

# RCEM BLOGS

## PEM STARTER PACK

# INTRODUCTION

Author: Nikki Abela



Nikki Abela and  
Daughter Julia

# CONTINUE THE CONVERSATION

## Hello there and welcome to the Paediatric Emergency Department

We hope you find this book as a useful adjunct to your learning while here. Our blogs have been tailored to meet most PED presentations and our brilliant contributors have been working hard to make sure you are armoured with the best knowledge out there.

You will notice that quite a few of them have websites of their own, and we really encourage you to have a look at the material on their sites too.

We really, really, really wanted to include a post about what is normal in neonates but have published one already and didn't want to overwhelm the book. Please make sure you have a look at it [here](#).

## Introduction

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You will also notice a recurrent theme on the importance of distraction and play in the PED. St Emlyns have some awesome posts [here](#) and [here](#) on this. Please go and read them. (their awesome team were happy for us to include them but in the end the book was already rather fat with new content). GPpaedstips also has a great post on how to approach paediatrics [here](#).

Working with young people is different, in a good way. It is challenging but fun and you will learn lots of techniques to help you do your job better. Remember, the PED is a team of people all trying to do their best for the little ones and their families who visit them, engage with those around you and try and absorb whatever you can from them. Everyone (and I mean everyone) who works there will have a unique set of skills which are needed to work with young people, from the cleaners to the hospital manager and each one of them can teach you something, embrace that.

Please continue the conversation, engage and share what you learn with us on social media (we have [facebook](#), [instagram](#) and [twitter](#) accounts), but until then please join me in thanking our FOAMed team and the book's contributors for all the work they have done here.

We hope you find it useful.

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**Awesome Editorial/Peer review team who made this book happen:** Charlotte Davies, Elizabeth Herrieven, Chris Walsh, Rebecca Maxwell (+Bump), Daryl Hardy

**Designer/magician:** Nigel Taylor

**Published by:** RCEMLearning 2018



# TIPS FROM SOMEONE WHO KNOWS

**Author:** Kate Dear / **Codes:** CC1, CC2, CC3, CC4, CC5, CC6, CC12, CC15, CC24

# Be opportunistic

Listen to the chest while they are asleep

Get information about motor function and range of movement by watching them play

# MARMITE OF EMERGENCY MEDICINE

RCEMLearning asked Kate Dear what her tips for new docs in the PED are. Kate is an excellent Nurse Consultant/ANP, and if there is someone who knows, it's her.

Starting in the PED might be quite a scary thought for some of you, while for others who have had some paediatric exposure it may be the opportunity to gain more experience and refine your skills. I just want to share some thoughts and experience that I have and that my fab Paeds ED nurses have to make your life a little easier and less scary.

We all appreciate that paediatric EM is not everybody's favourite flavour and whilst I love it with a passion for some it's just anxiety creating and hard work. The marmite of Emergency Medicine. I guess the first thing to say is that kids are usually honest –

if they are sick they are sick. They rarely have pseudo fits or feigned unconsciousness (as a rule) and if they are well they are running around the waiting room eating Quavers. However, kids can be a tricky subset of patients in that sometimes they look well when they are quite sick and conversely they can look really sick and miserable and actually be clinically well. Parents know their kids better than you ever will, if a parent says, "this is not normal for my child", believe them, dismissing parental concern will come back and bite you. Have a flexible approach to your assessment, they won't allow you to follow the textbook examination format. Listen to chests when you can and if they are crying use that opportunity to look into the back of their throat. Sometimes if they are sleeping when I go in I will listen to their chest immediately and then start taking a history etc. as they may wake up screaming.

## Tips from someone who knows

Make the examination fun, "I'm going to listen to your tummy to see if I can hear what you had for breakfast/dinner/tea", or, "Mr Mouse is looking for potatoes in your ears, what shall we do if we find one", that kind of thing.

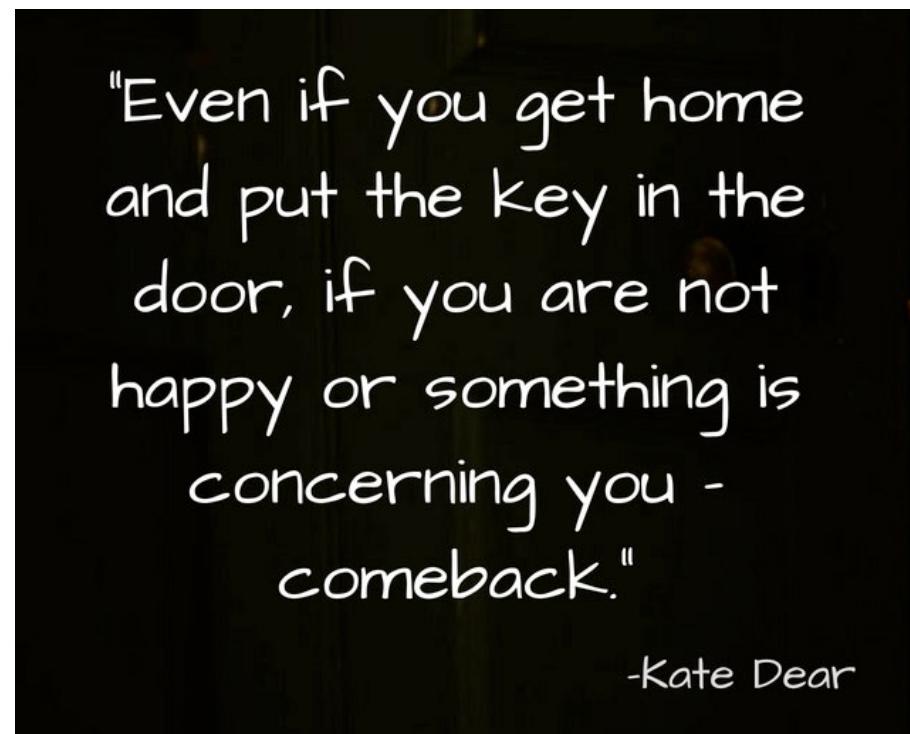
Distraction Distraction Distraction !!!! iPad, baby shark, paw patrol, Peppa Pig, bubbles, singing, stickers. Get really good with knowing what ages like what things. Have a supply of party bag bubbles and stickers and Baby TV on your phone or a department iPad (most places have these now). If you have a play specialist use them, they are amazing.

The nurses are the most precious commodity in a PED. LISTEN to them. ALWAYS ask the nurses what they think as they have a wealth of experience and knowledge, top tips and practical solutions to most of your problems. They know the pathways, the safeguarding pitfalls, the options available to you and they know when a child is well and when they are sick. ALWAYS and I mean ALWAYS check with the nurse before you send a child home, for several reasons. They may have additional information such as safeguarding that you are not aware of, they may not have done the child's repeat observations in the past few hours, they may know that a child needs admission even if you don't. PLEASE communicate with them they will absolutely save your bacon all day every day. They have saved mine countless times.

### I asked my Paediatric Nurses for some top tips and this is what they said:

1. Speak to the nurses before seeing the child
2. Keep the nurses updated after seeing a child
3. Don't put paracetamol and ibuprofen on a prescription unless you really feel they are unable to get any from the chemist/supermarket
4. If it's super busy please feel free to do your own set of observations/take a cannula out etc
5. Know where to restock tongue depressors/ear pieces if you find they have run out
6. Read the nurses notes and paramedics notes for vital information such as BM, urine dip results, safeguarding concerns
7. Don't be scared to ask for help or ring the paediatricians for advice it's not a competition on who can send the most kids home. Stay safe, the most experienced clinicians ask for help, that's what makes them good
8. Don't feel the need to wait for a temp to go down if you have a source of infection and the child is well

Safety net when sending a child home, explain all the relevant red flags and advise them when to return to the ED, make them feel like they can come back as this is very important. My standard dialogue when I'm discharging a child home is to discuss the red flags and say:



## Tips from someone who knows

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### The really sick child

Do a rapid ABCDE, give them high flow oxygen and get help. Doing those few things makes ALL the difference. Offer to help the ED senior clinician by running a gas, helping to prepare IV fluids, writing a time line of observations and actions/interventions. Gathering important information such as previous attendances, ringing for paediatric support, putting an emergency call our for anaesthetics, ordering a chest x-ray, these all help.

Find out about the Paediatric critical care Transport service for your area, in my area the North West/Wales area, this is the [NWTS](#) service. If you are in a DGH this amazing team offer PICU support at the patients bedside for a critically unwell child in the ED. They are also available for telephone advice. The senior clinician often needs to speak to this team but its invaluable that you know where to locate their contact details. This specific team have a [crash call drugs calculator](#) which will calculate doses of emergency drugs and you can print it off. If you know how to find it and do this, it will be an enormous help in an emergency.

Have an aide-memoire for WETFLAG and reference values for observations laminated and in your pocket at all times as this makes life so much easier when a parent rushes in with a peri-arrest 3 year old and you haven't had time to prepare.

Finally ask for help, any experienced clinician would much rather you sought them out for advice and support rather than take a risk as kids can be tricky and sometimes a second pair of eyes and a senior review can make all the difference. Your senior clinicians and nurses want to support and guide you as we recognise it can be tricky and we all still need support and advice from a friendly more experienced clinician.

Finally, enjoy! Paediatric Emergency Medicine is fun and really rewarding. There's so much more I could say but hopefully I've covered some of the main things to support your venture into the world of PEM. Good luck! If you can't get enough advice, Edward Snelson has an excellent blog [here](#).

# DECISION MAKING IN PAEDS

Author: Nikki Abela / Co-Authored and reviewed by: Damian Roland and Edward Snelson / Codes: CC4, CC5



# MARGIN OF ERROR

**EM physicians need to be decision makers, quick thinkers and risk balancers. This is what we are good at. In fact, many will tell you that the purpose of the PEM rotation is to learn to spot the sick child. And that is very true. But if that is all we take away from this rotation, we are letting ourselves down.**

Lots of unwell children are obviously sick, many of them obviously aren't (yes, mum with the toddler eating a packet of crisps in the waiting room who was triaged as "decreased oral intake", I'm looking at you), but then there are the ones that sit on that grey area in the middle. You have all heard of them – the ones which "hold their own", "cope well", until they suddenly don't any more. Children are renowned for doing this. This is why 'spotting the sick child' in some ways is a misnomer. It's a convenient phrase as, "recognising using history and examination the potentially unwell child at a stage of their illness before decompensation occurs," doesn't quite have the same ring to it.

So what do we do? Keep them all in and treat them all or send them all home and accept a "margin of

error"? Of course, none of these options are acceptable for a multitude of reasons.

