


NICE guideline review: fever in under 5s: assessment and initial management (NG143)

Siba Prosad Paul ¹, Prashant Karkala Kini,¹ Shiv Ratan Tibrewal,² Paul Anthony Heaton¹

¹Paediatrics, Yeovil District Hospital, Yeovil, UK
²Paediatrics, Darlington Memorial Hospital, Darlington, UK

Correspondence to

Dr Siba Prosad Paul, Paediatrics, Yeovil District Hospital, Yeovil BA21 4AT, UK; siba.paul@nhs.net

Received 29 April 2021
Accepted 7 June 2021

BACKGROUND

Feverish illness is one of the leading causes for a child to be seen by healthcare professionals, and is a major cause for hospital admissions.

In 2007, the National Institute for Health and Care Excellence (NICE) published the original guidance on feverish illness in children (CG47). This was developed to aid healthcare professionals in their decision-making process while managing children aged <5 years with fever. This guidance has been revised multiple times in 2013 (CG160) and 2019 (NG143) and was updated in 2017.

INFORMATION ABOUT THE CURRENT GUIDELINE

The current update (NG143) has made specific recommendations on assessment for Kawasaki disease in febrile children.¹ Most of the recommendations from the past update 2013 (CG160) have been retained.

This guideline should be used in conjunction with other NICE guidelines on gastroenteritis (CG84), urinary tract infection (CG54), neonatal infection (NG195), bacterial meningitis (CG102) and sepsis (NG51) (see [box 1](#)).

The incidence and type of serious bacterial infection is likely to have changed following the introduction of newer vaccines.^{2 3} This review encompasses recommendations from the NICE guideline NG143 (2019).

KEY ISSUES THAT THE GUIDELINE ADDRESSES

Definition of fever

Children <3 months with temperature $\geq 38^{\circ}\text{C}$ should be included in red category. Children aged 3–6 months with temperature $\geq 39^{\circ}\text{C}$ should be included in

amber category. Beyond 6 months of age, the height or duration of body temperature correlates poorly to the nature and severity of illness, and other parameters should be used in conjunction with temperature.

Detection of fever

- ▶ For children aged <4 weeks, the body temperature should be taken using an electronic thermometer placed in the axilla.
- ▶ The following methods may be used to measure body temperature for children aged 4 weeks to 5 years:
 - Electronic thermometer in the axilla.
 - Chemical dot thermometer in the axilla.
 - Infrared tympanic thermometer.

Clinical assessment of children

- ▶ Healthcare professionals should identify any immediately life-threatening features, including any compromise of the airway, breathing or circulation, or decreased level of consciousness.
- ▶ The traffic light system should be used to predict the risk of serious illness ([table 1](#)).
- ▶ Think ‘Could this be sepsis?’ and refer to the NICE guideline on sepsis: recognition, diagnosis and early management if a child presents with fever and symptoms or signs that may indicate possible sepsis.
- ▶ Infants <3 months with fever $\geq 38^{\circ}\text{C}$ should be categorised under ‘red’ group and have the following vital signs recorded:
 - Temperature.
 - Heart rate.
 - Respiratory rate.
 - Capillary refill time.
- ▶ Children should be assessed for features of meningitis, urinary tract infection, pneumonia, meningococcal disease and herpes simplex encephalitis. Septic arthritis and osteomyelitis should also be considered in the differential diagnoses.
- ▶ Consider Kawasaki disease for fever lasting ≥ 5 days ([box 2](#)).



© Author(s) (or their employer(s)) 2021. No commercial re-use. See rights and permissions. Published by BMJ.

