

Don't Forget The Bubbles



APPROACH TO THE FEBRILE CHILD

Facilitators Guide

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Duration **Up to 2 hrs**

Facilitator level **Senior trainee/ANP and above**

Learner level **Junior trainee/Staff Nurse and Senior trainee/ANP**

Equipment required: **None**

OUTLINE

- Basics (10 mins)
- Main session: (2 x cases, 1 x 20 minutes, 1 x 15 minute) case discussions covering the key points and evidence
- Advanced session: (2 x 15 minutes) case discussions covering grey areas, diagnostic dilemmas; and more advanced management
- Sim scenario (30-60 mins)
- Quiz (10 mins)
- Infographic sharing (5 mins): 5 take home learning points

We also recommend printing/sharing a copy of your local guideline for sharing admission criteria.

PRE-READING FOR LEARNERS

The expectation is for the learners to have watched or read one of the basic links before the session.

What is the deal with fever? a good overview of the approach to a febrile child

[Read it](#)

NICE fever guidelines for kids - LITFL covers the NICE guidelines, plus a bit more

[Read it](#)

If you prefer to listen rather than read, there is a podcast that although long, is worth listening to and covers the approach to a febrile child: (1hr 14 minutes)

Pediatric Fever Without A Source

[Read it](#)

BASICS (DOES NOT NEED TO BE INCLUDED BUT FOR INFORMATION IF IT COMES UP IN DISCUSSION)

Fever is one of the most common presentations to the paediatric emergency department; it scares parents and it makes children miserable. So why does fever occur? A fever is a natural physiological response to infection. It occurs when either an exogenous (eg micro-organisms) or endogenous (eg TNF, interleukin-1 or 6) pyrogen is activated. These pyrogens, via a number of mechanisms, activate the anterior hypothalamus which ultimately results in an increase in body temperature

[\(The pathophysiological basis and consequences of fever\).](#)

Read it

This is crucial to understand – your body is in control of your temperature. This is not something an infection is doing to your body; it is something your body is doing to the infection. Of note- this is different from pathological hyperthermia, where your temperature is elevated by either hypothalamic dysfunction or external heat. These are extremely rare.

[\(Hot Garbage: Mytbusting fever in children\)](#)

Read it

The process of having a fever is believed to be a beneficial response to an infection. The mechanisms by which a fever helps protect you from infection include:

1. Higher temperatures inhibiting growth/replication of pathogens
2. Higher temperatures promoting the immune response to infection
3. It is also worth noting that bacteria are killed more easily by antibiotics at higher temperatures, so there is also a potential third mechanism.

With all this considered, it is not the presence of the fever that is the issue, but what the reason behind the fever is. This is what we, as clinicians, need to discern. First of all, is it infection (most likely in the paediatric population), if so, is this a serious infection? Or is the fever caused by something else (malignancy, drugs, autoimmune, endocrine)?

CASE 1: (20 MINUTES)

A father attends the ED with his 4 year child, who has a 2 day history of fever, his most recent temperature was 39.9 and this has prompted his visit to the emergency department. The father describes his child as being otherwise well, but is extremely concerned about the height of the fever.

1. Describe how you would assess the child?
2. What investigations and treatment options would you consider?
3. You are happy with your assessment of the child, and would like to discharge him, however his temperature is 38.5. How do you proceed?

Discussion points:

1. First assess whether you think this child is sick

1. Observe the child
2. Take a history from the parent, what are they worried about?
3. Examine the child

The Paediatric Assessment Triangle (from DFTB)

[Read it](#)

In some instances it will be fairly obvious if the child is unwell, they just 'look unwell'. A tool that can help you put a system to this assessment is the paediatric assessment triangle. Which considers the child's: appearance, breathing and circulation. This will let you consolidate what you are worried about and allow you to communicate this to your colleagues.

If all these appear to be in order, this is a reassuring sign. A happy child playing in the waiting room, whilst eating a packet of crisps is much less likely to be unwell with a serious bacterial infection than one that is quiet. Remember to write what you have observed in your notes.

NG143 Traffic light tool (from NICE)

[Read it](#)

Once you have some observations you can also use the NICE traffic light table - which helps categorise children into green (well), amber or red (potentially unwell). If they score red, you know they need further workup, and potentially quickly. Green, then they can probably wait a bit to be seen.

2. History

Take a full paediatric history, specifically asking about

Normal self?