Yet, daily, PEM physicians manage to strike a balance between the two through decision making processes which are important skills to learn. However they cannot be taught through a classroom or formula or guide. One size will not fit all and ultimately all are underpinned by experiences, often both positive and negative.

In a [recent article](#) the two excellent co-authors of this blog analysed what goes into these decisions:

1. The nature of paediatric physiology
2. The variability of communication
3. The heuristics used by clinicians and how they are affected by cognitive biases
4. The impact of external factors: parents/carers and/or the clinical environment

Complex huh? Fantastic! Having a growth mindset myself, I love a challenge, and I encourage you to look at it the same way.

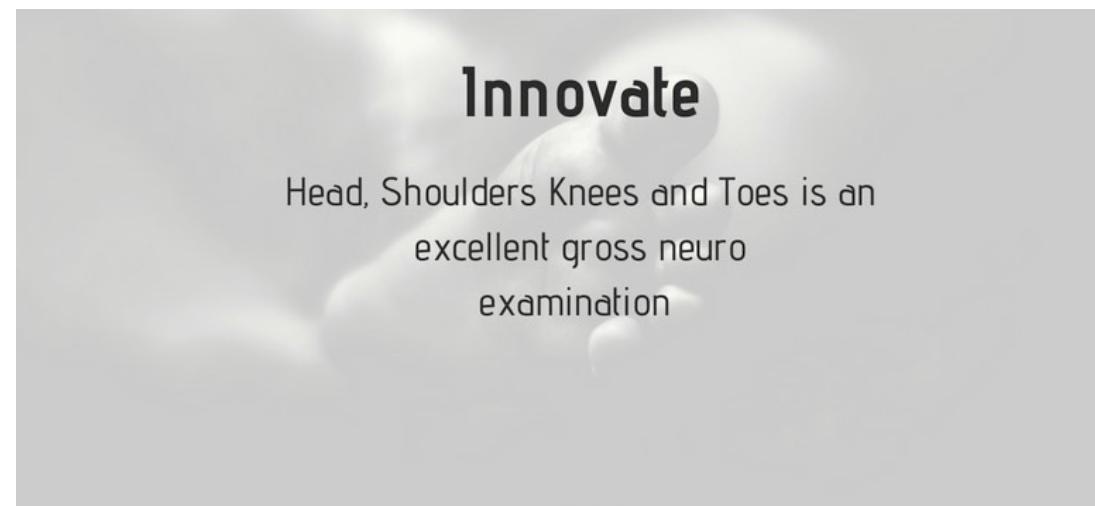
## Decision Making in Paeds

Let's start with paediatric physiology. How many times have you heard the term, "You shouldn't send home a child with a tachycardia"? Many departments will (rightly) observe to see a trend, or, if accompanied by a fever, give anti-pyretics to see if it settles. We can argue right and wrong till the cows come home here as the evidence is scanty, but one thing is certain, when my baby wants a feed, fever or not, if I deny her that milk for five minutes, her heart rate will be triggering a senior review on any paediatric observation scoring system (e.g. PEWs/POPS). So what am I saying? You need to take the whole picture into consideration.

The principle here is that it is not a binary tachycardia or not, it is the context of that tachycardia. "You shouldn't send a child home with a tachycardia," implies you can send a child home without one. This corollary is nonsense of course. So not all children should be sent home if they have a tachycardia, nor should you observe or treat them all. The decision to do so is aided by documenting your reasoning and reading it back to yourself, i.e if the child is giggling away and covered in chocolate but has a mild fever, mild tachycardia, cough, snotty red ears and a red throat, then the giggling and chocolate bit need to go down in the notes. This is not defensive medicine but gives a good description of the patient you examined in case they did later, say, fall off their precipice and re-present in a sicker state. As Edward says, "a picture is worth a thousand words".

Guidelines tend to be simplistic and will under-represent the intangible elements of our decision making. Numbers based decision making implies that there is a line to cross from normal to abnormal. The reality is that all of the elements are valid the numbers, the symptoms, the signs and the global gut feel.

In the same way that normality of things like heart rate is not binary, nor is the clinical assessment. Our evaluation of the likelihood of a significant diagnosis is a spectrum. Significant head injury is a good example. If a child has a minor bump and no worrying signs or symptoms, it is obvious to us that they do not have a brain injury. If they have a concerning mechanism and a reduced conscious level, it is reasonable to assume that they do have a brain injury. In many ways, it is those patients in the middle that are the most challenging. What happens when there is a plausibly significant mechanism, an alert child and a bit of headache or vomiting? In such cases, the decision making is both more complex and likely to be a longer process than in the first two cases.



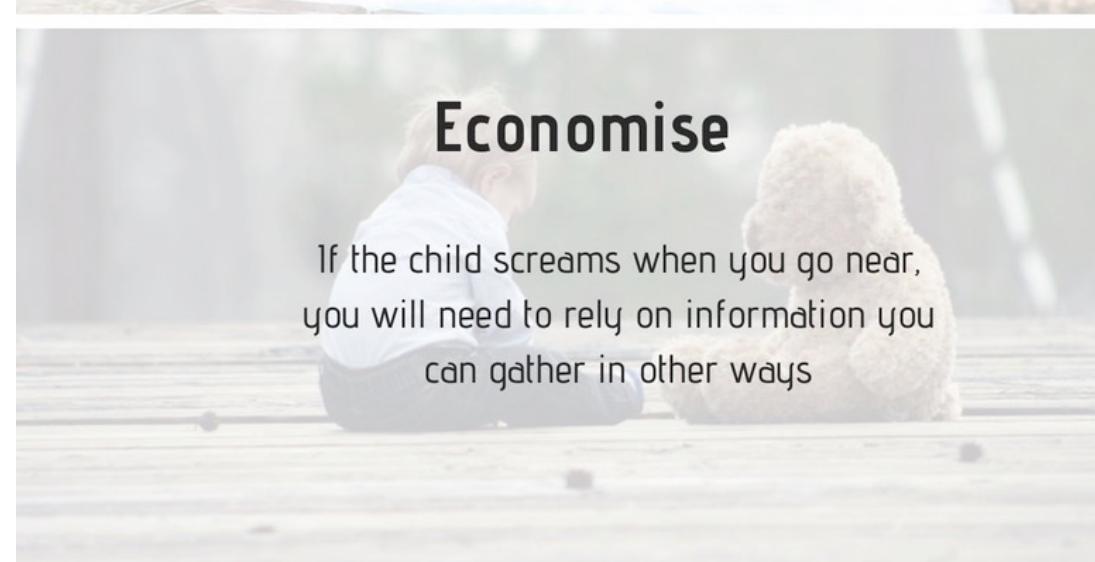
### Innovate

Head, Shoulders Knees and Toes is an excellent gross neuro examination



### Extrapolate

Jumping jacks and touch screen games are great to spot cerebellar signs



### Economise

If the child screams when you go near, you will need to rely on information you can gather in other ways

## Decision Making in Paeds

And this is where communication comes in (which is the second point in the Roland-Snelson article). One of my favourite lines to tell parents is, “I can only comment/decide on the child I am seeing in front of me now (happily eating that chocolate ice-cream). If they change and he or she develop these symptoms

for a child and their parents to trust us to examine them, and then figure out how to adapt what we know (e.g. a cranial nerve examination) to the patient in front of us (e.g. a four day old infant). As Damian and Edward explain in their piece: Innovate, Extrapolate and Economise.

Hungry

Angry

Late

Tired

**.. and do you need to pee?**

{list core symptoms relevant to the presentation}, please bring them back”. Learning to safety-net appropriately is essential in any part of our practise – however, in paeds, communication needs to take us that bit further. We need to break the barriers down

Moving on to heuristic thinking, i.e. mental shortcuts used to make decisions and judgments quickly without having to spend a lot of time researching and analysing information. There's lots of literature on this and how many physicians use it to aid decision making. We've skimmed over this before but you may not have noticed – remember when we discussed that patient in the waiting room stuffing his face with the crisps while his mum was worried that his oral intake has decreased? I (and probably you) had already decided his discharge destination using this technique.

But while this type of thinking is efficient (something EM physicians love), it is also full of traps. Because this type of thinking opens us up to cognitive biases. St.Emlyn's excellent Natalie May has a whole blog on this, which I encourage you to read [here](#). Remember to always use clinical decision aids and tools to help you structure the way you think and decide – most paeds EDs will be rife with guidelines, you just need to know where to look.

Lastly, we move on to external factors – parents, carers and/or the clinical environment. External factors could be changing the decision you make, and you need to be aware of that so that it does not limit you. As I said before, every EM clinician knows about risk, but the level of risk you are happy to take may not be the same as the parents and you may decide to lower the level of risk after discussion with them. Although every clinical case should be the same, none ever is, and flexibility to find what is right for the child in front of you should be your top priority. Again, communication here is paramount.

Moreover the clinical environment may be effecting you and the way you think, try to find ways not to let it. For example your cognitive load is increased when you have a parent looking at you when you go to

## Decision Making in Paeds

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waiting room/are at desk – that parent is worried about their child, find ways to go about it. Think about when you need to HALT.

I repeat, decision making in paediatrics is complex. But most of the time, people are right, even when they don't invest so much grey matter.

As Damian says,

**“The low incidence of serious disease in children protects the unwary”.**

Just because you're right, doesn't mean your methods or reasons are. Be smart and decide well.

### About the authors:

*Damian* and *Edward* are excellent PEM physicians with blogs of their own which are really worth following. Edward runs the site [gppaedstips.blogspot.com](http://gppaedstips.blogspot.com) (which is not just for GPs) and Damian hosts a series of blogs on his website [rolobotrambles.com](http://rolobotrambles.com). Both of them have an eminent social media presence and should definitely be followed on twitter to keep up to date with all things PEM.