To cite: Paul SP, Kini PK, Tibrewal SR, et al. *Arch Dis Child Educ Pract Ed* Epub ahead of print: [please include Day Month Year]. doi:10.1136/archdischild-2021-321718

Table 1 NICE traffic light system

	Green—low risk	Amber—intermediate risk	Red—high risk
Colour (of skin, lips or tongue)	▶ Normal colour	▶ 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 ▶ No smile ▶ Wakes only with prolonged stimulation ▶ Decreased activity	▶ No response to social cues ▶ Appears ill to a healthcare professional ▶ Does not wake or if roused does not stay awake ▶ Weak, high-pitched or continuous cry
Respiratory	–	▶ Nasal flaring ▶ Tachypnoea: respiratory rate – >50 breaths/minute, age 6–12 months; – >40 breaths/min (age >12 months) ▶ Oxygen saturation ≤95% in air ▶ Crackles in the chest	▶ Grunting ▶ Tachypnoea: respiratory rate >60 breaths/min ▶ Moderate or severe chest indrawing
Circulation and hydration	▶ Normal skin and eyes ▶ Moist mucous membranes	▶ Tachycardia: heart rate – >160 beats/min (age <12 months); – >150 beats/min (age 12–24 months); – >140 beats/min (age 2–5 years) ▶ Capillary refill time ≥3 s ▶ Dry mucous membranes ▶ Poor feeding in infants ▶ Reduced urine output	▶ Reduced skin turgor
Other	▶ None of the amber or red symptoms or signs	▶ Age 3–6 months, temperature ≥39°C ▶ Fever for ≥5 days ▶ Rigors ▶ Swelling of a limb or joint ▶ Non-weight bearing limb/not using an extremity	▶ Age <3 months, temperature ≥38°C ▶ Non-blanching rash ▶ Bulging fontanelle ▶ Neck stiffness ▶ Status epilepticus ▶ Focal neurological signs ▶ Focal seizures

Note that some vaccinations have been found to induce fever in children aged under 3 months.

NICE, National Institute for Health and Care Excellence.

- ▶ Children aged <1 year may present with fewer clinical features of Kawasaki disease in addition to fever, but may be at higher risk of coronary artery abnormalities than older children.

Advice for home care

- ▶ It should be emphasised to parents that resolution of fever following administration of antipyretics may not indicate that the child is now well, and safety netting advice should therefore include:
 - Verbal and/or written information on warning symptoms and how to access further healthcare advice/assessment.
 - Provide details of specified time and place if further follow-up is arranged.
 - Ensure direct access for the child is arranged if further assessment may be considered necessary.
- ▶ Encourage their child to drink more fluids and consider seeking further advice if there are signs of dehydration (see [box 3](#)).
- ▶ Advise parents to check their child at night and monitor for signs of deterioration (see [box 4](#)).

Investigations

Children <3 months

- ▶ Full blood count, blood culture, C reactive protein (CRP), urine testing.
- ▶ Chest X-ray (CXR) if respiratory signs are present.
- ▶ Stool culture if diarrhoea is present.

Box 1 Resources

- ▶ Fever in under 5s: assessment and initial management (National Institute for Health and Care Excellence guideline 2019): <https://www.nice.org.uk/guidance/ng143>
- ▶ Sepsis: recognition, diagnosis and early management (National Institute for Health and Care Excellence guideline 2016): <https://www.nice.org.uk/guidance/ng51>
- ▶ Neonatal infection: antibiotics for prevention and treatment (National Institute for Health and Care Excellence guideline 2021): <https://www.nice.org.uk/guidance/ng195>
- ▶ Meningitis (bacterial) and meningococcal septicaemia in under 16s: recognition, diagnosis and management (National Institute for Health and Care Excellence guideline 2010): <https://www.nice.org.uk/guidance/cg102>
- ▶ Urinary tract infection in under 16s: diagnosis and management (National Institute for Health and Care Excellence guideline 2007): <https://www.nice.org.uk/guidance/cg54>
- ▶ Diarrhoea and vomiting caused by gastroenteritis in under 5s: diagnosis and management (National Institute for Health and Care Excellence guideline 2009): <https://www.nice.org.uk/Guidance/CG84>

Box 2 Features of Kawasaki disease*

- ▶ Bilateral conjunctival injection without exudate.
 - ▶ Erythema and cracking of lips; strawberry tongue; or erythema of oral and pharyngeal mucosa.
 - ▶ Oedema and erythema in the hands and feet.
 - ▶ Polymorphous rash.
 - ▶ Unilateral solitary cervical lymphadenopathy (>1.5 cm).
- *Ask parents or carers about the presence of these features since the onset of fever, because they may have resolved by the time of assessment.