Eating and drinking?

Passing urine?

Bowels opening?

Drowsy?

Pulling at ears?

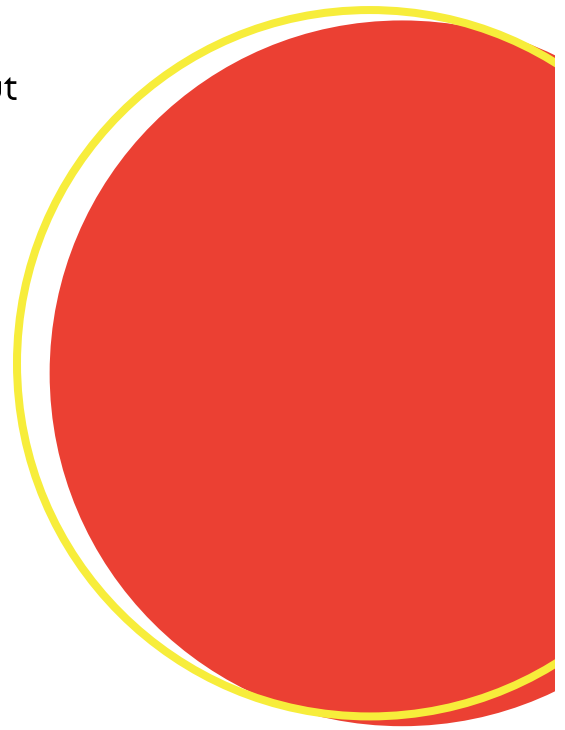
Vomiting?

Rash/ lumps and bumps?

Siblings, anyone else unwell?

Travel?

Immunisations?



This should also give you an idea about how worried the parents are, is it just the temperature, or is it something else? A high fever with a child who seems their normal self is far less concerning than a child with a normal temperature that just isn't right.

3. Examination:

This needs to be thorough, given that the majority of these kids will be discharged without further investigation. This means looking in ears and throats, looking at the skin hidden under clothing, looking at joints, feeling pulses. So undress the child. You may find a petechial rash, a lump, or more likely, some very enlarged tonsils. Get the child to walk if they are old enough, and stand on one leg and then the other. And when it comes to ears and throats get the parent on board and show them how to hold the child properly. Whilst you are hunting for the source, also note the absence of one- look for the signs of the scary infections, the petechiae, the reduced air entry on a lung base, the red knee.

Are you happy examining a child?

<https://vimeo.com/60599216>

gives some top tips on how to examine different age groups

Also read <https://dontforgetthebubbles.com/finding-fever/>

for a step by step fever focussed examination guide

2. Investigations and treatment

The source:

This step depends very much upon your assessment of the child. If you have found a source-treat that as appropriate. If full history and examination does not provide you with an answer, you have a fever with an unclear source. NICE helpfully has a set of guidelines for these:

[\(NICE fever guidelines for kids- LITFL\)](#)

Read it

- Investigate fever with no source if they have any red features – this includes FBC, CRP, B/C and urine. Consider LP, CXR, UEC and gas if indicated.
- Investigate fever with no source if there are any amber features unless deemed unnecessary by an experienced paediatrician. (this is the bit that could cause you to become unstuck, and you may want a senior to look over these)
- Check urine for all children with fever (over 37.5) and no source, even if they are green.

Treatment options:

Consider the use of paracetamol or ibuprofen to bring down a high temperature in a hot and miserable child. If it makes the child feel better, it will make the examination process easier for everyone. NICE advises alternating antipyretics.

In many children with fever, the cause will be viral, the source of which may be obvious, or may still be unclear. If they are in a low risk group with a normal urine, they may be ok to go home with advice and a leaflet on the use of antipyretics, fluid management and safety netting advice. However as stated above these are only guidelines, if you are not happy you can always investigate, or admit for observation, and parents can always come back.

3. You are happy with your assessment of the child, and would like to discharge him, however his temperature is 38.5. How do you proceed?

If the child has a fever but you have a well child that you have no concerns about then you do not have to wait for the temperature to come down before discharge.

Give the parents advice on recognising red or amber signs by providing written information and/or arranging follow-up- most EDs will have a 'fever' leaflet to give to parents.

