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Feverish illness in children

Assessment and initial management in children younger than 5 years

NICE clinical guideline 47
Developed by the National Collaborating Centre for Women's and Children's Health

NICE clinical guideline 47
Feverish illness in children: assessment and initial management in children younger than 5 years

Ordering information
You can download the following documents from www.nice.org.uk/CG047
- The NICE guideline (this document) – all the recommendations.
- A quick reference guide – a summary of the recommendations for healthcare professionals.
- 'Understanding NICE guidance' – information for patients and carers.
- The full guideline – all the recommendations, details of how they were developed, and summaries of the evidence they were based on.

For printed copies of the quick reference guide or 'Understanding NICE guidance', phone the NHS Response Line on 0870 1555 455 and quote:
- N1247 (quick reference guide)
- N1248 ('Understanding NICE guidance').

This guidance is written in the following context

This guidance represents the view of the Institute, which was arrived at after careful consideration of the evidence available. Healthcare professionals are expected to take it fully into account when exercising their clinical judgement. The guidance does not, however, override the individual responsibility of healthcare professionals to make decisions appropriate to the circumstances of the individual patient, in consultation with the patient and/or guardian or carer.

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Introduction

Feverish illness in young children usually indicates an underlying infection and is a cause of concern for parents and carers. Feverish illness is very common in young children, with between 20 and 40% of parents reporting such an illness each year. As a result, fever is probably the commonest reason for a child to be taken to the doctor. Feverish illness is also the second most common reason for a child being admitted to hospital. Despite advances in healthcare, infections remain the leading cause of death in children under the age of 5 years.

Fever in young children can be a diagnostic challenge for healthcare professionals because it is often difficult to identify the cause. In most cases, the illness is due to a self-limiting viral infection. However, fever may also be the presenting feature of serious bacterial infections such as meningitis or pneumonia. A significant number of children have no obvious cause of fever despite careful assessment. These children with fever without apparent source are of particular concern to healthcare professionals because it is especially difficult to distinguish between simple viral illnesses and life-threatening bacterial infections in this group.

Although there are guidelines for many individual infections, there is no national guidance on the management of fever as a presenting illness. Management varies across the UK and there is some evidence that mortality and morbidity from infectious diseases in children is sometimes associated with deficiencies in the healthcare system and in the diagnosis and treatment of illnesses. There is also some evidence that death rates are higher in the least affluent areas.

As a result, there is a perceived need to improve the recognition, assessment and immediate treatment of feverish illnesses in children. This guideline is designed to assist healthcare professionals in the initial assessment and immediate treatment of young children with fever presenting to primary or secondary care.

Patient-centred care

This guideline offers best practice advice on the care of children with feverish illness.

Treatment and care should take into account childrens' needs and preferences and those of their parents or carers. Parents and carers of children with fever should have the opportunity to make informed decisions about their care and treatment, in partnership with their healthcare professionals. If parents or carers do not have the capacity to make decisions, healthcare professionals should follow the Department of Health guidelines – 'Reference guide to consent for examination or treatment' (2001) (available from www.dh.gov.uk). Since April 2007, healthcare professionals need to follow a code of practice accompanying the Mental Capacity Act (summary available from www.dca.gov.uk/menincap/bill-summary.htm).

Good communication between healthcare professionals and the parents and carers of children with fever is essential. It should be supported by evidence-based written information. Treatment and care of children with fever, and the information parents and carers are given about it, should be culturally appropriate. It should also be accessible to people with additional needs such as physical, sensory or learning disabilities, and to people who do not speak or read English.

Parents and carers should have the opportunity to be involved in decisions about the patient's care and treatment.

Parents and carers should also be given the information and support they need.

Key priorities for implementation

Detection of fever

- In children aged 4 weeks to 5 years, healthcare professionals should measure body temperature by one of the following methods:
  - electronic thermometer in the axilla
  - chemical dot thermometer in the axilla
  - infra-red tympanic thermometer.

- Reported parental perception of a fever should be considered valid and taken seriously by healthcare professionals.

Clinical assessment of the child with fever

- 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).

- 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.

Management by remote assessment

- Children with any 'red' features but who are not considered to have an immediately life-threatening illness should be urgently assessed by a healthcare professional in a face-to-face setting within 2 hours.