- ▶ Lumbar puncture should be performed without delay (unless contraindicated) and whenever possible, before starting parenteral antibiotics in:
 - All infants <1 month.
 - All infants 1–3 months appearing unwell or with white blood cell (WBC) $<5 \times 10^9/L$ or $>15 \times 10^9/L$.

Children >3 months

- ▶ Investigations to consider in this age group are discussed in [table 2](#).

Management in the hospital

- ▶ All children without an apparent source for fever should have a period of observation as part of clinical assessment to identify/exclude serious illness.
- ▶ Following the initial assessment, children judged to be under the 'red' and 'amber' category should be reassessed after 1–2 hours to detect clinical deterioration/improvement; in some cases, more frequent or urgent reviews may be needed.
- ▶ Apart from the clinical condition, various other factors may have to be considered in admitting a child with fever to the hospital ([box 5](#)).

Antipyretic interventions

When using paracetamol or ibuprofen in children with fever:

- ▶ Avoid administering both agents simultaneously.
- ▶ Consider changing to the other agent if the child's distress is not alleviated.
- ▶ May consider alternating these agents if the distress persists or recurs before the next dose is due.
- ▶ Continue antipyretics only as long as the child appears distressed or clinically indicated.

Antibiotics and antivirals

- ▶ Children of all age groups should receive immediate parenteral antibiotic if they are:
 - Shocked.
 - Unarousable.
 - Show signs of meningococcal disease.

Box 3 Signs of dehydration

- ▶ Sunken fontanelle.
- ▶ Dry mouth.
- ▶ Sunken eyes.
- ▶ Absence of tears.
- ▶ Poor overall appearance.

Table 2 Investigations to consider in children aged >3 months

Red	Amber	Green
<ul style="list-style-type: none"> ▶ FBC, blood culture, C reactive protein ▶ Urine testing ▶ Following investigation guided by clinical assessment <ul style="list-style-type: none"> – Lumbar puncture – Chest X-ray – Serum electrolytes – Blood gas 	<ul style="list-style-type: none"> ▶ All the investigation under 'red' should be organised unless considered to be unnecessary by an experienced paediatrician ▶ Lumbar puncture should be considered for children <1 year ▶ Chest X-ray for a child with fever $>39^\circ\text{C}$ and WBC $>20 \times 10^9/L$ even in absence of respiratory symptoms 	<ul style="list-style-type: none"> ▶ Urine testing

FBC, full blood count; WBC, white blood cell.

- ▶ Children having fever should be given parenteral antibiotics if:
 - Aged <1 month.
 - Between 1 and 3 months if:
 - Appear unwell.
 - WBC $<5 \times 10^9/L$ or $>15 \times 10^9/L$.
- ▶ Third-generation antibiotics (cefotaxime or ceftriaxone) should be used when parenteral antibiotics are indicated.
- ▶ For infants <3 months, antibiotic active against *Listeria monocytogenes* (eg, ampicillin or amoxicillin) should be added.
- ▶ Intravenous aciclovir should be considered for children with fever and any of the following:
 - Focal neurological signs.
 - Focal seizures.
 - Reduced levels of consciousness.

WHAT DO I NEED TO KNOW?**What should I stop doing?**

- ▶ Do not use the oral or rectal routes routinely to measure the body temperature in children aged 0–5 years.
- ▶ Do not use duration of fever to predict the likelihood of a serious illness.
- ▶ Response to antipyretic therapy should not be used as a clinical decision-making parameter to differentiate between a serious and non-serious illness.
- ▶ Do not prescribe oral antibiotics to children with fever without apparent source.

