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Feverish illness in children under 5 years

M Richardson, M Lakhanpaul

Feverish illness is very common in young children. It is probably the commonest reason for a child to be taken to the doctor and nearly half of all paediatric admissions to hospital are associated with fever. Most feverish illnesses are caused by self-limiting viral infections but a significant few are caused by serious bacterial infections. It is often difficult for healthcare professionals to distinguish between the two, especially in the younger child. In an attempt to help healthcare professionals in this area, the Department of Health instructed the National Institute for Health and Clinical Excellence (NICE) to commission an evidence-based guideline on the assessment and initial management of feverish illness in children aged 0–5 years. The guidance has recently been published in full and abbreviated forms. Another summary has also been published.

The Department of Health considered that national guidance was needed for a number of reasons (MacFaul R, personal communication). Not least was the fact that infectious diseases remain a major cause of mortality in childhood. In recent decades, the infant mortality rate has not reduced significantly in the UK, and other European countries now have mortality rates up to 50% lower. It is possible that the infant mortality rates in this country could be brought in line with those in other countries if the proportion due to infectious diseases could be reduced. This possibility is supported by the fact that, in the absence of national guidance, there is evidence of variable management of infections in children. In some cases this has been associated with higher fatality rates. This is illustrated by recent studies of meningococcal disease, the leading cause of infectious death in childhood. One large national study reported an association between death from meningococcal disease and deficiencies in health care, and another found case mortality ratios to be highest in the least affluent areas of the UK.

This summary concentrates on management by paediatricians but it should be noted that the guideline contains sections for all healthcare professionals. It is likely that these sections will affect referral patterns, hopefully so that more children at risk of serious illness are referred to hospital while those who can be safely managed at home are not. The guideline developers used standard NICE evidence-based methodology to identify clinical studies that would inform the recommendations. Where no published evidence was available the guideline development group used a formal consensus method, the Delphi technique, to make recommendations. The Delphi technique involved the collective opinions of over 50 healthcare professionals and parents/carers. Recommendations in this summary deriving from the Delphi technique are marked (δ).

MANAGEMENT BY PAEDIATRICIANS

Children younger than 3 months

► Infants younger than 3 months with fever should be observed and have the following vital signs measured and recorded:
  - temperature
  - heart rate
  - respiratory rate.

► Infants younger than 3 months with fever should have the following investigations performed:
  - full blood count
  - blood culture
  - C-reactive protein
  - urine testing for urinary tract infection
  - chest x-ray only if respiratory signs are present
  - stool culture, if diarrhoea is present.

► Lumbar puncture should be performed on the following children (unless contraindicated) and parenteral antibiotics started:
– infants younger than 1 month
– all infants aged 1–3 months who appear unwell
– infants aged 1–3 months with a white blood cell count (WBC) less than 5 or greater than 15 $\times 10^9/l$.

> When indicated, a lumbar puncture should be performed without delay and, whenever possible, before the administration of antibiotics.

**Children aged 3 months or older**

> Children with fever without apparent source should have investigations performed as summarised in table 2.

> In children aged 3 months or older with fever without apparent source, a period of observation in hospital (with or without investigations) should be considered as part of the assessment to help differentiate non-serious from serious illness.

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**Immediate treatment by the paediatric specialist (for children of all ages)**

> Children with fever and shock should be:

– given an immediate intravenous fluid bolus of 20 ml/kg. The initial fluid should normally be 0.9% sodium chloride

– actively monitored and given further fluid boluses as necessary.

> Children with fever should be given immediate parenteral antibiotics if they are:

– shocked

– unrousable

– showing signs of meningococcal disease.

> Immediate parenteral antibiotics should be considered for children with fever and reduced levels of consciousness.

> When parenteral antibiotics are indicated, a third-generation cephalosporin (for example, cefotaxime or ceftriaxone) should be given, until culture results are available. For children younger than 3 months, an antibiotic active against Listeria (for example, ampicillin or amoxicillin) should also be given.

> Children with fever and symptoms and signs suggestive of herpes simplex encephalitis should be given intravenous aciclovir.

> Oxygen should be given to children with fever who have signs of shock or oxygen saturation ($\text{SpO}_2$) of less than 92% when breathing air. Treatment with oxygen should also be considered for children with an $\text{SpO}_2$ of greater than 92%, as clinically indicated.

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**Clinical assessment of the child with fever**

> First, healthcare professionals should identify any immediately life-threatening features, including compromise of the airway, breathing or circulation, and decreased level of consciousness.

> Second, children with feverish illness should be assessed for the presence or absence of symptoms and signs that can be used to predict the risk of serious illness using the traffic light system (see table 1).

> Third, healthcare professionals should look for a source of fever and check for the presence of symptoms and signs that are associated with specific serious diseases (these are listed in the guideline).

> Healthcare professionals should measure and record temperature, heart rate, respiratory rate and capillary refill time as part of the routine assessment of a child with fever.

> Height of body temperature alone should not be used to identify children with serious illness. However, children in the following categories should be recognised as being in a high-risk group for serious illness:

– children younger than 3 months of age with a temperature of $38^\circ$ C or higher

– children aged 3–6 months with a temperature of $39^\circ$ C or higher.

> Duration of fever should not be used to predict the likelihood of serious illness.