Management by the non-paediatric practitioner

- If any 'amber' features are present and no diagnosis has been reached, healthcare professionals should provide parents or carers with a 'safety net' or refer to specialist paediatric care for further assessment. The safety net should be one or more of the following:

  - providing the parent or carer with verbal and/or written information on warning symptoms and how further healthcare can be accessed (see section 1.7)
  - arranging further follow-up at a specified time and place
  - liaising with other healthcare professionals, including out-of-hours providers, to ensure direct access for the child if further assessment is required.

- Oral antibiotics should not be prescribed to children with fever without apparent source.

Management by the paediatric specialist

- Infants younger than 3 months with fever should be observed and have the following vital signs measured and recorded:

  - temperature
  - heart rate
  - respiratory rate.

- Children with fever without apparent source presenting to paediatric specialists with one or more 'red' features should have the following investigations performed:

  - full blood count
  - blood culture
  - C-reactive protein

- urine testing for urinary tract infection[1].

- The following investigations should also be considered in children with 'red' features, as guided by the clinical assessment:

  - lumbar puncture in children of all ages (if not contraindicated)
  - chest X-ray irrespective of body temperature and white blood cell count
  - serum electrolytes and blood gas.

Antipyretic interventions

- Antipyretic agents do not prevent febrile convulsions and should not be used specifically for this purpose.

[1] See 'Urinary tract infection in children', NICE clinical guideline (publication expected August 2007).

1 Guidance

The following guidance is based on the best available evidence. The full guideline (www.nice.org.uk/CG047fullguideline) gives details of the methods and the evidence used to develop the guidance (see section 5 for details).

This guideline is intended for use by healthcare professionals in the assessment and initial management of young children with feverish illness. The guideline should be followed until a clinical diagnosis of the underlying condition has been made. Once a diagnosis has been made, the child should be treated according to national or local guidance for that condition.

Parents or carers of a child with fever may approach a range of different healthcare professionals as their first point of contact, for example, a general practitioner (GP), a pharmacist or an emergency care practitioner. The training and experience of the healthcare professionals involved in the child's care will vary and each should interpret the guidance according to the scope of their own practice.

For the purposes of this guideline, fever was defined as 'an elevation of body temperature above the normal daily variation'.

1.1 Thermometers and detection of fever

1.1.1 Oral and rectal temperature measurements

1.1.1.1 The oral and rectal routes should not routinely be used to measure the body temperature of children aged 0–5 years.

1.1.2 Measurement of body temperature at other sites

1.1.2.1 In infants under the age of 4 weeks, body temperature should be measured with an electronic thermometer in the axilla.

1.1.2.2 In children aged 4 weeks to 5 years, healthcare professionals should measure body temperature by one of the following methods:

- electronic thermometer in the axilla
- chemical dot thermometer in the axilla
- infra-red tympanic thermometer.

1.1.2.3 Healthcare professionals who routinely use disposable chemical dot thermometers should consider using an alternative type of thermometer when multiple temperature measurements are required.

1.1.2.4 Forehead chemical thermometers are unreliable and should not be used by healthcare professionals.

1.1.3 Subjective detection of fever by parents and carers

1.1.3.1 Reported parental perception of a fever should be considered valid and taken seriously by healthcare professionals.

1.2 Clinical assessment of the child with fever

1.2.1 Assessment of risk of serious illness

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

1.2.1.2 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).

1.2.1.3 Children with the following symptoms or signs should be recognised as being in a high-risk group for serious illness:

- unable to rouse or if roused does not stay awake
- weak, high-pitched or continuous cry
- pale/mottled/blue/ashen

- reduced skin turgor
- bile-stained vomiting
- moderate or severe chest indrawing
- respiratory rate greater than 60 breaths per minute
- grunting
- bulging fontanelle
- appearing ill to a healthcare professional.

1.2.1.4 Children with any of the following symptoms should be recognised as being in at least an intermediate-risk group for serious illness:

- wakes only with prolonged stimulation
- decreased activity
- poor feeding in infants
- not responding normally to social cues/no smile
- dry mucous membranes
- reduced urine output
- a new lump larger than 2 cm
- pallor reported by parent or carer
- nasal flaring.

1.2.1.5 Children who have all of the following features, and none of the high or intermediate risk features, should be recognised as being in a low-risk group for serious illness:

- strong cry or not crying
- content/smiles
- stays awake
- normal colour of skin, lips and tongue
- normal skin and eyes
- moist mucous membranes
- normal response to social cues.

1.2.1.6 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.

1.2.1.7 Healthcare professionals examining children with fever should be aware that a raised heart rate can be a sign of serious illness, particularly septic shock.