### References:

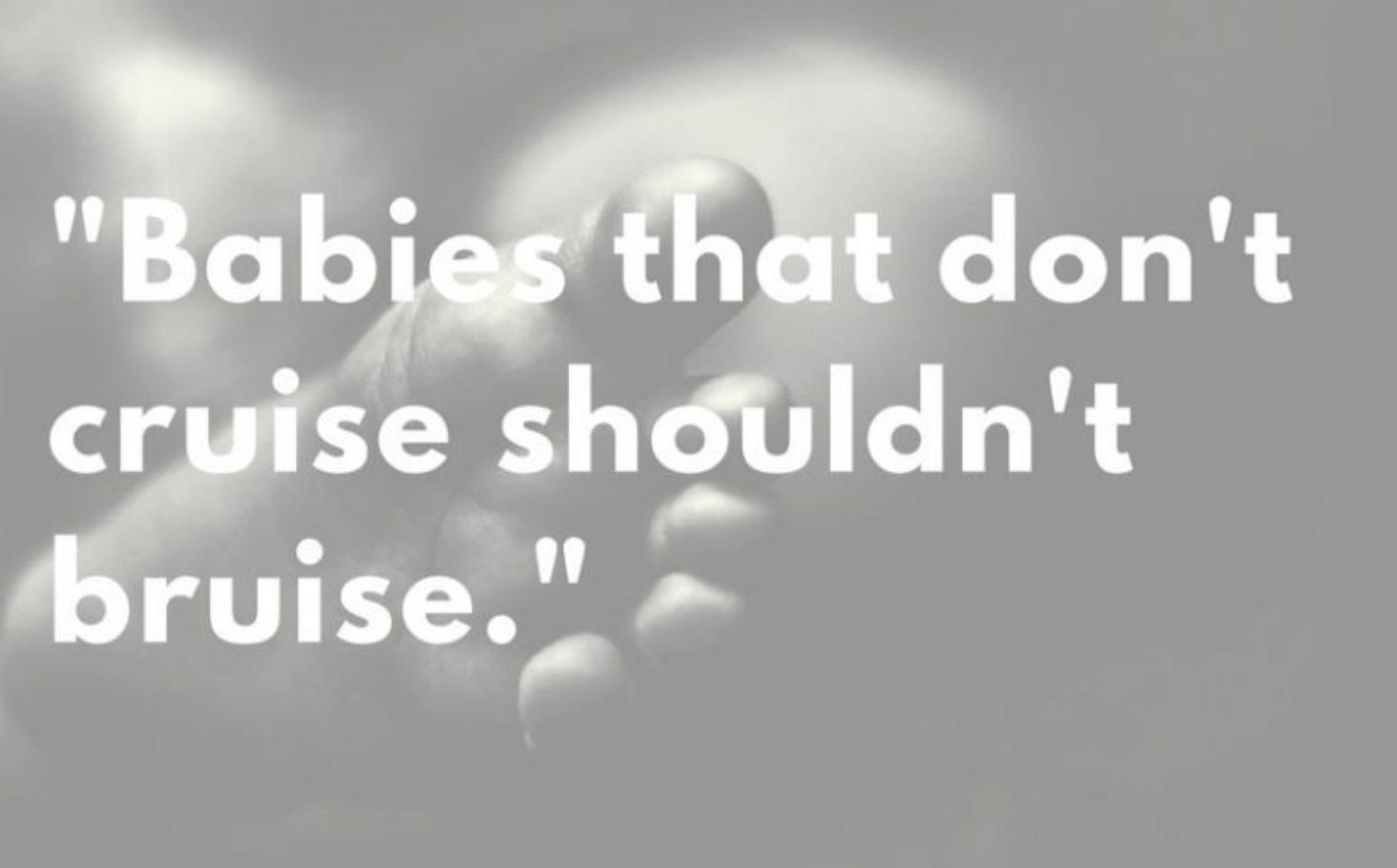
Roland D, Snelson E. [So why didnt you think this baby was ill? Decision-making in acute paediatrics. Archives of Disease in Childhood – Education and Practice](#) Published Online First: 01 March 2018. doi: 10.1136/archdischild-2017-313199.

St. Emlyn's – [When is a Door not a Door?](#) Bias, Heuristics and Metacognition



# THE UNWELL, NEONATE AND INFANT

**Author:** Meriel Tolhurst-Cleaver / **Peer review:** Thomas Webster / **Codes:** CC5, PAP13



**"Babies that don't  
cruise shouldn't  
bruise."**

# DIAGNOSTIC NIGHTMARE!

**The neonatal period (<28 days of age) and young infancy (<3 months) is the most common time for presentation of congenital conditions and the highest susceptibility for infection**

But, unfortunately, young babies are renowned for their vague presentations and lack of localising clinical signs. In fact, they can be a bit of a diagnostic nightmare! So in order to avoid panicking when faced with a sick baby, keep in mind these big 5 diagnoses not to be missed, how to spot them and a few tips about management.

**Warning:** this is an overview and summary of how to approach an unwell infant and covers a lot of big and broad topics. Please do check out the further reading and references delve deeper into each of them.

## Sepsis

You must always consider sepsis in any unwell infant (<3 months)! You really need to have a low threshold for performing a full septic screen (blood cultures, urine culture and CSF culture) and commencing on empirical intravenous antibiotics. Any infant (<3 months) presenting with a fever (>38 C) will definitely qualify for this (as per [NICE guidance](#)), but please also consider this management in any baby who presents with non-specific symptoms and signs, as they may not mount a febrile response to infection.

It's useful to ask about birth risk factors for neonatal infection (these include a maternal fever or known infection in labour, prolonged rupture of membranes over 24 hours and Group B Streptococcus infection confirmed in this pregnancy). If any of these are

# The Unwell Neonate and Infant

present you should be even more suspicious and it would lower your threshold for a full septic screen (for example in a neonate who has not had a fever but is generally unwell). However, do not be falsely reassured if there are no risk factors present.

Presentation of sepsis in a young baby may include irritability, 'off feeds', vomiting and diarrhoea, lethargy (not waking for feeds), not wetting nappies, high pitched cry, rapid or shallow breathing, apnoea, seizures or abnormal movements. Clinical features on examination

may include tachycardia, tachypnoea, fever ( $>38\text{ C}$ ) or hypothermia, hypotension, poor perfusion, respiratory distress, distended abdomen, bulging or tense fontanelle, pallor, mottled skin and decreased conscious level.

Babies are non-specifically unwell  
For

## 5 Big Reasons



Management involves a full septic screen (as above) and commencement on empirical antibiotics (as per local antibiotic guideline). These should be given within 1 hour of sepsis being identified. Antibiotics should NOT be delayed whilst waiting for a lumbar puncture if there is nobody available to perform it (or it fails). Get parents and nurses to attempt to catch a clean urine sample whilst they are waiting for investigations and during procedures to avoid the need for a catheter or supra-pubic aspiration. Sepsis 6 guidelines also recommend sending a lactate, using oxygen to keep saturations  $>94\%$ , giving a fluid challenge if needed and measuring the urine output (NB. This doesn't necessarily have to be via a catheter as many units will weigh nappies to measure output). While you will be routinely sending inflammatory markers and renal function, remember to also check the blood glucose as these babies can easily become hypoglycaemic if they have had decreased feeding and increased metabolic demand from sepsis!

Sounds straightforward? It rarely is! If you want to read more, Edward Snelson has written posts about it [here](#) and [here](#).

### Metabolic

Inborn errors of metabolism often present in the first few months of life and we should always try to bear this in

mind in an unwell young infant. Pointers from the history may include consanguineous parents, previous miscarriages or sudden infant death in the family and known family history of metabolic conditions. The presentation of metabolic disorders is often very unclear, which means you must keep a high index of suspicion. A baby may present encephalopathic, with seizures, poor weight gain or poor growth, vomiting or just generally unwell.

If you have any suspicions of a metabolic problem then perform these screening tests: glucose, ketones, lactate and ammonia. The glucose and ketones can be done on a bedside machine, send a gas (to include a lactate) and an ammonia sample (this must be a free flowing venous sample and sent immediately to the lab on ice). **Stop all feeds** and commence IV fluid resuscitation (as needed) and maintenance fluids that must include

# The Unwell Neonate and Infant

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dextrose (normally 10%). If any of these are abnormal or you need more advice then contact your local tertiary Paediatric Metabolic team for advice. This [website](#) is also a really excellent resource and includes lots of advice for emergency management of metabolic conditions.

We have a blog on metabolic babies [here](#).

## Non-accidental Injury

Have a high index of suspicion for non-accidental injury (NAI) in a baby that presents generally unwell, or possibly with a decreased level of consciousness, lethargy, irritability or any signs of trauma such as swelling or bruising. Red flags from talking to the parents may include a bizarre, inconsistent or vague history of events or an unusual affect or interaction with the baby. Remember “babies that don’t cruise shouldn’t bruise” and the mechanism of injury must be developmentally appropriate (e.g. a baby who can’t yet roll cannot roll off a sofa). You need to strip **all** babies off completely to examine them, including examining in the nappy area. Any bruising or sign of trauma in a non-mobile child is abnormal and needs careful consideration, and potentially investigation if there are any concerns of NAI.

Also be aware of known risk factors for NAI such as parental drug and alcohol abuse or mental health issues and domestic violence. Ask whether the family is known to social services. You need to ask these difficult questions routinely, the more you do this, the less awkward it will feel. You may want to preface this section of your history by saying “these are a few standard questions we ask everyone”. Ensure you are familiar with your local pathway for management of suspected NAI, as it varies between trusts. In this age group it normally involves a referral to social care and your local Paediatric or safeguarding team, and possibly the police. Emergency department management must include any necessary resuscitation and treatment regardless of the suspicion of NAI. Initial investigations in the ED will depend on clinical presentation, and investigations will be limited to those required to diagnose the underlying problem. Once the child is clinically stable, further investigations will be performed by the safeguarding clinicians and may include a CT head scan to look

for intracranial bleeding, bloods (especially FBC and clotting studies), a skeletal survey and ophthalmology review to look for retinal haemorrhages.

NAI is so important – you may notice we’ve covered it again, later on in this iBook!

## Surgical

Surgical issues may also present in young infants. They may present with intestinal obstruction (for example due to malrotation and volvulus) and signs may include a distended abdomen, visible peristalsis, bilious vomiting, lethargy, decreased feeding or irritability. Bilious vomiting is very serious in a young infant and should never be ignored. Remember to always check the hernial orifices and testes as well!

In the first few days of life you need to consider [Hirschsprung's disease](#) if an infant has failed to pass meconium within the first 24-48 hours of life. Always remember to check for a patent anus as well before you call the surgeons (just to save yourself a red face if it's imperforate).

Also be aware of [Necrotising Enterocolitis](#) that can present in term babies as well as preterm, and after a few days of life. The baby may be septic or shocked, and may have apneas or respiratory distress. Their abdomen may be distended, shiny and they may have peri-umbilical flare.

Pyloric stenosis usually presents a bit later around 3-6 weeks of age with forceful vomiting (not bilious) after feeds, persistent hunger, dehydration, weight loss and irritability. This [BMJ Best Practice](#) piece is really useful to read further.

