Diagnosing meningococcus

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Learning objectives Meningococcal disease

- The clinical picture
- Respect or fear the disease
- The red flags for early diagnosis and treatment
- The Killers
  - "somebody told me"
  - spread the word.

Red flags

- Prodrome – 1st 4 hours, 8 hours if older
  - The red flag isn't here
- Early septicaemia – perhaps at 4-8 hours
  - Here it is –look for it and act.
- Classic symptoms – perhaps at 8-24 hours
  - You need to act very promptly here
- Limb pain, Pale hands and feet

CORE EM

Development of symptoms The prodrome.

- 50% of children presenting to GPs with meningococcal disease sent home on first visit and these children more likely to die.
- The first symptoms reported by parents of kids with meningitis and septicaemia were common to many self limiting viral illnesses.
  - Nausea, vomiting, fever, UTRI, lethargy
- Prodrome lasts up to 4 hours kids, 8 hours teenagers, followed by…

Early septicaemia

- Limb pain, cold hands and feet, or pale or mottled skin at median time = 8 hours
  - 72% of children
- Drowsiness, rapid or laboured breathing
  - Younger children
- Thirst
  - In older children
- Limb pain is highly specific,
- Cold hands/feet moderately specific

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The first classic symptom

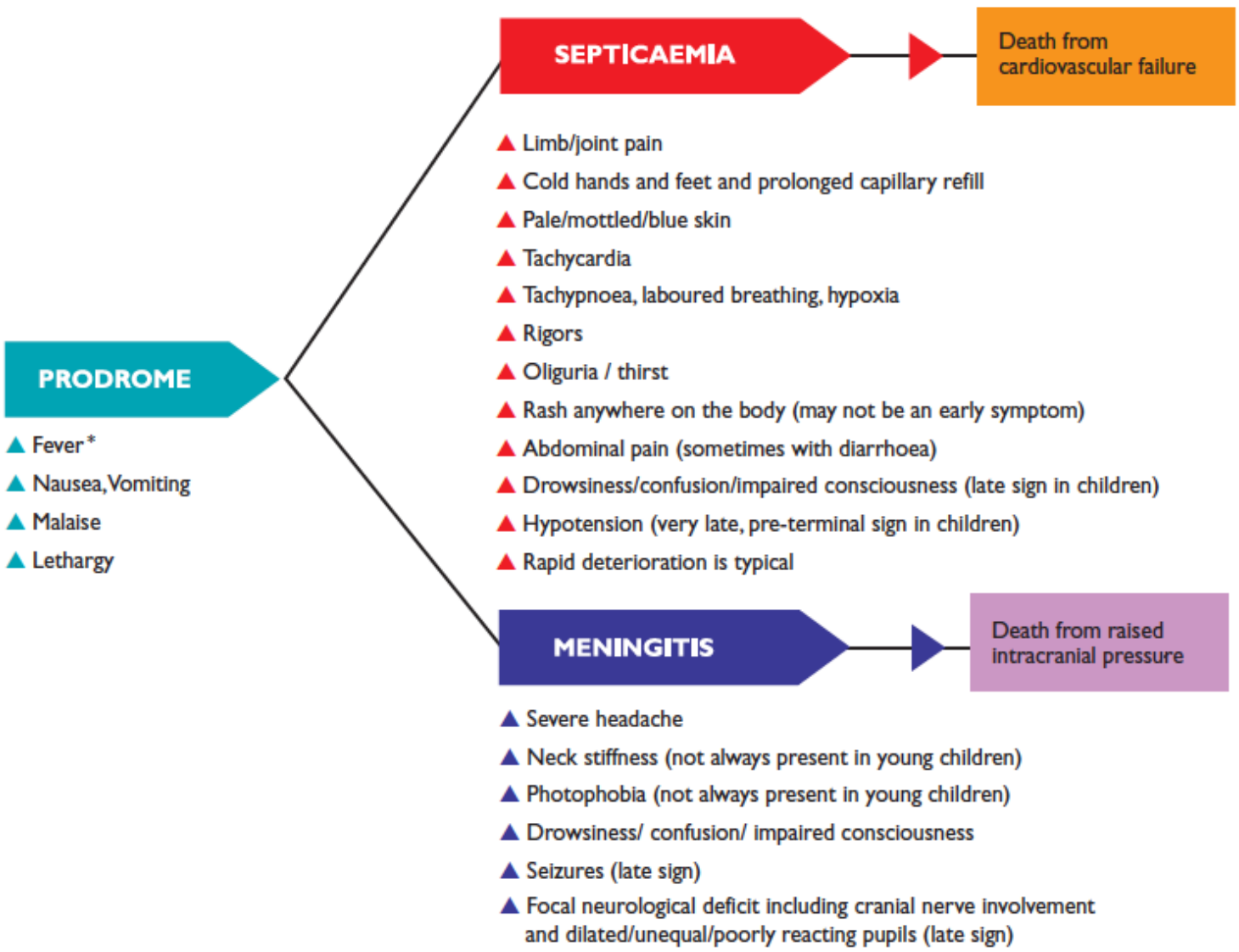
- Rash – appears later – non blanching/petechiae
- 8-9 hours
  - Later in older children
- Meningitis symptoms – neck stiffness, photophobia, bulging fontanelle – 12-15 hours
  - More reliable in older children
- Late features – confusion, delirium, impaired consciousness in 50%, at 15-24 hours