1.2.1.8 A capillary refill time of 3 seconds or longer should be recognised as an intermediate-risk group marker for serious illness (amber sign).

1.2.1.9 Healthcare professionals should measure the blood pressure of children with fever if the heart rate or capillary refill time is abnormal and the facilities to measure blood pressure are available.

1.2.1.10 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°C or higher
- children aged 3–6 months with a temperature of 39°C or higher.

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

1.2.1.12 Children with fever should be assessed for signs of dehydration. Healthcare professionals should look for:

- prolonged capillary refill time
- abnormal skin turgor
- abnormal respiratory pattern
- weak pulse
- cool extremities.

1.2.2 Symptoms and signs of specific illnesses

1.2.2.1 Healthcare professionals should look for a source of fever and check for the presence of symptoms and signs that are associated with specific diseases (see table 2).

1.2.2.2 Meningococcal disease should be considered in any child with fever and a non-blanching rash, particularly if any of the following features are present:

- an ill-looking child
- lesions larger than 2 mm in diameter (purpura)
- a capillary refill time of 3 seconds or longer
- neck stiffness.

1.2.2.3 Meningitis should be considered in a child with fever and any of the following features:

- neck stiffness
- bulging fontanelle
- decreased level of consciousness
- convulsive status epilepticus.

1.2.2.4 Healthcare professionals should be aware that classical signs of meningitis (neck stiffness, bulging fontanelle, high-pitched cry) are often absent in infants with bacterial meningitis.

1.2.2.5 Herpes simplex encephalitis should be considered in children with fever and any of the following features:

- focal neurological signs
- focal seizures
- decreased level of consciousness.

1.2.2.6 Pneumonia should be considered in children with fever and any of the following signs:

- tachypnoea (respiratory rate greater than 60 breaths per minute, age 0–5 months; greater than 50 breaths per minute, age 6–12 months; greater than 40 breaths per minute, age older than 12 months)
- crackles in the chest
- nasal flaring
- chest indrawing
- cyanosis
- oxygen saturation of 95% or less when breathing air.

1.2.2.7 Urinary tract infection should be considered in any child younger than 3 months with fever[2].

1.2.2.8 Urinary tract infection should be considered in a child aged 3 months and older with fever and one or more of the following:

- vomiting
- poor feeding
- lethargy
- irritability
- abdominal pain or tenderness
- urinary frequency or dysuria
- offensive urine or haematuria.

1.2.2.9 Septic arthritis/osteomyelitis should be considered in children with fever and any of the following signs:

- swelling of a limb or joint
- not using an extremity
- non-weight bearing.

[2] See 'Urinary tract infection in children', NICE clinical guideline (publication expected August 2007).

1.2.2.10 Kawasaki disease should be considered in children with fever that has lasted longer than 5 days and who have four of the following five features:

- bilateral conjunctival injection
- change in mucous membranes in the upper respiratory tract (for example, injected pharynx, dry cracked lips or strawberry tongue)
- change in the extremities (for example, oedema, erythema or desquamation)
- polymorphous rash
- cervical lymphadenopathy.

Healthcare professionals should be aware that, in rare cases, incomplete/atypical Kawasaki disease may be diagnosed with fewer features.

1.2.3 Imported infections

1.2.3.1 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.

Table 1 Traffic light system for identifying risk of serious illness

Children with fever and **any** of the symptoms or signs in the red column should be recognised as being at high risk. Similarly, children with fever and any of the symptoms or signs in the amber column and none in the red column should be recognised as being at intermediate risk. Children with symptoms and signs in the green column and none in the amber or red column are at low risk. The management of children with fever should be directed by the level of risk.

	Green – low risk	Amber – intermediate risk	Red – high risk
Colour	• Normal colour of skin, lips and tongue	• Pallor reported by parent/carer	• Pale/mottled/ashen/blue
Activity	• Responds normally to social cues • Content/smiles • Stays awake or awakens quickly • Strong normal cry/not crying	• Not responding normally to social cues • Wakes only with prolonged stimulation • Decreased activity • No smile	• No response to social cues • Appears ill to a healthcare professional • Unable to rouse or if roused does not stay awake • Weak, high-pitched or continuous cry
Respiratory		• Nasal flaring • Tachypnoea: RR > 50 breaths/minute age 6–12 months RR > 40 breaths /minute age > 12 months • Oxygen saturation ≤ 95% in air • Crackles	• Grunting • Tachypnoea: RR > 60 breaths/minute • Moderate or severe chest indrawing
Hydration	• Normal skin and eyes • Moist mucous membranes	• Dry mucous membrane • Poor feeding in infants • CRT ≥ 3 seconds • Reduced urine output	• Reduced skin turgor
Other	• **None** of the amber or red symptoms or signs	• Fever for ≥ 5 days	• Age 0–3 months, temperature ≥ 38°C • Age 3–6 months, temperature ≥ 39°C
		• Swelling of a limb or joint • Non-weight bearing/not using an extremity	• Non-blanching rash • Bulging fontanelle • Neck stiffness • Status epilepticus • Focal neurological signs • Focal seizures
		• A new lump > 2 cm	• Bile-stained vomiting