For all of these surgical conditions the basic management involves getting IV access, giving IV fluids and stopping feeds. It is often also useful to insert an NG tube on free drainage and perform a chest and abdominal x-ray. Always liaise with your tertiary Paediatric Surgeons early if you are in a DGH, as you will probably need to arrange transfer for the baby and this can take time.

# The Unwell Neonate and Infant

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## Take Home Points

- Most unwell neonates and infants present with non-specific symptoms
- ALWAYS consider sepsis – most unwell neonates and infants will need empirically treating for infection
- When sending initial blood work a reasonable first line is FBC, U&Es, CRP, blood culture, venous gas (with lactate), glucose and ammonia
- Consider cardiac and metabolic disease in any unwell baby – look for key red flags highlighted above
- Keep a high index of suspicion for non-accidental injury

## References & Further Reading

1. PEM Playbook: Undifferentiated sick infant
2. NICE NG51: Sepsis: Recognition, diagnosis and early management
3. GPpaedstips: Sepsis
4. RCEM Learning: Congenital Heart Disease
5. RCEM Learning: Metabolic Babies
6. EM cases: Episode 84 Congenital Heart Disease Emergencies
7. EM cases: Congenital Heart Disease
8. British Inherited Metabolic Diseases Group [website](#)
9. BMJ Best Practice [Pyloric stenosis](#)

# A CHILD WITH A FEVER

**Author:** Frances Copp / **Codes:** PAP9

**Paediatric Sepsis 6**

Severe sepsis is a **CLINICAL EMERGENCY**. Signs and symptoms of sepsis in children can be subtle and deterioration to shock rapid. Early initiation of simple treatment has been shown to improve outcomes.

**YOU CAN MAKE A DIFFERENCE**

Patient Name: Date of Birth: Unit number:

**Recognition:**

If a child with suspected or proven infection AND has at least 2 of the following:

- Core temperature < 36°C or > 38.5°C
- Inappropriate tachycardia (Refer to local criteria / APLS Guidance)
- Altered mental state (including: sleepiness / irritability / lethargy / floppiness)
- Reduced peripheral perfusion / prolonged capillary refill

**Think: could this child have SEPSIS or SEPTIC SHOCK?**

If in doubt, consult a senior clinician.

Time Initials

**Figure 2:**  
Paediatric Sepsis 6

# FIRST IMPRESSIONS MATTER

**Febrile children compete for the most common non-traumatic paediatric presentation in the ED, causing concern for parents worldwide. Your mission: to find the source. This guide, by no means exhaustive, aims to talk you through a basic approach to assessment and management, with a reminder of those causes you really don't want to miss.**

### Key points:

- Source is key. If you find a source, further investigation may not be necessary
- Look for signs of serious illness and suspect the 'scary stuff' in all children – that way you are less likely to be caught out

- Investigate as indicated, not as a routine
- Antibiotics are not always the answer
- If in doubt, a longer period of observation and a senior opinion never go amiss

### First impressions matter

Before even calling the patient's name, take a moment to observe the child in the waiting room: How do they look? Charging around the play area with toy in hand? Subdued, super-glued to their guardian? Distressed? Unconscious? Posturing?

Whilst certainly not the only factor to be taken into account (see NICE 2013 '[Traffic Light system](#) for identifying risk of serious illness), much can be gleaned from a child's level of activity and interaction with those around them particularly when trying to determine whether you are dealing with a septic child or yet another happy URTI.

## A child with a fever

However, beware: younger infants may not respond as dramatically as older children to illness. In babies, particularly under 3 months of age, more nebulous indicators may be present – these may not be immediately evident.

First impressions can also be used as a reference point: if the child presents as grizzly, clingy and refusing fluids/food, with a fever and raised heart rate on initial observations, but an hour or two after administration of antipyretics you see before you a bouncing, interactive, feeding child with normal heart rate and settling temperature, you and the parents may be reassured. This may even be sufficient reassurance for discharge. It is also worth remembering that first impressions go both ways. Approaching with a smile, getting quickly to their level (height and humour) and plying younger children with bubbles and distraction toys goes a long way to help you fully assess a child's level of distress and gain trust from parents.

### 'Just a fever?' Taking a history: Parental fears and expectations

Frequently, parents exhibit '[fever phobia](#)': they are often concerned by the fever itself, the perceived degree of fever, regularity of fevers and the potential for fevers to continue to spiral with dangerous outcome. If specific concerns are uncovered early in the discussion – especially with any related parental experience – you may be guided towards any targeted reassurance and many of these fears may be abated.

Firstly, fever usually represents a natural physiological response to infection and damage is rarely a direct result of the fever itself. Whilst fever plays its part in the fight against invading pathogens, the comfort brought by reducing the temperature has long been thought to outweigh the benefit of letting the fever run its course as we all know, when febrile with an infection on board, you feel dreadful. Therefore, current advice is to dose-up, if there is [evidence of distress](#).

When using paracetamol or ibuprofen in children with fever:

- continue only as long as the child appears distressed
- consider changing to the other agent if the child's distress is not alleviated
- do not give both agents simultaneously
- only consider alternating these agents if the distress persists or recurs before the next dose is due.

**Note, underdressing or overdressing, or sponging with tepid water, are NOT recommended for reducing fever**

**Figure 1:** Use of antipyretics, taken from NICE Guidelines: 'Fever under 5s'

Complications and adverse outcomes are usually related to the underlying aetiology and associated fluid loss. The specific value of the fever is usually irrelevant: higher temperatures (40-42 degrees Celsius) are not linked to tissue damage nor to the development of febrile seizures.<sup>5</sup> It might be helpful here to note the confusion around the disputed value of temperature regarded as fever interestingly, the NICE Guidelines only mentions the figure of 38 degrees Celsius and only in association with infants under 3 months. Clinicians dealing with fever in children will often take this value to be the starting point for a fever, and any value 37.5-38 classed as low grade. Due to hypothalamic control, temperatures caused by infection rarely exceed 42 degrees.

# A child with a fever

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## It is useful to delve into the history of the fever:

- Fever onset and duration: clarify if there are daily high temperatures and if there has been any break in the fever (and if so, for how long particularly important in presentations of over 5 days of fever).
- Any recorded temperatures at home (if normothermic on presentation). Occasionally parents will have a different idea of 'fever' to those clinically recognised.
- Associated febrile symptoms: behaviour change with fever (lethargy, off feeds/not drinking)? Improving when fever settles? Rigors? Febrile seizures?
- Anti-pyretic use and response: regular use and, if so, paracetamol, ibuprofen or both, and at what dose? Always note the time of the last dose(s) given!
- Any focal infective symptoms?
- Rash? If so timing in relation to fever, where did it start and any spread?
- Oral intake and urine output – dehydration?
- Vaccination history
- Birth history particularly relevant in younger babies: Preterm? Perinatal complications such as postnatal/intrauterine infection?
- Past medical history: any recurring infections? Immunocompromise? (usually volunteered early by parents)
- Suspicion of more severe, or more specific, aetiology may be raised if any of the following are revealed:
  - Recent travel abroad, or recent contact with travellers
  - Contact with unwell individuals

- In the case of GI upset – suspicious food history and associated time frame: restaurants? Takeaways? BBQ? Others unwell with same symptoms from same event? Meat/fish?

It is also worth considering in the social history others who may be affected for example, any contact with immunocompromised individuals, pregnant women or young babies?

As with any good history, you will often be able to predict the source of the fever even if the child is unable to localise any symptoms. Be prepared to think laterally for example, if a child is refusing food and fluids could the source of fever be visible in the mouth or pharynx?

## Examination - The three E's: ENT, Exposure and Extremities!

The younger the child, the more important the examination. Take note of the [NICE table](#) for signs of serious illness (Figure 1) and bear in mind the Paediatric Sepsis 6 (Figure 2). NICE also have a handy table for common features of specific diseases see [Table 2](#)<sup>6</sup>

Don't be afraid to expose fully to check for a rash and any inflammation around the genitalia. Wiggle joints for tone and tenderness and never, ever, forget ENT and lymph nodes! No child looks forward to a good tonsillar inspection and whilst this may be challenging, recruiting the parents and using distraction techniques will help you get the best view possible. Position is paramount. It's worth leaving to the end of your examination, as you will probably make them cry! On your way in, make sure you take note of the appearance of the tongue and oral mucosa. The only exception to this would be if you have any suspicion of epiglottitis/severe croup in which case, further aggravation is best avoided. Be careful when looking for a rash: petechiae may be very subtle to begin with. Clarify the cause of any bruises with the child or parents. Meningococcal infection should be suspected in all until another source is isolated.

Here it is useful to remember a non-infective cause you do not want to miss: Kawasaki disease. Principally affecting young children (<5yrs), this

## A child with a fever

systemic vasculitis can result in cardiac disease (coronary aneurysms), affecting 20-25% of those left untreated.<sup>7</sup> Any sign or suspicion should prompt urgent discussion and review with Paediatric seniors.

### KAWASAKI DISEASE

Fever for more than 5 days and at least 4 of the following:

- bilateral conjunctival injection
- change in mucous membranes – lip erythema/cracking
- strawberry tongue
- change in the extremities – induration of hands and feet, fusiform swelling of digits, non-pitting oedema
- polymorphous rash
- cervical lymphadenopathy (usually unilateral)

**Figure 5:** Table of Signs of Kawasaki Disease, adapted from NICE Guidelines ‘Fever in under 5s’

Source evident?

Or do you remain unconvinced? Consider pyrexia of unknown origin in any child with fever for over 5 days without clear source:

### Pyrexia of Unknown Origin

- Fever >38.3 degrees
- For > consecutive 8 days
- Unwell for 3 weeks
- With no apparent source after 1 week of inpatient investigation

**Figure 6:** PUO definition

# A child with a fever

## 'Doctor, my child needs a blood test!'

Whilst most parents will be understandably wary of lumbar punctures, even if clinically indicated (see NICE Fever in under 5s for detailed indications<sup>8</sup>), blood tests are a mythicized phenomenon for many. With explanation of the limitations of the tests available (CRP and WCC alone are not reliable markers of severity of infection), explanation of the potential distress caused by cannulation, and reassurance that management would not be changed by blood test results, any request for blood tests are usually retracted. That being said, it is always reasonable to check a bedside BM if lethargic or vomiting, particularly with a history of poor oral intake.