Red flags

- Could reduce proportion missed at 1st consult by 50%
- Children admitted on average 19 hours post onset
- Recognition of early septicaemia could bring forward diagnosis by 11 hours

CORE EM

Consider meningococcal disease in patients who present with the following symptoms and signs[1].



Order in which the symptoms appear may vary. Some symptoms may be absent.

*fever is often absent in babies less than 3 months of age.

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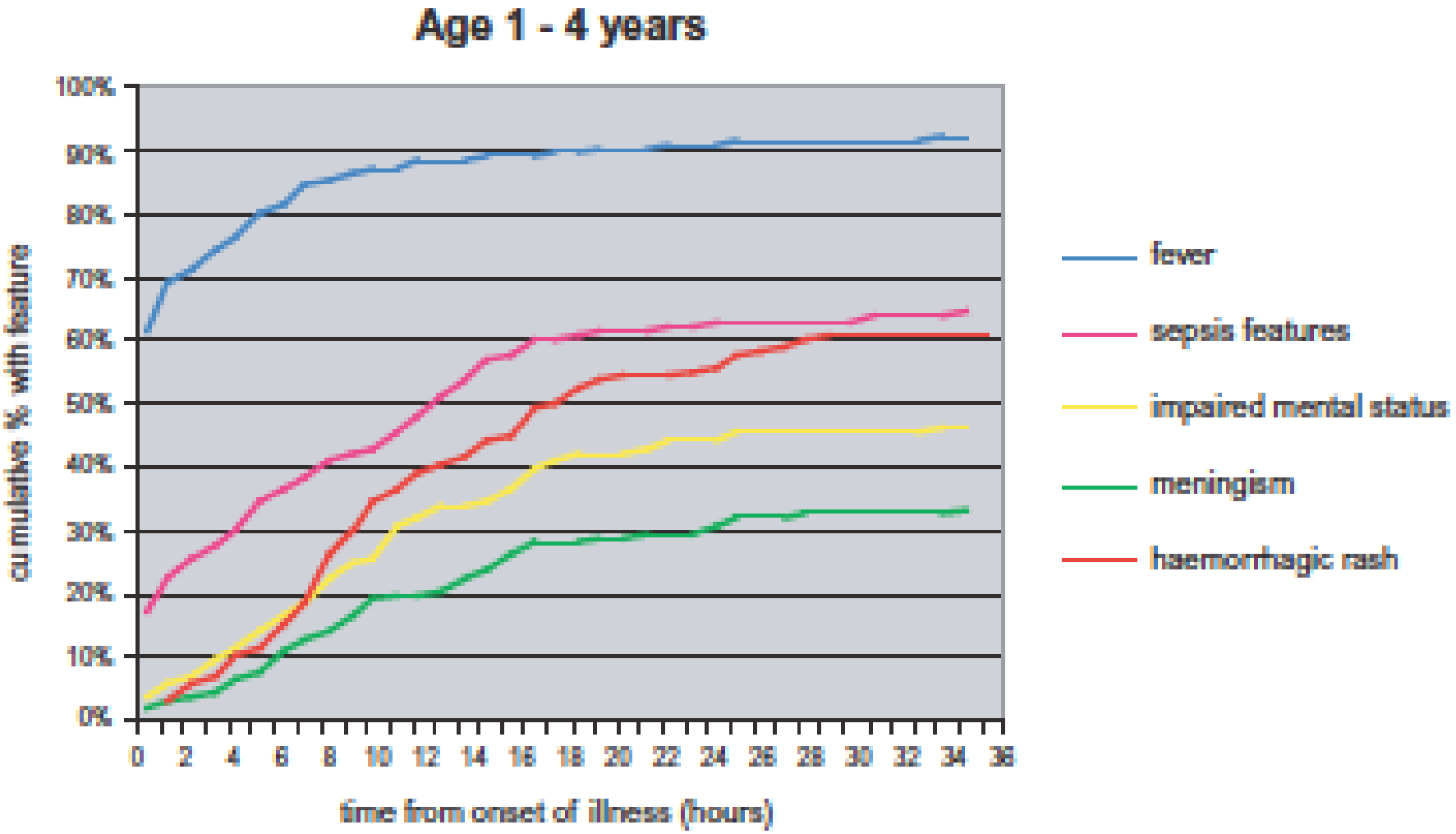
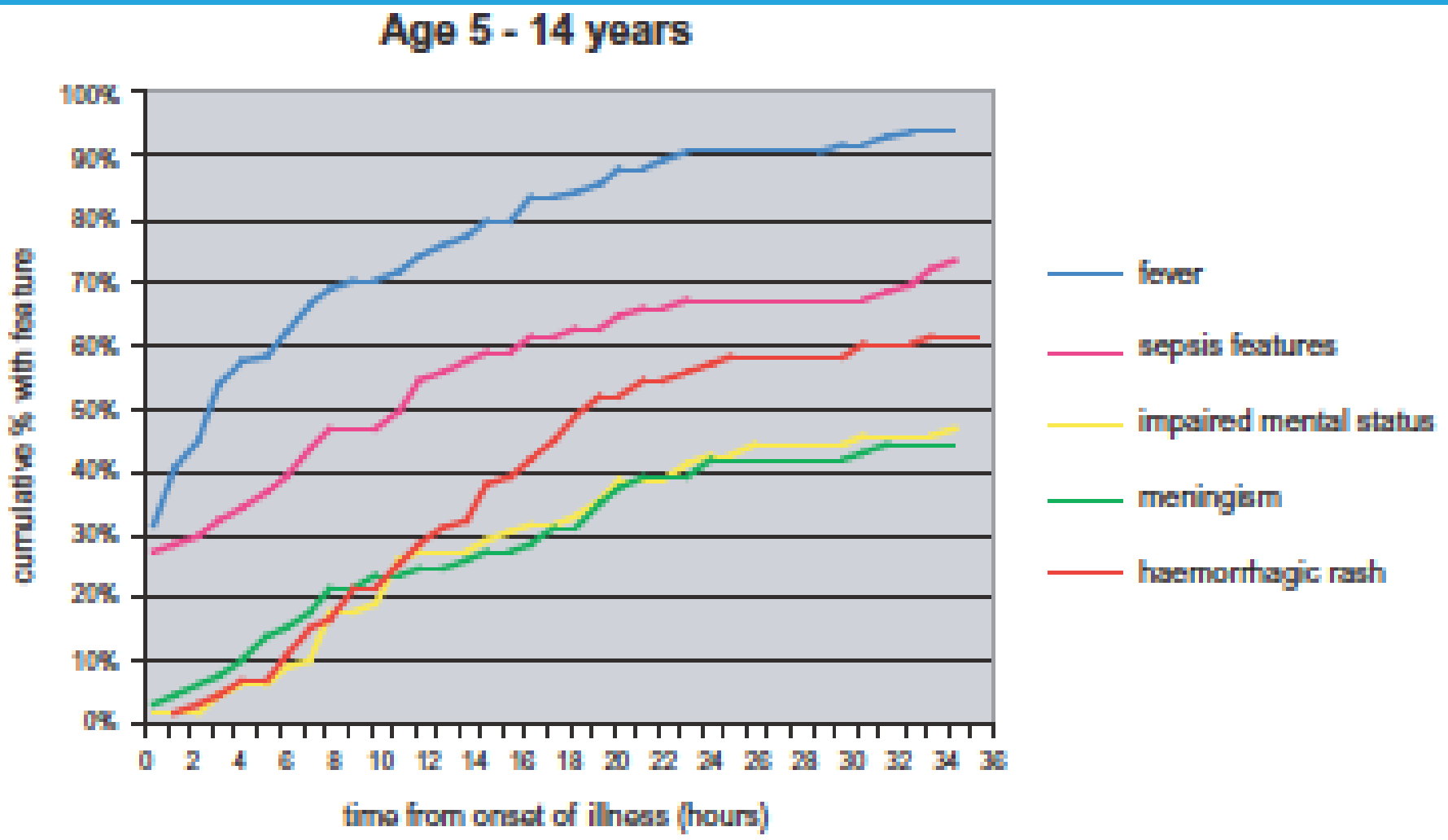
Implications