CRT, capillary refill time; RR, respiratory rate.

Table 2 Summary table for symptoms and signs suggestive of specific diseases

Diagnosis to be considered	Symptoms and signs in conjunction with fever
Meningococcal disease	Non-blanching rash, particularly with one or more of the following: • an ill-looking child • lesions larger than 2 mm in diameter (purpura) • a capillary refill time of ≥ 3 seconds • neck stiffness
Meningitis	Neck stiffness Bulging fontanelle Decreased level of consciousness Convulsive status epilepticus
Herpes simplex encephalitis	Focal neurological signs Focal seizures Decreased level of consciousness
Pneumonia	Tachypnoea (RR > 60 breaths per minute age 0–5 months, RR > 50 breaths per minute age 6–12 months; RR > 40 breaths per minute age > 12 months) Crackles Nasal flaring Chest indrawing Cyanosis Oxygen saturation ≤ 95%
Urinary tract infection	Vomiting Poor feeding Lethargy Irritability Abdominal pain or tenderness Urinary frequency or dysuria Offensive urine or haematuria
Septic arthritis	Swelling of a limb or joint Not using an extremity Non-weight bearing
Kawasaki disease	Fever for more than 5 days and at least four of the following: • bilateral conjunctival injection • change in mucous membranes • change in the extremities • polymorphous rash • cervical lymphadenopathy

1.3 Management by remote assessment

Remote assessment refers to situations in which a child is assessed by a healthcare professional who is unable to examine the child because the child is geographically remote from the assessor (for example, telephone calls to NHS Direct). Therefore, assessment is largely an interpretation of symptoms rather than physical signs. The guidance in this section may also apply to healthcare professionals whose scope of practice does not include the physical examination of a young child (for example, community pharmacists).

1.3.1 Management according to risk of serious illness

1.3.1.1 Healthcare professionals performing a remote assessment of a child with fever should seek to identify symptoms and signs of serious illness and specific diseases as described in section 1.2 and summarised in tables 1 and 2.

1.3.1.2 Children whose symptoms or combination of symptoms suggest an immediately life-threatening illness (see recommendation 1.2.1.1) should be referred immediately for emergency medical care by the most appropriate means of transport (usually 999 ambulance).

1.3.1.3 Children with any 'red' features but who are not considered to have an immediately life-threatening illness should be urgently assessed by a healthcare professional in a face-to-face setting within 2 hours.

1.3.1.4 Children with 'amber' but no 'red' features should be assessed by a healthcare professional in a face-to-face setting. The urgency of this assessment should be determined by the clinical judgement of the healthcare professional carrying out the remote assessment.

1.3.1.5 Children with 'green' features and none of the 'amber' or 'red' features can be managed at home with appropriate advice for parents and carers, including advice on when to seek further attention from the healthcare services (see section 1.7).

1.4 Management by the non-paediatric practitioner

In this guideline, a non-paediatric practitioner is defined as a healthcare professional who has not had specific training or expertise in the management of children and their illnesses. This term includes healthcare professionals working in primary care, but it may also apply to many healthcare professionals in general emergency departments.

1.4.1 Management according to risk of serious illness

1.4.1.1 Management by a non-paediatric practitioner should start with a clinical assessment as described in section 1.2. Healthcare professionals should attempt to identify symptoms and signs of serious illness and specific diseases as summarised in tables 1 and 2.

1.4.1.2 Children whose symptoms or combination of symptoms and signs suggest an immediately life-threatening illness (see recommendation 1.2.1.1) should be referred immediately for emergency medical care by the most appropriate means of transport (usually 999 ambulance).

1.4.1.3 Children with any 'red' features but who are not considered to have an immediately life-threatening illness should be referred urgently to the care of a paediatric specialist.