There are instances, however, in which blood tests are beneficial – principally FBC, CRP, blood culture and lactate are indicated in the following febrile circumstances:

- Infant under 3 months of age: due to maternal immunoglobulin cover and their own immature immune system, presentation with fever is more suspicious of bacterial sepsis (You will find in most places, that a child <3months with a fever will have a full septic screen)
- Any suspicion of meningococcal infection or meningitis: petechial/purpuric rash, fever, irritability/lethargy, photophobia, bulging fontanelle... any of these should raise your suspicions, but meningitis should be considered as 'rule-out' differential for all. Remember to take a clotting sample!
- Suspected PUO
- Any child over 3 months of age with fever of unknown source and 1 or more amber or red feature(s) from the traffic light table
- Consider U&E/LFTs if any concerns about end-organ damage or if the kidneys/liver are the suspected source of fever.

Specific rapid testing may also be indicated depending on signs and symptoms e.g. monospot for EBV, malaria testing, or ASOT and throat swab if

there are concerns over the possibility of streptococcal infection (also useful to take a viral throat swab at the same time!)

For the vast majority, less-invasive investigations will suffice: a clean-catch sample of urine for bedside dipstick testing, if indicated. A stool sample may be collected if relevant in a similar manner (always request if any evidence of bloody diarrhoea).

X-rays are more contentious. If you can hear unilateral crepitations, X-ray findings may or may not confirm underlying consolidation and therefore routine X-ray is not recommended by the BTS guidelines<sup>9</sup>, especially if the child is well enough to be discharged.

If the source remains unclear following the above basic testing, referral and admission may be indicated even in the absence of signs of serious illness.

## Mission Accomplished?

In most cases, a fever will be the result of a virus with clear localising signs. Rarely, other demons are at large. However, it is important to acknowledge that 'just a virus' may cause an otherwise well child to decompensate and therefore it is always necessary to be on the lookout for signs of compromise.

If you have found a source and feel your patient is well enough to head home, you may now be facing the antibiotic conundrum: to give or not to give? For this, bear in mind the question: 'what am I treating and for whom?' do not be swayed by parents if you feel antibiotics are not indicated! Stressing the relatively high risk of complications and likelihood of minimal impact on the course of illness is usually enough to dissuade any pro-antibiotic parents. The following poster from Edward Snellson's gppaedstips blog site may also be of aid:

For many URTIs it is very difficult to distinguish between viral and bacterial causes however, if there is a possibility of secondary complication due to untreated bacterial infection (for example, streptococcal infection and Scarlet fever: exudative/inflamed tonsils, sandpaper rash, strawberry

## A child with a fever

tongue), antibiotic cover should be carefully considered. Scoring systems can help towards this (for example CENTOR score for likelihood of Streptococcal tonsillitis), although these also have

terms of symptoms, give advice regarding the use of anti-pyretics for comfort, advise regular fluids, and provide strong and specific safety netting for signs of worsening infection and dehydration. Remember, what you see now may not represent the patient later in the course of infection if any deterioration, parents must be encouraged to seek help.

### SORE THROATS AND EARS IN CHILDREN & WHAT TO DO ABOUT THEM

The majority of infections in young children are viral - this includes tonsillitis and acute otitis media

**The most effective treatment regardless of diagnosis is simple analgesia** - paracetamol and ibuprofen

**Bulging and red ears do not mean that antibiotics will be effective** - the number needed to treat (NNT) is still high

**Exudate on tonsils does not mean that antibiotics will be effective** - the number needed to treat (NNT) is still high

**Antibiotics frequently cause additional symptoms** - up to 1 in 10 children develop abdo pain, vomiting or diarrhoea

**There is no evidence that any antibiotic prescribing strategy reduces the risk of complications**

*The bottom line* - Regardless of decision tools or clinical findings, for uncomplicated URTI, AOM and tonsillitis in young children the risk vs benefit of antibiotics is usually such that a no antibiotic strategy is best.



**What's important -**

- good analgesia and hydration
- Rule out sepsis
- Rule out complications
- Good safety netting

1. NICE '[Fever under 5s](#)' Guideline, CG 160
2. NICE [Traffic Light Table](#) for recognition of the seriously ill child
3. Schmitt BD. '[Fever phobia: misconceptions of parents about fevers](#)' Am J Dis Child 1980; 134: 176-181
4. Sahib Mehdi El-Radhi, A, '[Fever management: Evidence vs current practice](#)' World J Clinical Paediatrics, 2012 Dec 8; 1(4): 29-33
5. BMJ [Kawasaki Disease Learning](#)
6. BTS [Guidelines for the Management of the Community Acquired Pneumonia in Children: update 2011](#)
7. GPPaedstips. '[Decision Fatigue and What to Do About It When to Use Antibiotics for URTI, AOM and Tonsillitis in Children](#)',

their limits. The best approach is to treat the patient in terms of risk-benefit: if a child has severe or prolonged symptoms, complications, typical presentation for a particular antibiotic-susceptible pathogen, the reported 10% risk of complication from taking antibiotics may be outweighed by the benefits of their use.<sup>10</sup>

### Discharge Likely?

Should you decide that your patient is fit to go home, now is the time to further empower their parents in the management of fever. Explain what to expect in



# COUGHING, WHEEZY AND STRIDULOUS CHILDREN

**Author:** Edward Snelson / **Codes:** PAP6



# LIFE THREATENING

**Children with noisy or difficult breathing often present to the Emergency Department (ED). The acuity of these patients varies, but any of the conditions that cause respiratory symptoms can be life threatening. This article will give key information about each presentation and condition, while signposting further information that you can read for more in depth learning.**

### LRTI vs URTI

Children with cough and fever are one of the most common presentations to the ED. The vast majority of these children do not have pneumonia. Clinical examination of children's chests can be challenging because they may not cooperate and because transmitted sounds are very commonly heard in URTI. Thankfully, assessment of children is something that can be done more easily and often more safely from a distance. The appearance, behaviour and work of breathing of a child are all good discriminators between URTI and LRTI.

### LRTI vs URTI – Key learning points

- Pneumonia in children is characterised by cough, fever, respiratory distress and a consistent reduction in activity.
- URTI in children is characterised by cough, fever, a fluctuating level of unwellness but absence of respiratory distress.
- Chest X-ray is not recommended as a way of diagnosing uncomplicated community acquired pneumonia.(BTS)
- Pneumonia is a clinical diagnosis. Blood tests and chest X-ray are not routinely required even if a child is being admitted. (BTS)

### LRTI

Most children with LRTI can be discharged from the ED with oral antibiotics and careful safety netting.

You should have local guidelines for when to refer children with LRTI. Usually they include the following criteria:

## Coughing, Wheezy and Stridulous Children

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- Age below 1 year
- Low SaO<sub>2</sub>
- Moderate/ severe increased work of breathing
- Comorbidities (e.g. immunodeficiency etc)
- Poor oral intake or urine output (note possibility of AKI or SIADH)
- Signs of sepsis (Sepsis 6 and refer!)

### URTI

The management of URTI is paradoxically often more complex. Children with sore throats, sore ears, runny noses or red eyes usually have a viral illness. The harsh reality is that even when tonsils are red or have exudate and when eardrums are red and bulging, the likelihood that antibiotics will help is very low. Even using a scoring system fails to give good odds. When you take into account the side effects that antibiotics cause to children, it is no surprise that NICE recommend a “no antibiotic or delayed antibiotic prescribing strategy.”

The most important aspects of managing URTI (including tonsillitis and otitis media) in children who present to the ED are:

- Good symptom control
- Ensure good hydration
- Rule out sepsis
- Rule out complications (peritonsillar abscess, mastoiditis etc.)
- Good safety netting advice

The evidence is against antibiotics being effective to reduce symptoms or complications so they should be prescribed mainly for prolonged or otherwise atypical cases of URTI in children.<sup>3</sup>

### What about wheeze?

Now that we have dealt with respiratory infection, let's cover wheeze. The vast majority of paediatric wheeze is caused by one of three things, bronchiolitis, viral wheeze or asthma. These three things tend to have recognisable patterns and tend to present at different ages. It can sometimes be difficult to tell the difference between them but most of the time it is possible. Getting the diagnosis right is important because each is managed differently.

### Bronchiolitis

Think of bronchiolitis as wet lungs. This cause of wheeze is usually seen under the age of 12 months. Typically, there is a slow gradual progression of cough, wheeze, feeding difficulty and then increased work of breathing over about 3-5 days. Symptoms often then plateau for a few more days and then finally begin to resolve.

## Coughing, Wheezy and Stridulous Children

Many, many studies have looked for effective treatments for bronchiolitis and all have found that there are none. Nothing works apart from respiratory support and feeding support where needed. This means no inhaler, no steroids, no antibiotics and no nebulisers.

For infants presenting to the ED, the most important aspects of assessing bronchiolitis are:

- History any red flag symptoms such as blue, pale or floppy episodes?
- Feeding is the infant taking at least half of their normal feeds and having wet nappies?
- Comorbidities is this infant ex-premature? Do they have a known heart problem?

- Examination work of breathing, hydration, signs of an alternative diagnosis (see cardiac causes of wheeze below)

Like all things in life and clinical practice, bronchiolitis comes in three sizes. The severity of the presentation will determine how the child is managed:

Mild and moderate cases do not require chest X-ray or blood tests. The decision to admit or discharge is clinical.<sup>4</sup> Chest X-rays often show a few streaks of white or a patch of uncertain significance which may lead to the prescription of unhelpful antibiotics.

\*Your department will have a guideline which you should use. This is provided to give you an at-a-glance understanding of how things should go.

## Management of Bronchiolitis in the ED (Brief overview)\*

### Mild

Discharge with feeding advice, safety netting advice and leaflet

### Moderate

Oxygen\* (often via nasal cannula) to maintain SaO<sub>2</sub> 90% if needed  
NGT feeding if needed  
Refer

### Severe

Get help - if in doubt get the crash team  
Oxygen\*\*  
If respiratory inadequacy, provide positive pressure ventilation  
Stop feeds and start IV fluids

# Coughing, Wheezy and Stridulous Children

\*\*There has been a recent increase in the number of centres using high flow nasal cannula oxygen as a treatment for moderate to severe bronchiolitis. There seems to be a measurable effect<sup>5</sup> of this therapy in babies who are heading towards respiratory failure however it is not a substitute for assisted ventilation in those babies who have already properly failed.

## Perplexing Cases 1: A wheezy 6 week old

A 6 week old baby presents with coryza, wheeze, poor feeding and increased work of breathing. While the obvious diagnosis should be bronchiolitis, this baby is excessively tachycardic (190 bpm) and has an unusually long prodrome for their symptoms, which started 7 days ago and are still getting worse. This is a case of cardiac failure, most likely due to a large ventricular septal defect. Other clues that might give the game away are a large liver and the presence of a murmur. It's not easy to hear a murmur at 190bpm but early recognition of heart failure facilitates early treatment.

