

ASSESSING THE RISK OF SEPSIS

- Careful history and examination, with close attention to vital signs, mental state, skin colour and urine output is needed.
- Many factors increase the risk of sepsis – these include young or old age, pregnancy and skin wounds, including from surgery. Extra caution should be used in these people.
- If any single high risk criteria is present, admit urgently (usually by 999 ambulance).
- If a single moderate–high risk criteria is present, it may be possible to manage the person in primary care, but only if a definitive diagnosis can be made. Very careful safety-netting is required. In those with impaired immunity from drugs (including oral steroids) or disease (including diabetes), urgent admission may be indicated.

NICE guidelines on sepsis (NICE NG51, 2016)

- Always ask yourself 'Could this be sepsis?' in people presenting with signs and symptoms of infection.
- If yes, use the risk factors below, and your clinical judgement, to decide if sepsis is a real possibility (if you are doing telephone triage this may only be symptoms such as 'feeling more breathless' or the carer reporting someone is more confused).
- If sepsis is a real possibility, assess the patient (see 'assessment' section below). Using the information gathered during assessment, stratify the risk of severe illness/death using the charts overleaf, and manage accordingly.

Remember, people may have non-specific, non-localised presentations (e.g. just feeling very unwell, subtle changes in behaviour) and **may not have a fever**. In those who can't give a good history (age, communication problems, memory issues), take extra care.

Risk factors for sepsis

General risk factors for sepsis	Pregnancy and 6w post-partum	Neonates
Age <ul style="list-style-type: none"> • Under 1. • Over 75y. • Frail people of any age. Impaired immune system <ul style="list-style-type: none"> • Diseases that impair immune system, including diabetes, asplenic patients, sickle cell disease. • Drugs that impair the immune system: long-term oral steroids, other immunosuppressant drugs (e.g. for rheumatoid arthritis) and cancer chemotherapy. Skin breaches <ul style="list-style-type: none"> • Surgery/invasive procedure in last 6w. • Indwelling lines/catheters. • Wounds (burns, cuts, skin infections). • Intravenous drug misusers. 	<p><i>Pregnant women, and those who have given birth in the past 6w, are at high risk of sepsis. This includes after miscarriage and termination of pregnancy.</i></p> <ul style="list-style-type: none"> • Invasive procedure (including forceps delivery, caesarean delivery, removal of retained product of conception). • Prolonged rupture of membranes. • Have had close contact with someone with a grp A haemolytic strep infection (e.g. scarlet fever). • Impaired immunity due to illness or drugs (including diabetes and gestational diabetes). • Continued vaginal bleeding/offensive vaginal discharge. 	Maternal factors <ul style="list-style-type: none"> • Invasive grp B infection in previous baby. • Maternal grp B strep colonisation, bacteriuria or infection in this pregnancy. • Maternal intrapartum fever ($>38^{\circ}\text{C}$). • Maternal parenteral antibiotics given for suspected invasive bacterial infection (e.g. sepsis) during labour/24h after birth (not prophylactic antibiotics). Infant factors <ul style="list-style-type: none"> • Premature rupture of membrane. • Preterm birth ($<37\text{w}$). • If preterm birth, suspected/confirmed rupture of membranes more than 18h. • Confirmed/suspected chorioamnionitis. • In a multiple pregnancy, suspected infection in another baby.

Assessment

- Use the tables opposite to stratify risk of sepsis and appropriate action to take.

Measure the following:	Ask about:	Examine patient:
<ul style="list-style-type: none"> • Temperature. • Pulse. • Respiratory rate and oxygen sats. • BP if $\geq 12\text{y}$, capillary refill time if $<12\text{y}$. • Skin colour (pallor, cyanosis, mottling). 	<ul style="list-style-type: none"> • Mental state (behaviour, functioning). • Recent fevers or rigors. • Frequency of urination in past 18h. 	<ul style="list-style-type: none"> • Look for possible source of infection (including any skin wounds or rash). • Don't forget to check the urine!