> When assessing a child with feverish illness, healthcare professionals should enquire about recent travel abroad and should consider the possibility of imported infections according to the region visited.

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**Admission to and discharge from hospital**

> In addition to the child’s clinical condition, healthcare professionals should consider the following factors when deciding whether to admit a child with fever to hospital:

– social and family circumstances

– other illnesses that affect the child or other family members

– parental anxiety and instinct (based on their knowledge of their child)

– contacts with other people who have infectious diseases

– recent travel abroad to tropical/subtropical areas, or areas with a high risk of endemic infectious disease

– when the parent or carer’s concern for their child’s current illness has caused them to seek healthcare advice repeatedly

– when a feverish illness has no obvious cause, but the child remains ill longer than expected for a self-limiting illness ($\delta$).

> If it is decided that a child does not need to be admitted to hospital, but no diagnosis has been
Table 1  Traffic light system for assessing the risk of serious illness in children with fever

<table>
<thead>
<tr>
<th>Colour</th>
<th>Green—low risk</th>
<th>Amber—intermediate risk</th>
<th>Red—high risk</th>
</tr>
</thead>
<tbody>
<tr>
<td>Activity</td>
<td>Responds normally to social cues</td>
<td>Not responding normally to social cues</td>
<td>No response to social cues</td>
</tr>
<tr>
<td>Hydroxy</td>
<td>Normal skin and eyes</td>
<td>Dry mucous membrane</td>
<td>Reduced skin turgor</td>
</tr>
<tr>
<td>Other</td>
<td>None of the amber or red symptoms</td>
<td>Swelling of a limb or joint</td>
<td>Non-blanching rash</td>
</tr>
</tbody>
</table>

CRT, capillary refill time; RR, respiratory rate.

Children with any features in the red column are at high risk of serious illness. Children with any features in the amber column and none in the red column are at intermediate risk of serious illness. Those with features in the green column, and none in the amber or red columns, are at low risk.

Antipyretic interventions

- Tepid sponging is not recommended for the treatment of fever.
- Children with fever should not be underdressed or over-wrapped (d).
- The use of antipyretic agents should be considered in children with fever who appear distressed or unwell. Antipyretic agents should not routinely be used with the sole aim of reducing body temperature in children with fever who are otherwise well (d).
- Either paracetamol or ibuprofen can be used to reduce temperature in children with fever.
- Paracetamol and ibuprofen should not be administered at the same time to children with fever.
- Paracetamol and ibuprofen should not routinely be given alternately to children with fever. However, use of the alternative drug may be considered if the child does not respond to the first agent.
- Antipyretic agents do not prevent febrile convulsions and should not be used specifically for this purpose.

COMMENTARY

Assessment of a young child presenting with fever can be challenging. The guideline commissioned by NICE is based on the presenting problem of fever rather than an end diagnosis. It aims to provide
guidance relevant to a range of health professionals (for example, nurses, GPs and paediatricians) in a variety of settings to identify children who may be in the early stages of a more progressive disease and require intervention and those who require observation or who could be managed at home. The remit of the guideline did not include service organisation, but it recognises that sequential observations may be made by different healthcare professionals and therefore focuses on reinforcing a structured holistic approach to the assessment and uses a novel traffic light system to support the implementation of the recommendations. The development group represented healthcare professionals who would be using the guidance and included GPs, paediatricians, NHS direct representation, nurses, a pharmacist, an emergency care practitioner and parents. The full guideline is accompanied by a quick reference guide, a patient version and a range of implementation tools developed by NICE. Where evidence is lacking further research has been recommended.

The GDG addressed the clinical questions where evidence was lacking by using a formal Delphi process. The Delphi process involved over 50 healthcare professionals including primary and secondary care and parents and carers. The inclusion of this process aimed to lend more credibly to recommendations derived from consensus because of the size and diversity of the consensus group and the reduced risk of bias. An example includes the decision to include the recording of vital signs in all settings. The strong evidence regarding certain vital signs, such as respiratory rate, has been highlighted and given due credence. Where evidence was lacking, such as for heart rate, a wider consensus was obtained rather than relying on the opinions of the smaller development group. The Delphi technique has previously been used successfully in the production of children’s problem-based guidelines and the FIC guideline can therefore be seen as a logical extension to the process of producing hybrid evidence/consensus-based guidelines for the management of common presenting problems in childhood.

NICE have stopped grading recommendations, and the FIC guideline is one of the first not to carry the familiar grade A, B, C and D recommendations. This can cause some difficulty in assessing the weight of evidence behind a recommendation but levels of evidence are retained in the full version of the guideline. In this summary, it can be assumed that, unless indicated otherwise, the recommendations are supported by the highest level of evidence available. For instance, the main recommendations in the traffic light system are supported by level 2 evidence, the highest level available for prognostic studies. They would therefore equate to the former grade B recommendations.

CONCLUSION

The FIC guideline is based around a novel “traffic light” system that directs clinical assessment and initial management. It is predicted that the guideline will lead to more appropriate management of children with fever in both primary and secondary care.

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Competing interests: MR was the Chair for this guideline and ML is the Clinical Director for the National Collaborating Centre for Women and Children’s Health.

REFERENCES


Guideline review