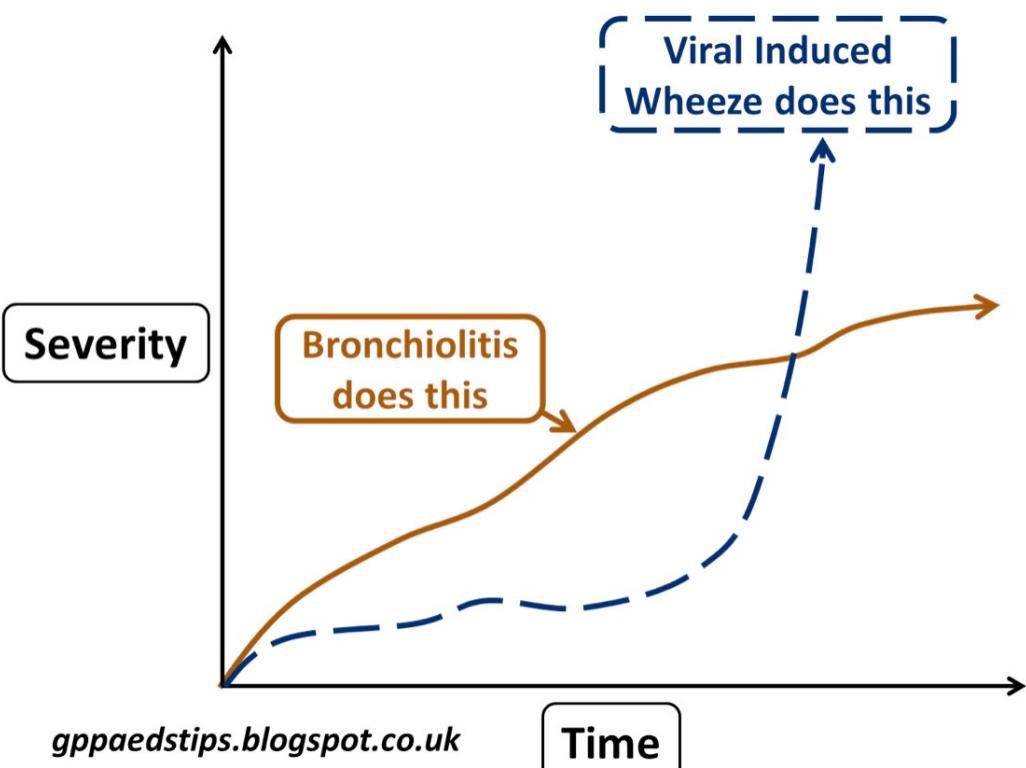
## Viral Wheeze

Viral wheeze is different from bronchiolitis. While bronchiolitis is wet lungs, viral wheeze is bronchospasm. So while both are caused by viruses, they present differently and respond differently to treatment. The reason for this difference is probably to do with the way that children's immune systems develop over their first few years.<sup>6</sup> This has an important effect on clinical practice because telling the difference between the two is important. Bronchiolitis is best NOT treated with bronchodilators but viral wheeze MUST be treated with bronchodilators. Viral wheeze is not a benign entity. Children have died from exacerbations of viral wheeze.

## Bronchiolitis vs Viral Wheeze

The simplest way to tell the difference is by age. The reality is that a wheezy patient under the age of 12 months is highly likely to have bronchiolitis and a patient aged between 1 and 5 years old is highly likely to have viral wheeze.

There is inevitably some overlap, mostly in the children aged between 9 and 15 months. In this age bracket it is particularly worthwhile to pay attention to the history of the onset of symptoms, which tends to be days in bronchiolitis and hours in viral wheeze.



Telling the difference is important, because although a trial of inhalers is another way of discriminating between the two, giving inhalers to infants with bronchiolitis will potentially tire them out. It is all too easy to fall into the trap of trying inhalers for all wheezy babies. The trouble with that is that there is a potential for you to be misled into believing that the bronchodilator has worked. If a trial of inhalers is undertaken in an under 12 month old, the child should be reviewed shortly afterwards looking for strong evidence of benefit.

## Treating Viral Wheeze

The treatment of a viral wheeze is all about one thing: -agonists. How that is done depends on the severity of the presentation.

\*Your department will have a guideline which you should use. This is provided to give you an at-a-glance understanding of how things should go.

## Coughing, Wheezy and Stridulous Children

Inhaler via spacer is preferable to nebuliser in all situations other than the hypoxic child.

Chest X-ray is not usually helpful and should be avoided unless it is a severe episode or there is a specific indication.

### Management of Viral Wheeze in the ED (Brief overview)\*

Salbutamol 6-10 puffs via spacer.

If good response, child may be discharged with TTO inhaler and spacer.

Information leaflets are really useful

No response?  
→ Escalate treatment and review diagnosis

“Hour of power”:

Salbutamol 10 puffs via spacer repeated at 15-30 minute intervals until 3 x 10 puffs given

Observe and reassess throughout

A good response may lead to discharge

A moderate response may need more time on hourly inhalers

Deterioration/ no response? → Escalate treatment and review diagnosis

Get help - if in doubt get the crash team

Oxygen

Give continuous nebulised bronchodilators as per the BTS guideline for acute severe asthma in children<sup>7</sup>

If deteriorating or failing to respond, start intravenous therapy as per guideline (salbutamol, aminophylline, magnesium, hydrocortisone)

Steroids are given for severe episodes but otherwise are not routinely used as the evidence does not support this practice.

#### Perplexing Cases 2: A not wheezy 3 year old

A 3 year old presents with increased work of breathing and a coryzal illness. They have a history of viral wheeze episodes but on auscultation there is no wheeze, and there is air entry throughout.

Odds are, this is still a case of viral wheeze.

Although other diagnoses should be considered, one thing that you can try here is 10 puffs of salbutamol. If you are right, a wheeze might well appear as the bronchospasm improves slightly allowing a different musical note.

# Coughing, Wheezy and Stridulous Children

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## Viral Wheeze vs Asthma

There is a risk that multiple episodes of viral wheeze will lead to a misdiagnosis of asthma. Many children have several episodes of viral wheeze. Asthma is rare in the under five year old age group. If asthma is suspected in an under five year old it is usually on the basis of repeated episodes of wheeze that are not related to viral illnesses. Prolonged cough without wheeze is unlikely to be asthma.

## Treating Asthma

Asthma in children should be treated as per BTS guidelines<sup>7</sup>. The important things to recognise are:

- Failure to respond to treatment is a very dangerous scenario
- If failing to respond to treatment, consider other diagnoses or comorbidities
- Anaphylaxis
- Pneumothorax
- Cardiac causes (e.g. Myocarditis)

In most cases of failure to respond to treatment, what is needed is more treatment.

## Perplexing Cases 3: A 2 year old with a cough for 2 months

A 2 year old presents with a cough that has gone on for two months. They had a particularly bad URTI at the beginning of the cough so bad that the child was vomiting after they coughed. Now that the cough has continued the parents think that their child might have asthma.

Prolonged cough without wheeze is rarely asthma and in a two year old the odds are massively against it. Post infective cough can take a long time to resolve and this case sounds like it could have been pertussis, which can lead to months of coughing. Very important: If a child has a daily (very important distinction from a cough that comes and goes) cough for 8 weeks, they should be referred for an

outpatient assessment. Earlier referral through a more urgent route is indicated if there are red flags such as weight loss, haemoptysis or contact with TB.

## Croup and other similar problems

The vast majority of children presenting with upper airways noises have croup. If a child goes from having a runny nose to having a barking cough, the diagnosis doesn't need too much thought it's going to be croup. While there are differential diagnoses for stridor, these alternatives usually stand out. If there has been a choking episode, then foreign body needs to be the presumed diagnosis. If the child is more unwell than expected for an uncomplicated viral infection, you should suspect epiglottitis, bacterial tracheitis or diphtheria.

Croup management depends on the severity of the episode. This is often categorised using the Westley croup score<sup>8</sup>.

\* Your department will have a guideline which you should use. This is provided to give you an at-a-glance understanding of how things should go. RCEMLearning has a blog on croup [here](#).

## Perplexing Cases 4: A squeaky 4 week old

A four week old baby presents because their parents have noticed noisy breathing, especially after feeds and when lying down. They are well, thriving and examine normally. The parents show you a video of the infant asleep and you can hear an inspiratory noise that sounds like a squeaky toy. This is very likely to be laryngomalacia a floppy larynx. The problem usually starts in the first few days after birth and may be exacerbated by reflux. In the majority of cases the problem resolves by itself as the child gets older. However, most ENT specialists recommend that all cases should be assessed by them in outpatients to exclude rarer causes of stridor in babies, such as haemangiomas and tracheal stenosis.

# Coughing, Wheezy and Stridulous Children

## Summary

Respiratory tract problems are the most common paediatric presentation to the ED. Hopefully, this gives you a good overview and understanding of what you're looking for and how to treat each condition. Here is a really basic and oversimplified summary of how to recognise the difference between them all:

Condition	Fever	Unwell	Recession/tachypnoea	Usual age range*	Cough	Wheeze
Viral URTI	Yes	With fever only	No	Any but uncommon under 3/12	Dry or productive	No
Bronchiolitis	Usually low grade	Only if severe	Yes	Birth -12 months	High pitched	Yes
Viral Wheeze	Usually low grade	No	Yes	1-7 years	Tight	Yes
Asthma	No	No	Yes	Over 5 yrs old	Yes	Yes
Croup	Usually low grade	Only if severe	If moderate	6 months to 6 years	Barking	No (may have stridor)
Pneumonia	Yes	Yes	Yes	Any age	Variable	No

\*These conditions will also be seen outside of these age ranges, much less commonly.

And here are the key differences in evidence based treatment:

Condition	Antibiotics	Ipratropium*	Salbutamol	Steroids
URTI	Rarely indicated	No	No	No
Bronchiolitis	No	No	No	No
Viral Wheeze	No	No	Yes	No
Asthma	No	Adjunct for severe	Yes	Yes
Croup	No	No	No	Yes
Pneumonia	Yes	No	No	No

# Coughing, Wheezy and Stridulous Children

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\*There is a myth that ipratropium is the most appropriate inhaler under the age of 12 months.<sup>9,10</sup> This myth leads to the use of ipratropium for children with bronchiolitis (where ipratropium has been shown to be ineffective<sup>4</sup> and for children who have viral wheeze but are under the age of 12 months old. If the clinical picture is viral wheeze, salbutamol is the treatment of choice.