Warnings and cautions with vital signs

Temperature	<ul style="list-style-type: none"> • Temperature may be normal, low or high. • The very young, the old, the frail and those having cancer treatment may not mount a fever response.
Heart rate	<ul style="list-style-type: none"> • Very fit people: remember 'normal' may be lower than the figures quoted in the very fit. • Pregnancy: baseline pulse is 10–15bpm higher. • Older people: pulse rate may not rise in response to infection, but may develop a new arrhythmia.
BP	<ul style="list-style-type: none"> • When interpreting BP, be aware of what is 'normal for them'. • In children and young people, a normal BP does not exclude sepsis.
Mental state	<ul style="list-style-type: none"> • Look for changes from normal cognitive state/functioning. Changes may be subtle: ask family members. • In children, and in adults with dementia, changes in cognitive state may present as irritability or changes in behaviours (and in dementia, functional ability).
Oxygen	<ul style="list-style-type: none"> • Peripheral oxygen saturations may be difficult to measure in sepsis because of peripheral shut down.

Once you have decided someone needs admission (see overleaf): refer immediately (usually 999)

Oxygen

- Adults: give oxygen if needed to achieve sats of 94–98% (88–92% if risk of hypercapnic respiratory failure (e.g. COPD)).
- Children: give oxygen to children if saturations $\leq 90\%$.

Antibiotics

- If meningococcal sepsis is suspected (fever and purpuric rash), give parenteral antibiotics (usually benzylpenicillin) in the community, but do not let this delay transfer to hospital.
- For all types of sepsis, if transfer to hospital will take $>1\text{h}$, GPs/ambulance services should have mechanisms in place to give antibiotics in the community.

Stratifying risk of severe illness/death if sepsis suspected (NICE NG51, 2016)							
From 12 years of age (including adults)							
MODERATE-HIGH risk of severe illness/death					HIGH risk of severe illness/death		
History of new change in behaviour/mental state Acute deterioration in functional ability				Mental state	Objective evidence of new altered mental state		
Signs of potential infection (redness, swelling or discharge at surgical site or breakdown of wound)				Skin	Mottled/ashen skin or cyanosis (skin/lips/tongue) Non-blanching rash		
Not passed urine for 12–18h				Urine output	Not passed urine for 18h		
Impaired immunity (illness/drugs incl. oral steroids) Trauma, surgery or invasive procedure in past 6w				Medical history			
Temp	Respiration	BP	Pulse	Vital signs	Pulse	BP	Respiration
<36°C	RR 21–24	SBP 91–100	P 91–130 (Pregnant: 100–130) or new arrhythmia		P ≥130	SBP ≤90 or SBP >40 below normal	RR≥25
If ANY moderate-high risk criteria: Can definitive diagnosis be made & treated? If yes: treat if safe to do so: safety-net clearly. If no: admit urgently (999).					If ANY high risk criteria: admit urgently (999)		

CHILDREN 0–11y									
MODERATE-HIGH risk of severe illness/death						HIGH risk of severe illness/death			
Not responding normally to social cues Decreased activity Parental/carer concern child is behaving differently And if 0-5y: No smile Wakes only with prolonged stimulation					Mental state	Appears ill to a healthcare professional Does not wake or if roused does not stay awake And if 0-5y: Weak high-pitched/continuous cry No response to social cues			
Leg pain Cold hands or feet And if 0-5y: Pale or flushed					Skin	Mottled or ashen skin Cyanosis of skin, lips or tongue Non-blanching rash			
Reduced urine output					Urine output				
Temp	Cap refill	O ₂ sats	Resp rate	Pulse	Vital signs	Pulse	Resp rate	O ₂ sats	Temp
No criteria except >39°C if 3–6m	Capillary refill time ≥3sec	90–92% or nasal flaring	50–59	150–159	Under 1y	<60 or ≥160	≥60	<90% grunting or apnoea	<36°C at any age (or if <3m ≥38°C)
			40–49	140–149	1–2y	<60 or ≥150	≥50		
			35–39	130–139	3–4y	<60 or ≥140	≥40		
		90–92%	24–28	120–129	5y	<60 or ≥130	≥29	<90%	
			24–26	110–119	6–7y	<60 or ≥120	≥27		
			22–24	105–114	8–11y	<60 or ≥115	≥25		
If ANY moderate-high risk criteria: If IMPAIRED IMMUNITY – admit urgently (999). If NORMAL IMMUNITY – Can a definitive diagnosis be made & treated? If yes: treat if safe to do so: safety-net clearly. If no: admit urgently (999).					If ANY high risk criteria: admit urgently (999)				

LOW RISK (but take any single abnormal sign seriously)	<1y	1–2y	3–4y	5y	6–7y	8–11y	≥12y
RR	<50	<40	<35	<24	<24	<22	<21
Pulse (Note: if under 12y, pulse <60 is a high risk criteria)	<150	<140	<130	<120	<110	<105	<91