1.4.1.4 If any 'amber' features are present and no diagnosis has been reached, healthcare professionals should provide parents or carers with a 'safety net' or refer to specialist paediatric care for further assessment. The safety net should be one or more of the following:

- providing the parent or carer with verbal and/or written information on warning symptoms and how further healthcare can be accessed (see section 1.7)
- arranging further follow-up at a specified time and place

- liaising with other healthcare professionals, including out-of-hours providers, to ensure direct access for the child if further assessment is required.

1.4.1.5 Children with 'green' features and none of the 'amber' or 'red' features can be managed at home with appropriate advice for parents and carers, including advice on when to seek further attention from the healthcare services (see section 1.7).

1.4.2 Further management by the non-paediatric practitioner

1.4.2.1 Children with symptoms and signs suggesting pneumonia who are not admitted to hospital should not routinely have a chest X-ray.

1.4.2.2 Urine should be tested on children with fever as recommended in 'Urinary tract infection in children'[3].

1.4.2.3 Oral antibiotics should not be prescribed to children with fever without apparent source.

1.4.2.4 Children with suspected meningococcal disease should be given parenteral antibiotics at the earliest opportunity (either benzylpenicillin or a third-generation cephalosporin).

1.5 Management by the paediatric specialist

In this guideline, the term paediatric specialist refers to a healthcare professional who has had specific training or has recognised expertise in the management of children and their illnesses. Examples include paediatricians, or healthcare professionals working in children's emergency departments.

1.5.1 Children younger than 5 years

1.5.1.1 Management by the paediatric specialist should start with a clinical assessment as described in section 1.2. The healthcare professional should attempt to identify symptoms and signs of

[3] NICE clinical guideline (publication expected August 2007).

serious illness and specific diseases as summarised in tables 1 and 2.

1.5.2 Children younger than 3 months

1.5.2.1 Infants younger than 3 months with fever should be observed and have the following vital signs measured and recorded:

- temperature
- heart rate
- respiratory rate.

1.5.2.2 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[4]
- chest X-ray only if respiratory signs are present
- stool culture, if diarrhoea is present.

1.5.2.3 Lumbar puncture should be performed on the following children (unless contraindicated):

- 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 than15 × 10^9/litre.

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

[4] See 'Urinary tract infection in children', NICE clinical guideline (publication expected August 2007).

1.5.2.5 Parenteral antibiotics should be given to:

- infants younger than 1 month
- all infants aged 1–3 months who appear unwell
- infants aged 1–3 months with WBC less than 5 or greater than 15×10^9/litre.

1.5.2.6 When parenteral antibiotics are indicated for infants less than 3 months of age (see recommendation 1.5.2.5), a third-generation cephalosporin (for example, cefotaxime or ceftriaxone) should be given plus an antibiotic active against Listeria (for example, ampicillin or amoxicillin).

1.5.3 Children aged 3 months or older

1.5.3.1 Children with fever without apparent source presenting to paediatric specialists with one or more 'red' features should have the following investigations performed:

- full blood count
- blood culture
- C-reactive protein
- urine testing for urinary tract infection[5].

1.5.3.2 The following investigations should also be considered in children with 'red' features, as guided by the clinical assessment:

- lumbar puncture in children of all ages (if not contraindicated)
- chest X-ray irrespective of body temperature and WBC
- serum electrolytes and blood gas.

[5] See 'Urinary tract infection in children', NICE clinical guideline (publication expected August 2007).

1.5.3.3 Children with fever without apparent source presenting to paediatric specialists who have one or more 'amber' features should have the following investigations performed unless deemed unnecessary by an experienced paediatrician:

- urine should be collected and tested for urinary tract infection[6]
- blood tests: full blood count, C-reactive protein and blood cultures
- lumbar puncture should be considered for children younger than 1 year
- chest X-ray in a child with a fever greater than 39°C and WBC greater than 20 × 10^9/litre.

1.5.3.4 Children who have been referred to a paediatric specialist with fever without apparent source and who have no features of serious illness (that is, the green group), should have urine tested for urinary tract infection[6] and be assessed for symptoms and signs of pneumonia (see table 2).

1.5.3.5 Routine blood tests and chest X-rays should not be performed on children with fever who have no features of serious illness (that is, the green group).

1.5.3.6 Febrile children with proven respiratory syncytial virus or influenza infection should be assessed for features of serious illness. Consideration should be given to urine testing for urinary tract infection[6].