And if you're not sure, there's a great audiovisual guide to Winter Wheezes [here](#).

## Author:

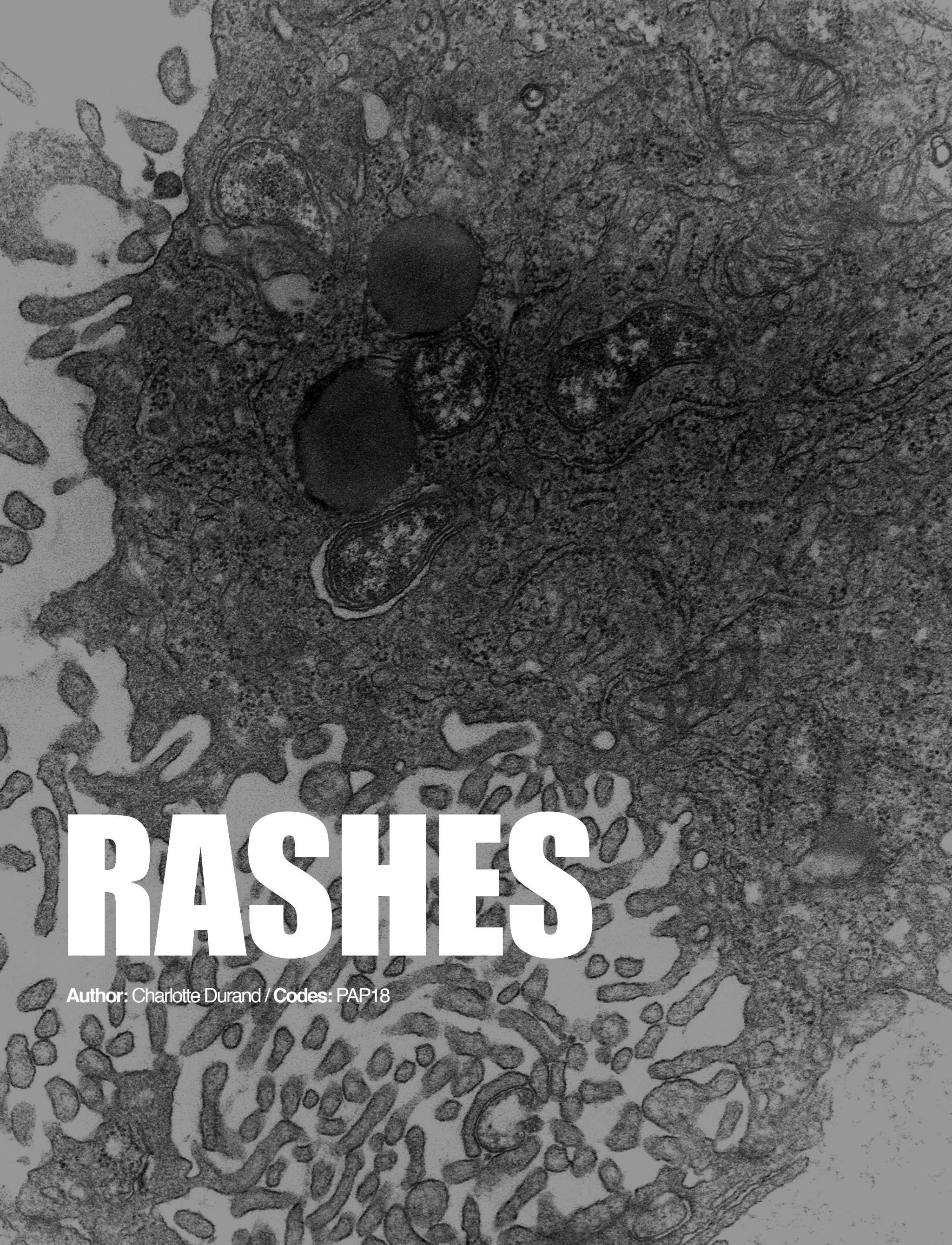
Edward Snelson, Consultant in Paediatric emergency Medicine at Sheffield Children's Hospital. Massive thanks to Caroline Worsley for checking this through and adding the perspective of a trainee in Emergency Medicine.

Edward runs the site [gppaedstips.blogspot.com](http://gppaedstips.blogspot.com) (which is not just for GPs), is an excellent PEM physician and one to [follow on twitter](#).

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# RASHES

Author: Charlotte Durand / Codes: PAP18



# JUST TO COME AND CHECK A RASH FOR

**Editor's Note: Rashes are difficult to diagnose in both children and adults. The key is to be able to identify the important types (anaphylaxis urticaria, meningitis, non-accidental injury), and then manage to learn about the rest slowly. If a child is otherwise well – you'll send them home with advice. If a child is poorly – they're being admitted.**

The cause of the rash? Well – saying it's a viral rash is safe 90% of the time as after all, measles, rubella, chicken pox etc. are all viral. And, kids are more prone to just getting Rashey with their other illnesses. Safety net carefully. I quite like [PCDS](#) websites as it gives you a list of differentials based on site symptoms or morphology – really useful!

As a Paediatric ED consultant I get asked by the junior doctors many times a day "just to come and check a rash for me". Often these will be innocent common rashes and we can reassure the parents and discharge the family home. Other times we won't know what the rash is, but if we know the common rashes then this gives us a fighting chance of being able to give the correct diagnosis.

At the other end of the spectrum it is vital to be aware of the more serious rashes which can indicate severe illness in babies and children.

I am going to go through some typical cases of paediatric rashes (with pictures) with the aim of giving you a good knowledge base when seeing these patients. The first section is regarding

# Rashes

neonates and the second section about the “classic” rashes seen in older babies and children.

## Part 1 – Neonates

I think it's safe to say that most ED doctors have a slight tachycardia when faced with newborn babies with spots. They are usually accompanied by anxious (and exhausted) new parents who may or may not have done a google search and have now come to you with their worries!

### Case 1

To start, you are asked to see a 3 week old baby with spots on their face, trunk, arms and legs. The spots have red bases with yellow pustular centres. The baby is feeding well and parents have no other concerns.

This is toxic erythema of the newborn. It occurs in 30-70% of full-term infants, and is therefore the most common pustular eruption in newborns. The aetiology is unknown. There are multiple yellow or white erythematous macules and papules (1-3mm in diameter) which can rapidly progress to pustules on an erythematous base. The lesions are distributed over the trunk and proximal extremities, but spare the palms and soles. It may be present at birth, but usually appears within 24-48 hours. Lesions typically resolve in 5-7 days, but may last several weeks.

Diagnosis is typically clinical, but can be confirmed by microscopic evaluation – numerous eosinophils. No treatment is needed.

These should not be confused with whiteish, raised papules on the gums.



Images: used with gratitude from [www.dermnetnz.org](http://www.dermnetnz.org) with use from creative commons

These 1-2mm whitish yellow papules that are found on the nose, cheeks, chin, and forehead are **Milia**. These typically resolve in the first few weeks of life. They are secondary to the retention of keratin and sebaceous material in the pilaceous follicles. These lesions disappear spontaneously.

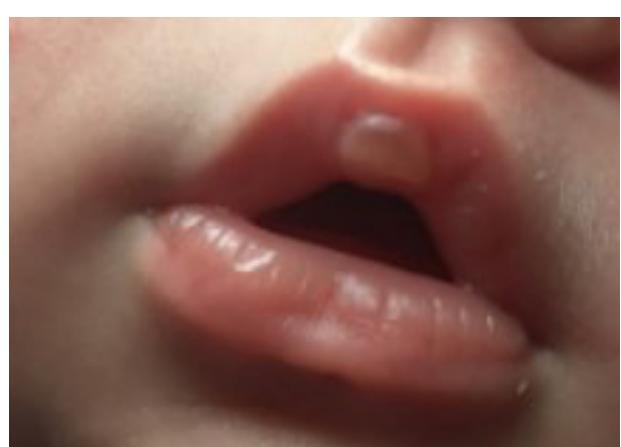
## Rashes



Milia in newborns may also occur on the hard palate (Bohn's nodules) or on the gum margins (Epstein's pearls) as seen on the five week infant in the image above.

### Case 2

You are asked to see a 2 day old baby as mum has noticed blisters on her lips and forearms. The baby is feeding well and there are no other concerns.



This is a diagnosis of exclusion – these are **sucking blisters**, i.e. oval, thick-walled vesicles or bullae that are filled with sterile fluid. Lesions may have erosion or crusting present. They are unilateral or bilateral and are usually located on the dorsal aspect of the wrists, hands, or fingers of neonates who are noted to suck excessively at the involved regions.

The mother of the baby also comments that the lesion keeps going a funny colour when on its side but then is back to normal within 5 minutes. This is classical of a Harlequin colour change, observed when an infant is lying on their side, characterized by intense reddening of the dependent side and blanching of the non-dependent side, with a demarcation line along the midline. Lasts seconds to 20 minutes and resolves with increased muscle activity or crying. It affects 10% of newborns, and is entirely benign. Aetiology unknown.

# Rashes

## Case 3

You are asked to see a 2 week old baby as the parents are concerned the baby has a large bruise on his lower back, this was not previously noted on the baby check. The mother is Chinese and dad is Caucasian.