- In children with fever
- Ask about limb pain
- Vital signs in all children < 5 with fever
- RR, HR, capillary refill

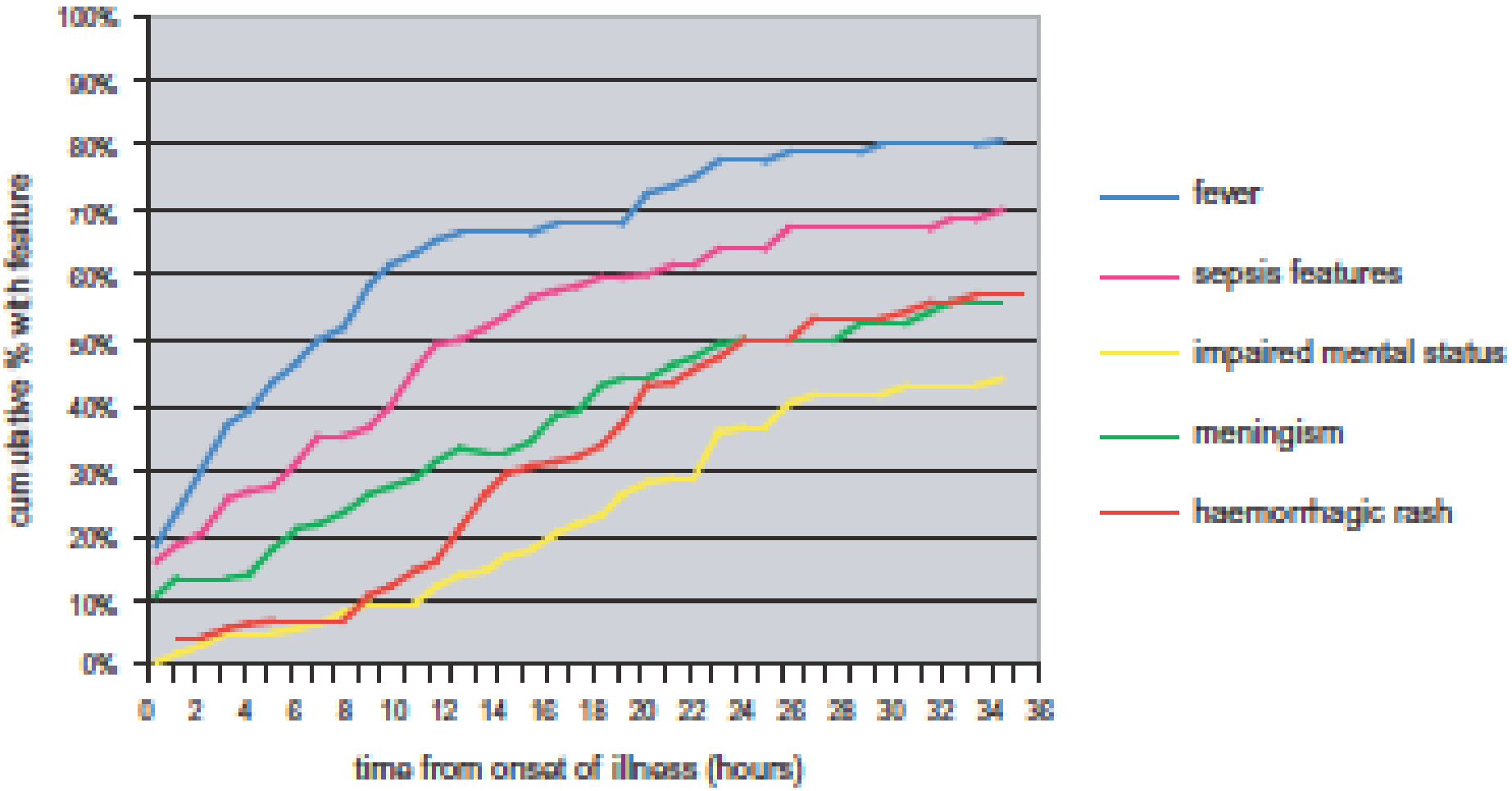
- Examine for cold hands and feet

CORE EM


Age 1 - 4 years
cumulative % with feature
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30 32 34 36
time from onset of illness (hours)
fever
sepsis features
impaired mental status
meningism
haemorrhagic rash