“We treat fever with anti-pyretics because it makes the child feel bad, not because fever itself is bad.” Fever is due to a functional immune response. It is what is causing the fever that has the potential to do harm. As a result what the fever is, is not nearly as important as how the child looks or behaves. (The caveat being an under 6 month old where the height of fever is relevant)

On discharge tell them If the fever lasts for more than 5 days, the child should at least have a repeat physical exam by a clinician.

Finish with “But come back if you are worried about the child, even if you have only made it to the car park/ house/ doors of the ED”

A good summary in video form on seeing a feverish child:
<https://bit.ly/2AqmJl5>

CASE 2: (15 MINUTES)

A 5 week old girl has been brought in by her mother. Her mother reports the child seemed irritable so she took her temperature and it was 38.2. Pregnancy and birth was unremarkable and there have been no concerns since her birth. The child is feeding well and the history and examination are unremarkable, observations in the ED have been within normal limits, apart from her current temperature which is 38.5. Your initial assessment has not provided you with an obvious source for the infection.

- 1. When is a temperature classed as a fever?**
- 2. How would you investigate this child?**
- 3. How would you manage this child if they had a white cell count of $17 \times 10^9/L$?**

Discussion points:

When is a temperature classed as a fever?

NICE consider >38 celsius to be a fever

RCEM considers a temperature of $37.5-38$ celsius to be a low grade fever

However, most people would agree that the difference between .1 of a degree is not significant, therefore infants with a temperature of 37.9 vs 38 celsius should be managed in the same way.

Investigations

This child is under 3 months old

Any child with a fever >38 degrees that is under 3 months old is at 'high risk' of serious illness ('red' on NICE's traffic light table [NICE fever guidelines for kids-LITFL](#)). If they have a history of fever, but none on assessment remember to ask about antipyretics.

According to NICE this child requires bloods (FBC, CRP, Blood cultures), a urine sample and if the history and exam suggests, a chest X-ray and/ or a stool culture.

A lumbar puncture should be considered and is indicated if the child is:

- less than 1 month
- 1-3 months and unwell;
- or 1-3 months with $WCC < 5 \times 10^9/L$ or $> 15 \times 10^9/L$.

The discussion here is if the child is 'unwell', or not. You have a few tools that can help you - the paediatric assessment triangle and the NICE traffic light table (referenced in the above case) can help you decide. However if in doubt, the child will be investigated, and you should be speaking to the paediatric seniors.

Management

If this child had a WCC of 20 then this is an indication for IV antibiotics.

IV antibiotics are required for children under the same criteria that a lumbar puncture is indicated:

- if less than 1 month;
- 1-3 months and unwell;
- or 1-3 months with $WCC < 5 \times 10^9/L$ or $> 15 \times 10^9/L$.

The choice of antibiotic will come down to trust guidelines.

ADVANCED DISCUSSION (15 MINS PER CASE)

This is an opportunity to cover grey areas, diagnostic dilemmas and advanced management and escalation if there are more experienced trainees or senior registrars in your group.

ADVANCED CASE 1

A 7 week old has been brought in by her mother because she felt very hot today, and has been 'a bit grizzly'. Mum has given paracetamol and brought her to ED. Her temperature is 37.6 on triage. On initial assessment you have no concerns and remaining observations are within normal limits.

1. How should a temperature be taken?

2. How would you investigate and manage this patient?

Discussion

Taking a temperature

NICE has recommendations on this:

Do not routinely use the oral and rectal routes to measure the body temperature of children aged 0–5 years.

They advise in infants under 4 weeks:

- measure body temperature with an electronic thermometer in the axilla

In children aged 4 weeks to 5 years use one of the following:-

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

It's worth checking what your department uses and what the parent has been using.

There are some small studies with low numbers of patients that suggest that layers of clothing can raise the skin temperature by up to 2.5°C with a minimal rise in rectal temperature in the very young ([Feel the heat](#)). Therefore undress children who seem inappropriately overdressed.

3. Investigations and management

For this patient, guidelines are helpful, but they will not tell us what to do.

We know that

1. Any child with a fever >38 under 3 months old is a 'red' on NICE's traffic light system, and this makes them at high risk of serious illness.
2. NICE guidelines suggest that the parents subjective perception of a fever should be considered valid and taken seriously by healthcare providers.