1.5.3.7 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.

[6] See 'Urinary tract infection in children', NICE clinical guideline (publication expected August 2007).

1.5.3.8 When a child has been given antipyretics:

- healthcare professionals should not rely on a decrease or lack of decrease in temperature after 1–2 hours to differentiate between serious and non-serious illness
- children in hospital with 'amber' or 'red' features should be re-assessed after 1–2 hours.

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

1.5.4.1 Children with fever and shock presenting to specialist paediatric care or an emergency department 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.

1.5.4.2 Children with fever presenting to specialist paediatric care or an emergency department should be given immediate parenteral antibiotics if they are:

- shocked
- unrousable
- showing signs of meningococcal disease (see table 2).

1.5.4.3 Immediate parenteral antibiotics should be considered for children with fever and reduced levels of consciousness. In these cases symptoms and signs of meningitis and herpes simplex encephalitis should be sought (see table 2).

1.5.4.4 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.

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

1.5.4.6 Oxygen should be given to children with fever who have signs of shock or oxygen saturation (SpO_2) of less than 92% when breathing air. Treatment with oxygen should also be considered for children with an SpO_2 of greater than 92%, as clinically indicated.

1.5.5 Treatment of suspected serious bacterial infection

1.5.5.1 In a child presenting to hospital with a fever and suspected serious bacterial infection, requiring immediate treatment, antibiotics should be directed against *Neisseria meningitidis*, *Streptococcus pneumoniae*, *Escherichia coli*, *Staphylococcus aureus* and *Haemophilus influenzae* type b. A third-generation cephalosporin (for example, cefotaxime or ceftriaxone) is appropriate, until culture results are available. For infants younger than 3 months of age, an antibiotic active against Listeria (for example, ampicillin or amoxicillin) should be added.

1.5.5.2 Healthcare professionals should refer to local treatment guidelines when rates of bacterial antibiotic resistance are significant.

1.5.6 Admission to and discharge from hospital

1.5.6.1 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 serious 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
- where the family has experienced a previous serious illness or death due to feverish illness which has increased their anxiety levels
- when a feverish illness has no obvious cause, but the child remains ill longer than expected for a self-limiting illness.

1.5.6.2 If it is decided that a child does not need to be admitted to hospital, but no diagnosis has been reached, a safety net should be provided for parents and carers if any 'red' or 'amber' features are present. The safety net should be one or more of the following:

- providing the parent or carer with verbal and/or written information on warning symptoms and how further healthcare can be accessed (see section 1.7)
- arranging further follow-up at a specified time and place
- liaising with other healthcare professionals, including out-of-hours providers, to ensure direct access for the child if further assessment is required.

1.5.6.3 Children with 'green' features and none of the 'amber' or 'red' features can be managed at home with appropriate advice for parents and carers, including advice as to when to seek further attention from the healthcare services (see section 1.7).

1.5.7 Referral to paediatric intensive care

1.5.7.1 Children with fever who are shocked, unrousable or showing signs of meningococcal disease should be urgently reviewed by an experienced paediatrician and consideration given to referral to paediatric intensive care.

1.5.8 Suspected meningococcal disease

1.5.8.1 Children with suspected meningococcal disease should be given parenteral antibiotics at the earliest opportunity (either benzylpenicillin or a third-generation cephalosporin).

1.5.8.2 Children admitted to hospital with meningococcal disease should be under paediatric care, supervised by a consultant and have their need for inotropes assessed.

1.6 Antipyretic interventions

1.6.1.1 Tepid sponging is not recommended for the treatment of fever.

1.6.1.2 Children with fever should not be under dressed or over wrapped.

1.6.1.3 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. The views and wishes of parents and carers should be taken into consideration.

1.6.1.4 Either paracetamol or ibuprofen can be used to reduce temperature in children with fever.

1.6.1.5 Paracetamol and ibuprofen should not be administered at the same time to children with fever.

1.6.1.6 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.

1.6.1.7 Antipyretic agents do not prevent febrile convulsions and should not be used specifically for this purpose.

1.7 Advice for home care

1.7.1 Care at home

1.7.1.1 Parents or carers should be advised to manage their child's temperature as described in section 1.6.

1.7.1.2 Parents or carers looking after a feverish child at home should be advised:

- to offer the child regular fluids (where a baby or child is breastfed the most appropriate fluid is breast milk)
- how to detect signs of dehydration by looking for the following features:
  - sunken fontanelle
  - dry mouth
  - sunken eyes
  - absence of tears
  - poor overall appearance
- to encourage their child to drink more fluids and consider seeking further advice if they detect signs of dehydration
- how to identify a non-blanching rash
- to check their child during the night
- to keep their child away from nursery or school while the child's fever persists but to notify the school or nursery of the illness.

