**Fever in the child under two**

**Introduction**

Important changes in the epidemiology of infectious disease in this age group have occurred during the past decade. These include vaccination against Haemophilus influenzae B, the meningococcal disease epidemic in NZ, and recent vaccination against the epidemic strain of Neisseria meningitidis group B. It is likely it will change further with the introduction of Prevenar (pneumococcal vaccine).

The majority of children under 2 years of age with a high fever have a viral illness. About 3% of children under 2 years with a rectal temperature of > 38.9°C have a potentially serious bacterial infection.

Young febrile children often present with non-specific changes in behaviour and appearance. Specific signs, such as meningism, cannot be relied on to diagnose significant illness in this age group. The height of fever, rapidity of onset of illness, and response to antipyretics are not good indicators of the nature of the underlying illness.

Simple febrile convulsions are not associated with increased risk for serious sepsis.

The following strategy is recommended in the Children's Emergency Department at Starship Children's Hospital. This strategy applies to previously well children. Children with co-morbidities are likely to require more investigation and greater use of empiric antibiotic treatment.

Remember that no set of guidelines can give the correct course of action for every clinical circumstance, and senior medical staff are available to assist with clinical decision making.

Temperature in these guidelines refers to rectal or electronic tympanic membrane “rectal equivalent”. Tympanic membrane temperature measurement is inaccurate in children < 6 months, a rectal temperature should be obtained unless contraindicated (e.g. peritonism or rectal bleeding). Tympanic membrane thermometers can also give falsely low recordings in some older children, if in doubt check by another method.
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Children under 6 weeks of age, any fever (i.e. >38°C)

This is a high risk group, with bacterial infection in approximately 15% and the possibility of rapidly progressive disease.

Full sepsis work up is necessary, including:
- CXR
- FBC
- Blood cultures
- CSF
- Urine (bladder aspirate or catheter)

A dip stick screen on a bag urine specimen will miss some UTIs and is not adequate since UTIs are both more common and more serious in this age group. It is preferable to obtain a definitive urine specimen (bladder aspirate or catheter) immediately as part of the general sepsis screen to allow rapid institution of antibiotic therapy in sick infants.

Test for hypoglycaemia in these children as soon as possible.

Antibiotics should be commenced immediately in infants who appear unwell (lethargic or very irritable).

Infants who look well may have IV antibiotics commenced once all investigations are completed, or may be observed closely in hospital without antibiotics if all initial results (FBC, urine and CSF microscopy, CXR) are normal. The decision regarding whether to start antibiotics will generally be made by the admitting team under these circumstances.

<table>
<thead>
<tr>
<th>Antibiotic</th>
<th>Dose/Route</th>
<th>Frequency</th>
<th>Age Limits</th>
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</thead>
<tbody>
<tr>
<td>Amoxycillin</td>
<td>50mg/kg/dose</td>
<td>Q8H, Q6H</td>
<td>1st week of life</td>
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<td>&gt;1 week of age</td>
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<tr>
<td>Cefotaxime</td>
<td>Load 100mg/kg, then 50mg/kg/dose</td>
<td>Q12H, Q6H</td>
<td>1st week of life</td>
</tr>
<tr>
<td></td>
<td></td>
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<td>&gt;1 week of age</td>
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</tbody>
</table>

Children 6 weeks to 3 months of age, any fever (i.e. >38°C)

The risk of bacterial infection in this age group is around 6%

If the infant looks unwell:
Perform full sepsis screen:
- CXR
- FBC
- Blood culture
- CSF
- Urine (CSU or clean catch).

Admit on IV antibiotics (amoxycillin & cefotaxime, dose as described above).
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If the child looks well and feeding is satisfactory:

- Blood culture
- Urine (CSU or clean catch sent to lab)
- CXR if indicated by respiratory signs (grunting, tachypnoea, recession, oxygen requirement).

If initial results are normal, the infant may be managed at home.

Clinical review must occur within 24 hours (GP or hospital).

If you have any doubts regarding the infant’s clinical state, laboratory results or social situation admit to hospital.

**Children 3months to two years of age, fever >38.9°C**

Decisions regarding investigation and management are based on the child’s history and examination findings, with particular focus on risk factors for serious infection, early signs of cardiovascular or respiratory compromise and the overall appearance and behaviour of the child. Investigations contribute only a small amount of additional information.

Children who present with a fever persisting for more than five days require a different approach and should be discussed with senior staff.

Decision making requires experience and clinical judgement, and you should discuss cases with senior medical staff who can help you develop your skills in this area. There is a spectrum of illness severity, and the sections below provide examples of the approach to children with different severity of illness:

1. **There is a clear clinical focus of infection in a child who appears well (alert, responsive and undistressed):**

   Treat as clinically indicated for the specific infection (usually viral infections requiring symptomatic care). No laboratory investigation is usually necessary.
2. The child has any of the following; reduced conscious level, poor perfusion, a petechial rash, signs of cerebral irritation, or just “looks very sick”:

Full sepsis work up:
- CXR
- FBC
- Blood culture
- CSF (note the contra-indications to lumbar puncture below).
- Urine culture

These children should be admitted to hospital for observation and IV antibiotics pending culture results:

Cefotaxime  Load 100mg/kg, then
50mg/kg/dose  Q6H

Children with poor perfusion, tachycardia or hypotension will require urgent fluid resuscitation:
20ml/kg of normal saline as an initial bolus.

