with possible infection

- Infection +/− Fever / Feeling unwell

Think: Could this be sepsis?

- High temperature could be present or absent
- People with sepsis may have non-specific, non-localising presentations, such as feeling very unwell

Pay particular attention to concerns expressed by the person and family/carer

Take particular care if there are communication barriers to overcome

- Young children
- Different first language
- People with communication problems

Assessment

Assess people with suspected infection to identify:

- Likely source of infection
- Indicators of clinical concern: Behaviour, Circulation, Respiration
- Risk factors for sepsis

Sepsis not suspected

- No clinical cause for concern
- No risk factors

Use clinical judgment to treat the person

Suspected sepsis

Stratify risk of severe illness and death from sepsis

Evidence level

Based on the opinion of the guideline development committee, supported by generally very low quality evidence

- Age 75+
- Age under 1
- Frail with complex comorbidities
- Trauma
- Surgery
- Invasive procedure
- Impaired immunity
- Indwelling lines or catheters
- Intravenous drug users
- Any breach of skin integrity:
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from bmj.com
### Detailed risk assessment

<table>
<thead>
<tr>
<th>Age (years)</th>
<th>Under 1</th>
<th>1-2</th>
<th>3-4</th>
<th>5</th>
<th>6-7</th>
<th>8-11</th>
<th>12+ and adults</th>
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<td><strong>Behaviour and history</strong></td>
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