1.7.2 When to seek further help

1.7.2.1 Following contact with a healthcare professional, parents and carers who are looking after their feverish child at home should seek further advice if:

- the child has a fit
- the child develops a non-blanching rash
- the parent or carer feels that the child is less well than when they previously sought advice

- the parent or carer is more worried than when they previously sought advice
- the fever lasts longer then 5 days
- the parent or carer is distressed, or concerned that they are unable to look after their child.

2 Notes on the scope of the guidance

NICE guidelines are developed in accordance with a scope that defines what the guideline will and will not cover. The scope of this guideline is available from http://guidance.nice.org.uk/page.aspx?o=264924.

How this guideline was developed

NICE commissioned the National Collaborating Centre for Women's and Children's Health to develop this guideline. The Centre established a Guideline Development Group (see appendix A), which reviewed the evidence and developed the recommendations. An independent Guideline Review Panel oversaw the development of the guideline (see appendix B).

There is more information in the booklet: 'The guideline development process: an overview for stakeholders, the public and the NHS' (second edition, published April 2006), which is available from www.nice.org.uk/guidelinesprocess or by telephoning 0870 1555 455 (quote reference N1113).

3 Implementation

The Healthcare Commission assesses the performance of NHS organisations in meeting core and developmental standards set by the Department of Health in 'Standards for better health', issued in July 2004. Implementation of clinical guidelines forms part of the developmental standard D2. Core standard C5 says that national agreed guidance should be taken into account when NHS organisations are planning and delivering care.

NICE has developed tools to help organisations implement this guidance (listed below). These are available on our website (www.nice.org.uk/CG047).

- Slides highlighting key messages for local discussion.
- Implementation advice on how to put the guidance into practice and national initiatives which support this locally.
- Costing tools.
- Audit criteria to monitor local practice.

NICE has also developed a discharge advice sheet to support implementation of this guidance (available from www.nice.org.uk).

4 Research recommendations

The Guideline Development Group (GDG) has made the following recommendations for research, based on its review of evidence, to improve NICE guidance and patient care in the future. The Guideline Development Group's full set of research recommendations is detailed in the full guideline (see section 5).

4.1 Predictive values of heart rate

A study to confirm the normal range of heart rate for different body temperatures to determine whether children with heart rates outside these ranges are at higher risk of serious illness.

Why this is important

Heart rate is one of the commonly used markers of serious illness both in children and adults, yet there is no evidence to support the use of heart rate as a sign of serious illness in children with fever. Heart rate is easy to measure manually or electronically and is used as a baseline observation in both primary and secondary care settings. There is currently no evidence to indicate the normal range of heart rates in healthy children younger than 5 years. There is no evidence in this age group to explain what happens to the heart rate in children with different body temperatures who have a non-serious illness. There is no evidence to determine if a heart rate above or below a certain level can help predict the presence of serious illness for a given body temperature. Without such data, interpreting heart rate in children with fever is not evidence based and a potential simple tool to detect those at high risk of serious illness remains undeveloped.

4.2 Remote assessment

The GDG recommends that a UK study is undertaken to determine the validity of symptoms reported on remote assessment for children with fever.

Why this is important

Traditionally, symptomatic patients have been assessed in a face-to-face setting but increasingly, remote assessment (for example, assessment over the telephone) determines the urgency of the patient's need, the level of care required and from that the most appropriate next step for the patient. This might include referral to emergency services, referral to acute or non-acute services or closing the call with self-care advice/support. Clinical and cost effectiveness will only be achieved through remote assessment if perceived need equates to actual need. There is currently a lack of data available that demonstrate the validity of remote assessment.

4.3 Referral patterns

The GDG recommends that research is carried out on referral patterns between primary and secondary care for children with fever, so the health economic impact of this and future guidelines can be estimated.

