

Vital signs for front line nurses

Early recognition of meningitis and sepsis*

Meningitis and sepsis can kill in hours. **Sepsis** and **meningitis** can occur on their own but often appear together. **Meningococcal sepsis without signs of meningitis is far more life-threatening. Early recognition depends on knowing what to look for.**

OBSERVATIONS

- Temperature
- Heart rate
- Respiratory rate
- Oxygen saturation
- Capillary refill time
- Conscious level **AVPU** -
Assess best response patient can make: **Alert?**
Responds to **Voice?** **Urgent**
Responds to **Pain?** **Emergency**
Unresponsive? **Emergency**
- Check for rash all over
- Blood pressure - check this if other signs outside normal

Non-blanching rash

- Typical of meningococcal sepsis
- Pin-prick spots, purple blotches, bruises or blood blisters
- May be absent (especially in pure meningitis), scanty, or rapidly evolving (in sepsis).

Normal values of vital signs

Age	RR/min	HR/min	Systolic BP
Birth	25-50	120-170	80-90
3 m	25-45	115-160	80-90
6 m	20-40	110-160	80-90
12 m	20-40	110-160	85-95
18 m	20-35	100-155	85-95
2 y	20-30	100-150	85-100
3 y	20-30	90-140	85-100
4 y	20-30	80-135	85-100
5 y	20-30	80-135	90-110
6 y	20-30	80-130	90-110
8 y	15-25	70-120	90-110
12 y	12-24	65-115	100-120
>14 y	12-24	60-110	100-120

Oxygen Saturation: normal value is >95% in air.
If SaO₂ monitor is not picking up, check perfusion - capillary refill should be <2 seconds



maculopapular rash with scanty petechiae*



early purpuric rash*

Up to 30% of meningococcal sepsis cases start with a blanching rash.

FINDINGS

Sepsis

Sepsis causes shock which can lead to multi-organ failure.

Look for

- Limb or joint pain - may be severe. Isolated limb pain is a well established symptom of sepsis
- Pallor, mottled skin
- Cold hands and feet
- Tachycardia
- Tachypnoea
- Rigors
- Conscious level:
early in shock - children often alert and able to speak
as shock advances
 - babies - limp and floppy
 - older children and adults - unable to stand



Child lucid despite advancing sepsis

- Metabolic acidosis - blood gas (arterial, capillary or venous) can confirm shock. Base deficit worse than -5 mmol/l is significant.
- Reduced urine output

Late signs

- Impaired consciousness - likely to be late in children
- Hypotension
- Cyanosis

Meningitis

Meningitis causes raised intracranial pressure, which can lead to coning (brain stem herniation) and brain death.

Look for

- Neck stiffness, headache, photophobia in older children and adults
 - Neck stiffness, photophobia uncommon in young children - their absence should not be reassuring
- All children - poorly responsive, staring, difficult to wake. Parents may report poor eye contact.
- Babies - irritable with a high pitched cry, particularly when handled
- Babies - stiff body, jerky movements, abnormal tone
- Teenagers and adults may be combative, confused or aggressive - you may suspect drug/alcohol use
- Seizures

Late signs

- Raised Intracranial Pressure:
 - Raised BP, slow pulse rate
 - Glasgow Coma Score <9 or rapidly falling
 - Dilated, unequal, or poorly reacting pupils
- In babies, tense/bulging fontanelle

In young babies with meningitis or sepsis

- Grunting is a serious sign
- Fever is often absent

Meningococcal disease

First symptoms as for self-limiting viral illnesses. Children under five – **fever** first. Older children and adolescents – **headache**. All ages – **vomiting and nausea**.

Red Flag Symptoms of sepsis and circulatory shut-down: **limb pain, pale or mottled skin**, and **cold extremities** can appear 5 or more hours earlier than classic symptoms.

Other early symptoms: **drowsy** with **rapid or laboured breathing** and sometimes **diarrhoea** in younger children; **thirst** in older children/teenagers.

Classic symptoms: **rash** is often the first one. **Neck stiffness** and **photophobia** are usually later and are not reliable signs in babies/young children.

ACTION

1 Very sick patient (with or without rash): shock/depressed conscious level/seizures?

Place in Resus, record all observations and put on continuous monitor. Ensure bloods are sent for investigations including blood gas. Call the most senior doctor available immediately. IV antibiotics and first fluid bolus within one hour.

2 Non-blanching rash with fever (or history of fever)?

Immediate review by Senior Doctor, record all observations and put on continuous monitor. Ensure bloods sent for investigations including blood gas. IV antibiotics within one hour. Give fluid bolus if lactate >2mmol/litre.

Suspected meningitis with or without rash?

- 3 Ensure prompt medical review, bloods sent for investigation including blood gas, IV antibiotics given immediately. At least hourly observations. If rash becomes non-blanching, treat as in 2 above.

Possible early sepsis, no rash or blanching rash?

- 4 Ensure prompt medical review, check for developing signs of sepsis and/or meningitis with at least hourly observations. If any of the observations are abnormal, ensure bloods sent for investigations including blood gas.

3&4 If observations change, consider if patient getting sicker and needs more urgent treatment as in 1 or 2.

Refer to Management algorithms for paediatric, neonatal and adult settings (details overleaf)

It is rarely possible to exclude meningitis or sepsis in a patient with non-specific symptoms. If you are sending a patient home it is important to provide a safety net. Give them information (see back page for contact details to order free patient information) and encourage them to seek medical help if it gets worse, even if it is shortly after you've seen them.

Public Health

- Doctor reports suspected meningitis or meningococcal disease to local health protection team which arranges prophylaxis for close personal contacts (if meningococcal/Hib or institutional outbreak of pneumococcal).
- Where local protocol agreed with public health, ward staff may give prophylaxis.
- Isolate patient and wear surgical masks when in close contact with an infectious patient for the first 24 hours after initiation of treatment.
- Health care workers only need prophylaxis if their mouth or nose is splattered with large particle droplets from the respiratory tract of a patient with meningococcal disease, or conjunctivitis develops within ten days. This is unlikely to occur except when using suction during airway management, inserting an oro/nasopharyngeal airway, intubating, or if the patient coughs in your face.

This resource has been updated in line with the NICE Guidelines CG102 and NG51, HPSC guidelines, and APLS guidance.

About Meningitis Research Foundation

Meningitis Research Foundation is an international charity with a vision for a world free from meningitis and septicaemia. Our free helpline number is 1800 41 33 44. We speak to callers, give information to people dealing with a case and offer support and befriending to patients and families affected. We also produce other resources for health professionals, including:

- **Management algorithms for paediatric, neonatal and adult settings**
- **Booklet for doctors in training in a hospital setting**
- **Resources for primary care**

To see all our resources, order or download free of charge visit

www.meningitis.org/resources

This resource is funded by donations. If you have found it useful and are able to support our work, you can contact us on the number below or donate on our website.

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