Box 4 When to seek further help

- ▶ Child has a seizure.
- ▶ Child develops a non-blanching rash.
- ▶ Caregiver feels that the condition of the child has deteriorated from the time they have sought advice previously during the same febrile episode.
- ▶ The fever has lasted ≥ 5 days.
- ▶ When caregiver reports or is judged being unable to monitor the child safely and identify signs of deterioration.

Guideline review

- ▶ Do not routinely perform CXR in children with symptoms and signs suggesting pneumonia who are not admitted to hospital.
- ▶ Physical interventions like tepid sponging, undressing or overwrapping should be avoided.

What should I start doing?

- ▶ Kawasaki disease should be considered in children with fever lasting ≥ 5 days (see [box 2](#)).

What can I continue to do as before?

- ▶ Use NICE traffic light system to identify likelihood of serious illness (see [table 1](#)).
- ▶ Suspect sepsis in any child presenting with fever and suggestive symptoms or signs.
- ▶ Ensure that children with tachycardia are triaged in the intermediate-risk or serious illness group and reassess every 1–2 hours. This is especially applicable for children who remain tachycardic after fever has subsided following antipyretic treatment.
- ▶ Check a urine sample on every febrile child aged < 3 months and for those > 3 months with no clear focus of infection.
- ▶ Measure the blood pressure of children with fever if the heart rate or capillary refill time is abnormal and poor peripheral perfusion is suspected.
- ▶ Some of the features mentioned in the traffic light system might not be applicable to children with learning disabilities.
- ▶ Parental perception of a fever should be seriously considered.
- ▶ Advise parents about when to seek help (see [box 4](#)).

What should I do differently?

- ▶ Ask caregivers specifically about the features of Kawasaki disease as some manifestations may not be reported at initial assessment because they may have resolved.
- ▶ Hospital clinicians can use the NICE traffic light system for remote assessment post-discharge when the caregiver has been provided direct access and subsequently seeks advice and guidance over the telephone. This will help the decision-making process as to whether a physical reassessment is urgently required for the child.

Box 5 When to consider admission to hospital

- ▶ When a feverish illness has no obvious cause, but the child remains ill longer than expected for a self-limiting illness.
- ▶ When the parent or carer's concern for their child's current illness has caused them to seek healthcare advice repeatedly.
- ▶ 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.
- ▶ Where the family has experienced a previous serious illness or death due to feverish illness which has increased their anxiety levels.
- ▶ Parental anxiety and instinct (based on their knowledge of their child).
- ▶ Social and family circumstances.

CRITICAL APPRAISAL

The NICE guidelines on management of fever have had several updates and revisions since 2007; it currently provides evidenced-based recommendations for managing children with fever. Recent advances and increased availability of molecular diagnostics may allow for rapid testing for respiratory syncytial virus and other viruses including COVID-19, adenovirus and influenza; this should allow for more focused antimicrobial therapy.⁴ Considering the strong association between SARS-CoV-2 infection and paediatric multi-system inflammatory syndrome temporally associated, this potential diagnosis should be considered when assessing a febrile child.⁵ Similarly, it is important to include testing viral PCR of the cerebrospinal fluid, especially in infants, as this would allow early discontinuation of antibiotics in cases of viral meningitis, and should lead to improved antibiotic stewardship.^{6,7}

The Guidelines Development Group was unable to recommend a specific cut-off level for CRP, but expected clinicians to use it as part of their overall assessment of a febrile child. There is a need for better biomarker(s)/diagnostic model to guide identification or exclusion of serious bacterial infection with greater accuracy.⁸ The efficacy and safety of antipyretic suppositories in fever management should be considered, particularly when used in febrile children who are vomiting or refusing to drink.⁹

Future NICE guidelines updates may include advice regarding lung ultrasound as there is increasing evidence about the efficacy of this non-radiation modality for febrile children with suspected pneumonia¹⁰; repeat imaging for some children, including those with pleural effusion or round pneumonia¹¹; and CXR for children presenting with acute abdominal pain where physical examination remained normal who may have occult pneumonia.