There is a temptation to treat a child who is afebrile in the department differently to one that does have a fever. Consider:

- Has this child had an antipyretic?
- In the young, mums are usually right (There is a study from 1984 that shows in children under 2 yrs, mums were correct 90% of the time when they thought their child had a fever, although this dropped to 50% accuracy in over 2 year olds.)
- Those with fever at home are equally at risk as those with fever in the department (A BMJ study reports that infants <60 days of age, with a history of documented fever are at equal risk for bacteraemia or meningitis as those with fever in the department.

<https://adc.bmj.com/content/103/7/665>.

So in summary, we have an infant with a normal temperature, who probably had a fever this morning. There are at least two ways of managing this, one is to treat as a fever which therefore means bloods (FBC, CRP, B/C), urine and if history suggests, a CXR and or stool culture. Given that there was parental concern this is probably the preferable option. The other is a period of observation to see how the child progresses, and see whether or not they spike a fever.

Given that there are no clinical concerns at present, antibiotics prior to blood results are not indicated.

For a debate surrounding overtreating infants read

https://dontforgetthebubbles.com/fever_under_60_days_of_age/

ADVANCED CASE 2 (15 MINUTES)

A 3 year old boy has returned to ED with a history of 6 days of fever, they have seen the GP twice, two and four days ago, and told it was a viral illness. However the fever is persistent and his parents are concerned. His past medical history includes two admissions for viral wheeze when he was younger, but is otherwise unremarkable. All immunisations are up to date, he goes to nursery and lives with his parents, he has no siblings but his mother is 9 weeks pregnant. On examination the child seems grumpy, he has a fever of 38.8 and a HR of 150 he has a rash across his face and torso and evidence of conjunctivitis.

You think the rash looks morbilliform, what are your concerns and how will you proceed?

What other differentials should you consider, and what examination findings would you be looking for?

How would you work this patient up?

1. You think this rash looks morbilliform what are you concerns and how will you proceed

Measles - A brief historical & clinical review

The MMR in the UK is given at 12 months and 3yrs 4 months, so this child will have had the first immunisations affording him 80-95% protection,

<https://em3.org.uk/foamed/15/7/2019/lightning-learning-measles>.

Measles therefore is unlikely but possible. Once he has had the second vaccination, this is quoted to afford 99% protection.

Hopefully you are seeing this child in a side room, as measles can survive for up to 2 hours in air and is very contagious in the un-immunised population.

It is likely wherever you are in the world, you will need to report this to your public health body.

His mother is pregnant, check her vaccination status, if this is not complete and she has no history of disease, you need to advise her to see her GP ideally today, she may need a measles titre and, if this does not show previous exposure to the disease, human normal immunoglobulin (HNIG). You also need to enquire about other immunosuppressed/ non immunised contacts.

A patient is infectious from 4 days before the onset of rash to 4 days afterwards, therefore he will need to be isolated until this period is up and nursery and other contacts need to be informed.

Serum and saliva testing for measles is available.

Most children with measles can be discharged home

UK guidelines on managing measles exposure :

[Guidelines on Post-Exposure Prophylaxis for measles June 2019](#)

Poster: <https://em3.org.uk/foamed/15/7/2019/lightning-learning-measles>

2. What other differentials should you consider, and what examination findings would you be looking for?

Recurrent or Periodic Fevers - investigate or reassure?

Think infection, inflammation or neoplastic. We know infection is common in paediatrics, and the other two are less so. The list of differentials is probably almost endless. There is a good article which lists a whole heap of causes of fever in children, and investigations which can be performed.

However with this presentation, it is important to consider Kawasaki disease with this time scale of fever and measles. Other conditions worth considering are listed below:

- Streptococcal disease (e.g. scarlet fever, toxic shock syndrome)
- Staphylococcal disease (e.g. scalded skin syndrome, toxic shock syndrome)
- Bilateral cervical lymphadenitis
- Leptospirosis and rickettsial diseases
- Stevens-Johnson syndrome and Toxic Epidermal Necrolysis
- Drug reactions
- Juvenile Chronic Arthritis

Kawasaki Disease

You are looking for evidence of Kawasaki disease: The diagnosis is made on the basis of the following clinical criteria (A + B):