Age 5 - 14 years
cumulative % with feature
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
0
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
time from onset of illness (hours)
fever
sepsis features
impaired mental status
meningism
haemorrhagic rash

Age 15 - 16 years

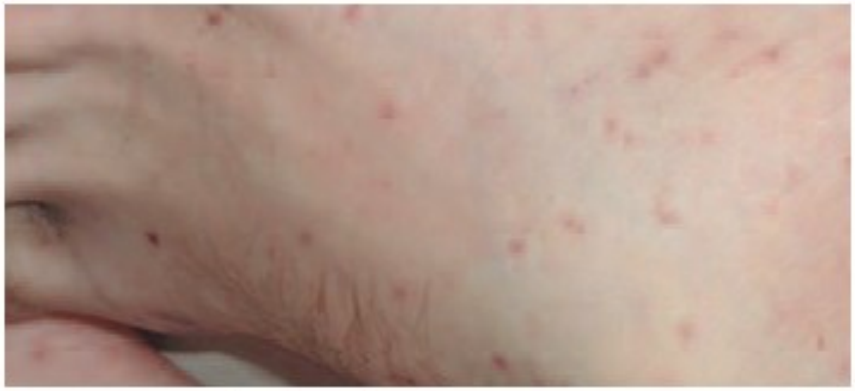


Every child < 5 with fever

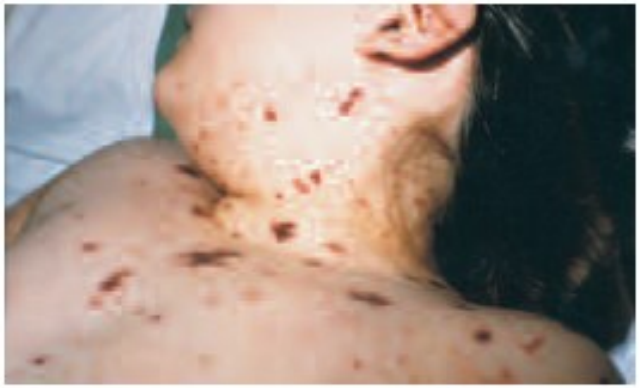
- Look for early septicaemia
- Document
- Capillary refill
- Heart rate
- Respiratory rate
- Every child with non blanching rash treated as an emergency – get help.

CORE EM

1. The Rash



Scanty petechial rash



Classic purpuric rash

Most patients with meningococcal septicaemia develop a rash - it is one of the clearest and most important signs to recognise. However, in meningitis the rash can be very scanty or even absent.

Although the majority of children seen in primary care with petechial rashes will not have meningococcal disease[11], it is very important to look for the rash, and a non-blanching rash should therefore be treated as an emergency[2,7].

Non-blanching rash is classified as 'red' in the NICE traffic-light system for assessing feverish children. A child seen in primary care with any 'red' features should be urgently referred to a paediatric specialist[2].

2. Early Signs of Septicaemia and Advancing Shock

The NICE Guideline on Bacterial Meningitis and Meningococcal Septicaemia[1] indentified recognising shock as one of the key priorities for implementation. Early signs of circulatory shutdown and shock include **pale or mottled skin,** and **cold hands and feet** due to vasoconstriction and **prolonged capillary refill, tachycardia,** and **fast or laboured breathing.**

The NICE Guideline on Feverish Illness in Children[2] specifies that temperature, heart rate, respiratory rate and capillary refill time should be routinely measured and recorded in all feverish children aged under five. Raised heart rate and respiratory rate can both be classified as amber in the NICE traffic light system, specifically:

- Raised heart rate in children under five
- Raised respiratory rate of more than 50 breaths per minute in 6-12 month olds or more than 40 breaths per minute in those aged over 12 months

These children should be assessed face-to-face and their need for paediatric care considered.