Reassess according to response. Children with septicaemia may require multiple fluid boluses to restore adequate circulation. Repeat fluid boluses according to effect, watching for reduction in tachycardia, improved perfusion and urine output, and change in conscious state. Two boluses of 20mls/kg is equivalent to half the normal circulating blood volume. Children who require this level of fluid resuscitation should be closely monitored (see Shock guideline).

Lumbar puncture is contra-indicated in children with evidence of raised ICP, a Glasgow Coma Score of less than 9, focal neurological signs, cardiovascular instability, or if showing signs of rapid deterioration.

If lumbar puncture is contra-indicated, then treatment for bacterial meningitis should be started immediately. Children with focal seizures, focal neurological abnormality, suspected encephalitis or contact with active herpetic disease should also be commenced on IV acyclovir.

3. The child who has a fever without clinical focus, who is not severely unwell.

These children have a rate of bacteraemia of ~ 2%, mostly Strep. pneumoniae. The majority of these cases resolve spontaneously.

FBC and CRP are not useful in determining the risk of bacterial sepsis in a child presently acutely with fever.

All require screening for a UTI. The prevalence of UTI in this age group with fever and no clinical focus is 2-5%. It is the most commonly missed bacterial diagnosis. Diagnosis is challenging as the clinical presentation tends to be non specific. A bag specimen screened by dipstick is acceptable in this age group, however a definitive specimen (CSU) is required if the dipstick is positive for either nitrates or leucocytes. **Do not send bag urine specimens to the laboratory.** A child with unexplained persistent fever or history of UTIs in the past should always have a urine sample obtained (see UTI guideline)

Consider blood culture in the more unwell child
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Chest x ray and CSF specimen should be obtained if indicated by history and examination, discuss with a senior doctor if in doubt. Children who have received prior antibiotics are more likely to require a CSF specimen despite lack of specific meningeal signs. If a child is drowsy (but otherwise looks well) after a simple febrile seizure, a short period of observation in CED may avoid excessive investigation and treatment, since most show dramatic improvement over 1 - 2 hours.

If focal infection is diagnosed on urine, CSF microscopy or CXR: treat as clinically indicated.

Virtually all of these children have viral illnesses, but alternative diagnoses may become apparent with time.

If, following a period of observation, the child remains responsive, interactive and well perfused, discharge home with symptomatic treatment (paracetamol) and arrange for clinical review within 24 hours, or sooner if condition deteriorates.

This review should normally be with the family’s GP. Bring the child back to CED if timing or other circumstances prevent GP review.

Consider the following when making decisions regarding disposition:

- Trend in clinical appearance and vital signs over a period of observation.
- Oral intake and losses.
- Any nursing concerns regarding the child.
- Social circumstances
- Ability of family to access the necessary follow up.

If you have any doubt about the clinical state of the child, or if the social circumstances make care at home more difficult take a blood culture and admit the child.

Antibiotic therapy is generally unnecessary in this group if hospitalised for observation unless clinical deterioration is evident. The decision regarding whether to start antibiotics will generally rest with the admitting team.

Any child with a positive blood culture should be immediately recalled to CED unless the child is reported to be well by parents and the culture is definitively identified by the laboratory as a contaminant organism (coagulase negative staphylococcus or diptheroids).
When to use Antipyretics &/or Analgesia

Is your patient:
- Over 3 months of age?
- No co-morbidities?
- No history of febrile convulsion?

Yes

Temperature measured at triage

Fever detected (>38.0°C)

No further routine temperature measurement required

If during CED attendance the child is
- Happy: Don’t give antipyretic/analgesic
- Miserable: Give Paracetamol or Ibuprofen

No fever

If miserable give analgesia

Temperature measured again only if diagnostic uncertainty (i.e. requested by medical team)

Fever detected (>38.0°C)

No

Measure & manage fever according to clinical need
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Rationale

- Fever does not predict serious bacterial illness
- There is no evidence suggesting repeated measures of temperature are helpful. Therefore we should not ‘routinely’ repeat temperature measurement
- The height of the fever does not significantly change the risk of serious bacterial illness
- Initial temperature measurement may help to inform us of the type of diagnosis
- However, independent of temperature recording, if child is:
  - Miserable (+/- febrile) – treat with antipyretic/analgesic
  - Happy (+/- febrile) – don’t treat with antipyretic/analgesic

- If a child is febrile initially, there are very few situations where repeat measurements are likely to be required. If there is uncertainty about the diagnosis or a prolonged history of illness, repeated temperature measurements may be required. These should be specifically requested by the clinician (it is anticipated this will be a small percentage of children presenting to CED).

- If a child is afebrile initially, temperature measurements should be repeated only if there is diagnostic uncertainty (these should be specifically requested by the clinician).
- If an initially afebrile child becomes miserable, then they will need analgesia regardless of their temperature.

References