A. Fever \geq 5 days

B. **At least 4 of the 5** following physical examination findings:

- 1. Bilateral, non-exudative conjunctivitis
- 2. Oropharyngeal mucous membrane changes - pharyngeal erythema, red/cracked lips, and a strawberry tongue
- 3. Cervical lymphadenopathy with at least one node >1.5 cm in diameter
- 4. Peripheral extremity changes
 - acute phase: diffuse erythema and swelling of the hands and feet
 - convalescent phase: periungual desquamation (weeks 2 to 3)
- 5. A polymorphous generalised rash - Nonvesicular and nonbullous. There is no specific rash that is pathognomonic for KD

4. How will you work this patient up?

This child has had a fever for 6 days, is tachycardic and the source currently is unclear. It may be measles, however this is not clear cut. He is therefore not going home. Depending on other findings on examination he may also fit the criteria for Kawasaki disease he certainly needs bloods, FBC, U+E, LFTs, CRP, ESR, cultures and a urine dip. He does not require IV antibiotics at this point.

Kawasaki Disease the first 4 minutes covers the presentation and investigation of Kawasaki disease

SIMULATION (30-60 MINS)

Communication: Septic screen , taken from [Simulation Library](#)

Communication 1: Septic Screen

QUIZ

Question 1.

Which of these is true, a 60 day old with a temperature of 38.5:

- | | |
|---|--|
| 1
Fulfil the criteria for a lumbar puncture | 2
Can be discharged without further investigation |
| 3
Needs IV antibiotics | 4
Needs urine sent for urgent microscopy and culture |

This child will need further investigation, at the least bloods and serum cultures, however if they are well they may not necessarily need antibiotics or a lumbar puncture.

All children under 3 months need urine sent, not dipped. Use dipstick testing for infants and children 3 months or older.

Question 2.

Which of these is false?

- | | |
|---|---|
| A
The height of the fever can make a difference to the how the child is managed | B
If a fever doesn't reduce with an antipyretic the child needs admission to hospital |
| C
A 28 day old with a temperature of 38.5 will need FBC, CRP and Blood cultures | D
It is recommended that children aged 4 weeks to 5 years have their temperature taken with an axillary probe or tympanic thermometer |

A is true because the height of the temperature does make a difference to the management of those under 6 months old

Presence of a fever, even one that does not reduced with an antipyretic is not an indication of a serious infection. It is perfectly acceptable to discharge a well child with a fever, with good safety netting.

Question 3.

Which of these is true?

A

Kawasaki disease can be diagnosed with fever for > 5 days plus 3 of the B symptoms

C

The higher the fever, the more likely it is to be a serious bacterial infection

B

Fever of over 39 degrees in a 3-6 month old automatically needs a full septic screen

D

Measles is infectious from 4 days before the onset of the rash to 4 days afterward

Kawasaki disease is diagnosed with fever >5 days and 4 out of 5 B symptoms

A fever of >39 in a 3-6 month may need a full septic screen, the temperature alone would push them into NICE's 'amber' category. However it depends on a few factors, including whether there is an obvious source and NICE recommends a review by an experienced paediatrician before performing a septic screen automatically on these patients.

C is not true, there is no good consistent evidence to suggest a higher fever means a more serious infection

Take home learning points

- 1 A fever in an under 3 months old needs further investigation
- 2 Examine the child fully to find the source
- 3 The height of the fever does not correlate with the severity of the illness (in over 6 months)
- 4 Antipyretics are not necessary if the child is happy
- 5 Fever for over 5 days needs further workup

REFERENCES

[What is the deal with fever?](#)

[NICE fever guidelines for kids • LITFL](#)

[Pediatric Fever Without A Source](#)

[The pathophysiological basis and consequences of fever](#)

[Hot Garbage: Mythbusting fever in children](#)

[The Paediatric Assessment Triangle](#)

[NG143 Traffic light tool](#)

<https://vimeo.com/60599216>

<https://dontforgetthebubbles.com/finding-fever/>

<http://rolobotrumbles.com/listen-look-locate-an-approach-to-the-febrile-child-tipsfornewdocs/>

[Feel the heat](#)

[Ability of Mothers to Subjectively Assess the Presence of Fever in Their Children](#)

https://dontforgetthebubbles.com/fever_under_60_days_of_age/

[Recurrent or Periodic Fevers - Investigate or reassure](#)

[Measles - A brief historical & clinical review](#)

<https://em3.org.uk/foamed/15/7/2019/lightning-learning-measles>

[Guidelines on Post-Exposure Prophylaxis for measles June 2019](#)

[Kawasaki Disease](#)

[Kawasaki Disease](#)

[Simulation Library](#)