EM

Normal Values of Vital Signs

From Advanced Paediatric Life Support Manual

Age (years)	Heart Rate per minute	Respiratory Rate per minute	Systolic Blood Pressure
<1	110-160	30-40	70-90
1-2	100-150	25-35	80-95
2-5	95-140	25-30	80-100
5-12	80-120	20-25	90-110
over 12	60-100	15-20	100-120

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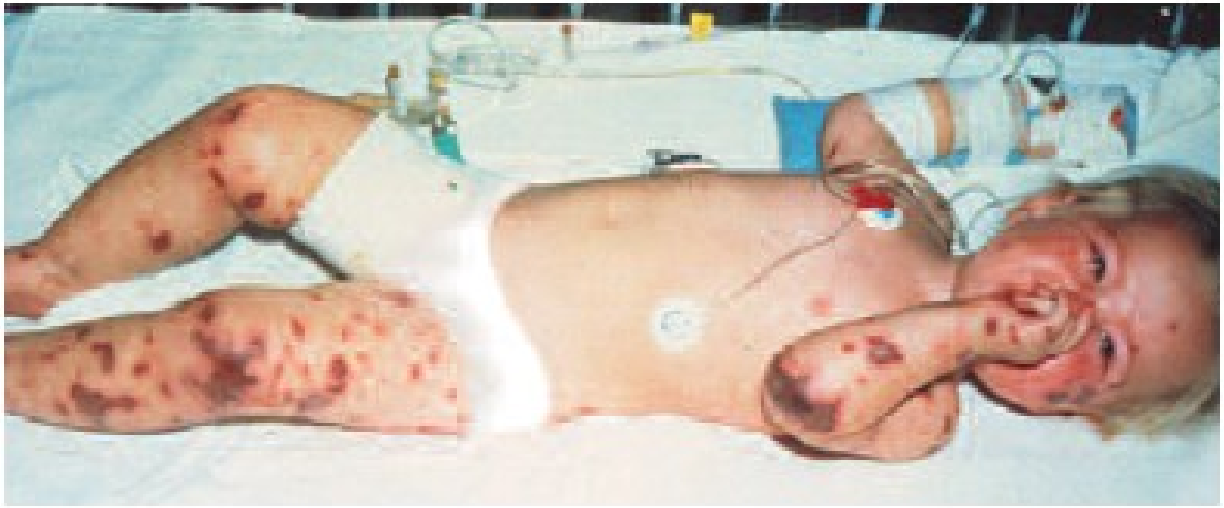
3. Conscious Level

This can be assessed by checking AVPU:

Alert? Responds to Voice? Responds to Pain? Unresponsive?

Drowsiness/impaired consciousness in children with septicaemia is a late and grave prognostic sign and indicates immediate action.



Even severely shocked children can still be alert and communicative.

5. Other Important Features of Meningitis

- Children are likely to be poorly responsive, staring, difficult to wake. Parents may report drowsiness or poor eye contact, and parental anxiety about their child's state of responsiveness should be taken seriously
- Babies are often irritable with a high-pitched cry, and may be stiff and jerky or else floppy and lifeless. **Fever is often absent in babies less than three months of age**
- Adolescents and adults may appear aggressive or combative
- Persistent vomiting may be seen at any age

Factors that may confuse diagnosis and delay recognition

- purpuric areas which look like bruises can be confused with injury or abuse
- disorientation/impaired consciousness can be confused with drug or alcohol intoxication[13]
- isolated limb or joint pain is a well-established sign of meningococcal septicaemia[6,14] - children have been mis-diagnosed with fractures due to the intensity of the pain
- maculopapular rashes are often dismissed as being viral in origin
- URTI does not exclude meningitis or septicaemia

It might be cold in Ballarat

What are we going to do

- Run as fast as a leopard

What are we going to do

- We are going to look for and recognize early septicaemia
- We are going to act fast
  - IV penicillin or ceftriaxone
  - We won't let a CT or LP delay the treatment
- We are going to save lives
- We are going to prevent disability or death

CORE EM

What are we going to do?

- Look for
- limb pain and
- cold hands or feet
- Document vital signs in febrile childred
- Look for and consider early septicaemia

- Somebody told me… spread the word

CORE EM

What matters?

- http://www.youtube.com/watch?v=ZUUcWWjjlhQ
- http://www.meningococcal.org/
- Your hard work and cleverness and compassion and integrity is appreciated by your colleagues and your patients.

References

- http://www.nice.org.uk/guidance/cg102/resources/guidance-bacterial-meningitis-and-meningococcal-septicaemia-pdf

- http://www.meningococcal.org/