Why this is important

GPs, in their traditional gate-keeping role, are often unsure of the referral threshold for sick children. Concern about the child is balanced with real concerns about not wasting NHS resources or perhaps placing a 'well' child at iatrogenic risk unnecessarily. Changing the pattern of referral between primary and secondary care could potentially have a large impact on the effectiveness of care if more children are correctly diagnosed and those needing secondary care are treated sooner. If a change in criteria for referral to specialist care leads to a higher number of new referrals, this may be a very good use of NHS resources if it decreases the risk of long-term morbidity and mortality in this patient group. Healthcare resources should be focussed on areas of clinical care where they do the most good, either in primary, community or secondary care. Concern that an increase in referrals to secondary care will increase NHS costs may therefore be overlooking the benefits of such an increase. What is needed is an analysis of the likely change in resource use (costs) and health outcomes resulting from changing the criteria for referral to specialist care.

4.4 Diagnosis

The GDG recommends that a UK study of the performance characteristics and cost effectiveness of procalcitonin versus C-reactive protein in identifying serious bacterial infection in children with fever without apparent source be carried out.

Why this is important

Many young children with fever appear well with no symptoms or signs of serious illness. The vast majority of these children will have self-limiting illnesses. However, a few will have serious bacterial infections which may not be identifiable by clinical assessment alone. Investigations that help to identify these children with serious bacterial infections could lead to prompt antibiotic treatment, which may improve their outcome. These investigations need to be both sensitive and specific so that most serious bacterial infections are identified and so that antibiotics are not given to children who don't need them. The inflammatory markers C-reactive protein and procalcitonin have

shown varying performance characteristics for identifying bacterial infection in a variety of populations. If either or both were found to be sensitive and specific for identifying serious bacterial infection in children with fever without apparent source, there would be evidence for their more widespread use. The cost effectiveness of this approach would need to be calculated.

4.5 Antipyretics

The GDG recommends that studies are conducted in primary care and secondary care to determine whether examination or re-examination after a dose of antipyretic medication is of benefit in differentiating children with serious illness from those with less serious conditions.

Why this is important

Antipyretic medications are widely used in primary and secondary settings by parents and healthcare professionals. Children may therefore present to healthcare facilities having had a dose of antipyretics. Furthermore, the child's response to antipyretic drugs may be used as an indication of severity of illness, the rationale being that those with milder illness will either show greater improvement in condition or a greater reduction in their fever than children with more serious illnesses. However, it is not clear if such changes in condition are a valid and reliable method of differentiating children with serious illness from those with less serious conditions.

5 Other versions of this guideline

5.1 Full guideline

The full guideline, 'Feverish illness in children', contains details of the methods and evidence used to develop the guideline. It is published by the National Collaborating Centre for Women and Children's Health, and is available from www.ncc-wch.org.uk, our website (www.nice.org.uk/CG047fullguideline) and the National Library for Health (www.nlh.nhs.uk).

5.2 Quick reference guide

A quick reference guide for healthcare professionals is also available from our website (www.nice.org.uk/CG047quickrefguide).

For printed copies, phone the NHS Response Line (telephone 0870 1555 455; quote reference number N1247).

5.3 'Understanding NICE guidance'

Information for patients and carers ('Understanding NICE guidance') is available from www.nice.org.uk/CG047publicinfo

For printed copies, phone the NHS Response Line on 0870 1555 455 (quote reference number N1248).

6 Related NICE guidance

Urinary tract infection in children. NICE clinical guideline (publication expected August 2007).

7 Updating the guideline

NICE clinical guidelines are updated as needed so that recommendations take into account important new information. We check for new evidence 2 and 4 years after publication, to decide whether all or part of the guideline should be updated. If important new evidence is published at other times, we may decide to do a more rapid update of some recommendations.

Appendix A: The Guideline Development Group

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Appendix B: The Guideline Review Panel

The Guideline Review Panel is an independent panel that oversees the development of the guideline and takes responsibility for monitoring adherence to NICE guideline development processes. In particular, the panel ensures that stakeholder comments have been adequately considered and responded to. The Panel includes members from the following perspectives: primary care, secondary care, lay, public health and industry.

Dr Peter Rutherford – Chair
Senior Lecturer in Nephrology, University of Wales and Medical Director, North East Wales NHS Trust, Guideline Review Panel Chair until June 2006

Dr Robert Walker
General Practitioner, Workington, Guideline Review Panel Chair from June 2006

Dr John Young
Medical Director, Merck Sharp & Dohme Ltd

Dr John Harley
Clinical Governance and Prescribing Lead and General Practitioner, North Tees PCT

Mrs Ailsa Donnelly
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Appendix C: The algorithms

Algorithms are being published as a separate file on the website.