Fever is a natural inflammatory response to infection and in itself is not harmful. Fear of fever (commonly referred to as 'fever phobia'), rather than concern about its cause, may result in the inappropriate administration of antipyretic measures, with potential for actual harm. A systematic global review of 65 reports covering 26 521 caregivers (1985–2018) showed widespread fever phobia, and noted that this was common among physicians and nurses.¹²

CLINICAL BOTTOM LINE

- ▶ Reports of fever by parents or carers should be considered seriously by healthcare professionals.
- ▶ Combinations of antipyretic therapy should be avoided.
- ▶ Children with unexplained tachycardia need further evaluation.
- ▶ Sepsis should be considered in an unwell child presenting with fever.
- ▶ Children with fever ≥ 5 days should be evaluated for Kawasaki disease.

- ▶ Parents should be educated that fever is a physiological response and is not harmful in itself; they should be encouraged to restrict use of antipyretics to a minimum.

Funding The authors have not declared a specific grant for this research from any funding agency in the public, commercial or not-for-profit sectors.

Competing interests None declared.

Patient consent for publication Not required.

Provenance and peer review Commissioned; externally peer reviewed.

ORCID iD

Siba Prosad Paul <http://orcid.org/0000-0003-1267-1269>

REFERENCES

- 1 Fever in under 5s: assessment and initial management (National Institute for health and care excellence guideline 2019). Available: <https://www.nice.org.uk/guidance/ng143>
- 2 Fathima P, Gidding HF, McIntyre PB, *et al.* Effectiveness of pneumococcal conjugate vaccine against hospital admissions for pneumonia in Australian children: a retrospective, population-based, record-linked cohort study. *Lancet Child Adolesc Health* 2019;3:713–24.
- 3 Ladhani SN, Giuliani MM, Biolchi A, *et al.* Effectiveness of meningococcal B vaccine against endemic hypervirulent *Neisseria meningitidis* W strain, England. *Emerg Infect Dis* 2016;22:309–11.
- 4 Doan Q, Enarson P, Kissoon N, *et al.* Rapid viral diagnosis for acute febrile respiratory illness in children in the emergency department. *Cochrane Database Syst Rev* 2014;2014:CD006452.
- 5 Flood J, Shingleton J, Bennett E, *et al.* Paediatric multisystem inflammatory syndrome temporally associated with SARS-CoV-2 (PIMS-TS): prospective, National surveillance, United Kingdom and Ireland, 2020. *Lancet Reg Health Eur* 2021;3:100075.
- 6 Turner PC, Brayley J, Downing HC, *et al.* Screening for enteroviral meningitis in infants and children—Is it useful in clinical practice? *J Med Virol* 2019;91:1882–6.
- 7 Chakrabarti P, Warren C, Vincent L, *et al.* Outcome of routine cerebrospinal fluid screening for enterovirus and human parechovirus infection among infants with sepsis-like illness or meningitis in Cornwall, UK. *Eur J Pediatr* 2018;177:1523–9.
- 8 Irwin AD, Grant A, Williams R, *et al.* Predicting risk of serious bacterial infections in febrile children in the emergency department. *Pediatrics* 2017;140:e20162853.
- 9 Walsh A, Edwards H, Fraser J. Over-The-Counter medication use for childhood fever: a cross-sectional study of Australian parents. *J Paediatr Child Health* 2007;43:601–6.
- 10 Reali F, Sferazza Papa GF, Carlucci P, *et al.* Can lung ultrasound replace chest radiography for the diagnosis of pneumonia in hospitalized children? *Respiration* 2014;88:112–5.
- 11 Heaton P, Arthur K. The utility of chest radiography in the follow-up of pneumonia. *N Z Med J* 1998;111:315–7.
- 12 Clericetti CM, Milani GP, Bianchetti MG, *et al.* Systematic review finds that fever phobia is a worldwide issue among caregivers and healthcare providers. *Acta Paediatr* 2019;108:1393–7.