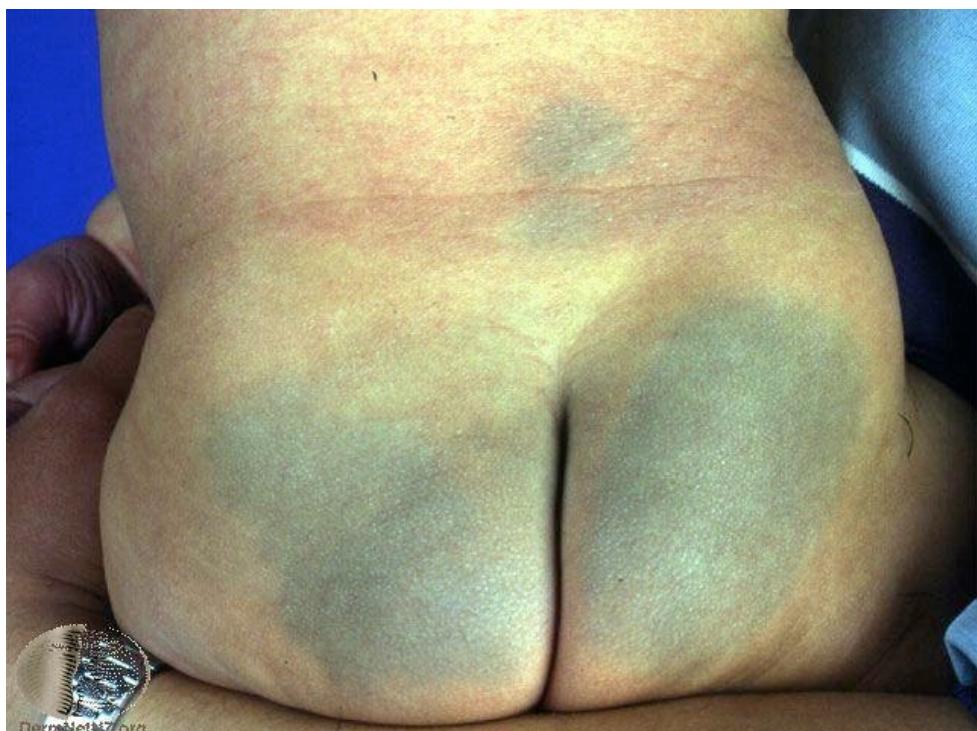


Image: used with gratitude from [www.dermnetnz.org](http://www.dermnetnz.org) with use from creative commons

Lumbosacral dermal melanocytosis or **Mongolian spot** is the most frequently encountered pigmented lesion in newborns. It is very common in Asian, African American, and Hispanic neonates. Very uncommon in Caucasian babies but does occur.

These congenital blue-grey pigmented macules with undefined borders can have a diameter of 10cm or more. Lesions are most commonly found in the sacro-gluteal region, or in the shoulders. They are completely benign lesions and usually fade during the first or second year of life. Mongolian spots can sometimes be difficult to differentiate from bruises and if there are concerns these may be bruises in a non-ambulant baby then senior advice should be sought for consideration of non-accidental injury or a bleeding disorder.

## Case 4

Next up is a 3 week old baby with a few spots on his face the previous day, now has peeling/raw areas in

hands, groin and axillae with some lymphadenopathy. Seems sleepy and not waking for feeds.



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This baby needs admission for IV access and IV antibiotics as per local protocol for likely **staphylococcal scalded skin syndrome**.

## Case 5

2 week old baby, mum noticed a few spots on the baby's face the previous day, the baby appears ok but more quiet than usual. Dad has had a recent



# Rashes

cold core. When you examine the baby they have a few vesicular looking spots on their trunk, a temperature of 35.8 and appear very quiet when examined.

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**Neonatal herpes simplex virus** is usually transmitted during delivery or through transplacental transmission of the virus. Contact with family members with cold sores also accounts for some cases, HSV 2 causes more cases than HSV 1. It generally presents in weeks 1-2 of life but may be later. Neonates may present with local or disseminated disease. Skin vesicles are common with either type, occurring in about 55% overall. Other signs are often non-specific but include temperature instability, lethargy, hypotonia, respiratory distress, apnea, and seizures. Neonates without skin vesicles usually present with localised CNS disease. In neonates with isolated skin or mucosal disease, progressive or more serious forms of disease frequently follow within 7 to 10 days if untreated.

Incidence estimates range from 1/3,000 to 1/20,000 births. Diagnosis is by viral PCR of vesicular fluid (or CSF), immunofluorescence, or electron microscopy. Treatment is with high-dose parenteral acyclovir and supportive care. It has a high mortality and significant morbidity, but IV Acyclovir decreases the mortality rate in CNS and disseminated disease by 50% and increased the percentage of children who develop normally from 35-50% to 80%. The mortality rate of untreated disseminated disease is 85%; among neonates with untreated encephalitis, it is about 50%. Without treatment, at least 65% of survivors of disseminated disease or encephalitis have severe neurologic sequelae. Death is uncommon in those with local disease but without treatment these will progress to disseminated disease or CNS disease that may not be recognised.

## Part 2 – Older Babies and Children

### Case 1

7 year old boy, unwell for last few days with coryza, fever and conjunctivitis. Miserable and off food and drink. Up to date with immunisations.



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# Rashes

## Paramyxovirus (Measles)

### At risk:

- unvaccinated preschool-age children
- older children in whom vaccination failed ie if they have been vaccinated they can still get measles

Cases tend to present in late Winter / Spring. Patient are infectious 1-2 days before prodrome to 4 days after onset of rash. The incubation period is 8-10 days, and normally asymptomatic until the 2-3 day prodrome of fever, malaise, anorexia, conjunctivitis, coryza, & cough. They may present with **Enanthem – Koplik's spots** which are 1-3 mm whitish elevations with erythematous base, typically buccal mucosa opposite molar teeth.

The rash is a maculopapular, blanching rash that begins on the face, spreads cephalocaudally and centrifugally to involve the neck, upper trunk, lower trunk, and extremities.

The cough may persist for 1-2 weeks. Fever beyond the third or fourth day of rash suggests complication.



### Complications of measles:

- Otitis media
- Bronchopneumonia
- Croup
- Encephalitis
- Myocarditis
- Pericarditis
- Subacute sclerosing panencephalitis (SSPE) years later

There has been a recent outbreak of measles in adults, so it's worth knowing about. Check out our [podcast](#) or [reference guide](#)

### Case 2

5 year old girl, fever and unwell for last few days, has sandpaper type rash on trunk with an inflamed and red tongue.



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This is **scarlet fever**, caused by Group A beta-haemolytic Streptococcus. Those at risk: <10 years (peak 4-8 years). Typically occurs in late Autumn, Winter, Spring, likely due to close contact indoors in school. The incubation period is 2-4 days. It presents

## Rashes

with abrupt onset fever, headache, vomiting, malaise, sore throat. The infectious period is during the acute infection, and gradually diminishes over weeks. [Northern Ireland](#) and the [HPA](#) suggest excluding a child with scarlet fever from school until 24 hours after antibiotics started.

Examination findings include a bright red oral mucosa, palatal petechiae, tongue changes (strawberry tongue). The rash appears 12-48 hours after start of fever, usually starts below the ears, neck, chest, armpits & groin. It spreads to the rest of body over 24 hours and by about the 6th day of infection the rash starts to fade. Peeling, similar to sunburn, most prominent in the armpits, groin, fingertips (and/or toes). May continue up to 6 weeks.

Treatment is supportive, with antibiotics to reduce the infective period.

Purulent complications include otitis media, sinusitis, peritonsillar/retro-pharyngeal abscesses, Cervical adenitis. Non-suppurative sequelae include rheumatic fever, acute glomerulonephritis.

### Case 3

A 4 year old boy presents with a 5 day history of fever, spiking up to 40. They are miserable +++ with conjunctivitis, a red sore tongue, peeling fingertips, rash.



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(A) Bilateral, non-exudative conjunctival injection with perlimbal sparing. (B) Strawberry tongue and bright red, swollen lips with vertical cracking and bleeding. (C) Erythematous rash involving perineum. (D) Erythema of the palms, which is often accompanied by painful, brawny edema of the dorsa of the hands. (E) Erythema of the soles, and swelling dorsa of the feet. (F) Desquamation of the fingers. (G) Erythema and induration at the site of a previous vaccination with Bacille Calmette-Gurin (BCG). (H) Perianal erythematous desquamation.

This is **Kawasaki's disease**. Incomplete kawasaki exists, but to formally diagnose complete Kawasaki Disease, you need 5 days of fever (usually  $>38.5$  c, unremitting and not responsive to antipyretics) **AND**

# Rashes

## 4 of:

- Bilateral non-exudative conjunctivitis (90% have this)
- Erythema of the lips and oral mucosa
- Polymorphous rash
- Extremity changes (oedema and desquamation usually into second week of illness)
- Lymphadenopathy (usually anterior cervical nodes over SCM)
- (Irritability)

Blood tests must be taken, and characteristic lab results:

- CRP
- ESR
- Normocytic, normochromic anaemia
- Pyuria (urethral in origin)

## Case 4

12 year old boy, non-English speaking family from Eastern Europe. Unclear vaccination status. Fever, nausea and generally unwell. Rash appeared today.



This is **Rubella virus** – at risk groups are unvaccinated adolescents. It often presents in Late Winter / early Spring, Incubation period: 14-21 days, Infectious period: 5-7d before rash to 3-5d after rash. Asymptomatic infection in up to 50%.

Prodrome in children is absent to mild. Adolescents & adults tend to have fever, malaise, sore throat, nausea, anorexia, painful occipital lymphadenopathy. Arthralgias/arthritis may be present in the older patients, and there is occasional peripheral neuritis, encephalitis, thrombocytopenic purpura (rare).

The rash is pinpoint, pink maculopapules that first appear on the face, spread caudally to trunk & extremities – and become generalised within 24h.

## Case 5

5 year old, slightly unwell. Mum noticed a rash on face this morning.



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## Rashes

This is **slapped cheek/ erythema infectiosum** caused by Human Parvovirus B19. At risk: school-age children, sporadic outbreaks throughout the year. Incubation period: 4-14 days. Non-specific prodromal symptoms, e.g. fever, coryza, headache, nausea & diarrhoea. Infectious period: up until onset of the rash.

The rash can be very itchy, particularly on the soles of the feet. When occurring in adults (particularly women) can involve painful, swollen joints and malaise.

### Case 6



This is **Roseola Infantum exanthem** caused by Human Herpes Virus 6 (and 7). At risk: 6-36 months (peak age 6-7 months). Sporadic outbreaks throughout the year. Incubation period: 9 days. Prodrome: fever for 3-4 days, can be very high and is a common cause for febrile convulsions. Infectious period: asymptomatic persistent infection – virus intermittently shed into saliva throughout life. Abrupt defervescence with appearance of rash.

The rash is a blanching macular or maculopapular rash that starts on neck & trunk, spreads to face & extremities.

### Case 7



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**Varicella zoster virus (chicken pox)** family herpesviridae. At risk: young children, sporadic outbreaks, incubation period: 10-21 days. Prodrome: Ranges from asymptomatic to fever, malaise, cough, coryza & sore throat, spread via respiratory droplet and vesicle fluid. Infectious period: 2 days before to approximately 5 days after onset of rash, when the spots have scabbed over.

The rash has characteristic crops of macules, papules and vesicles.

Increased risk in adults, neonates & immunocompromised. Secondary bacterial infection in 5-10% – of these otitis media in 5%, pneumonitis,

## Rashes

encephalitis , cerebellar ataxia (1:3000, lasts 2-3 months), hepatitis. Other complications include: Reye syndrome, Guillain-Barre, nephritis, carditis, arthritis, orchitis, uveitis.

### Case 8

3 year old with vesicular rash on chest, 3 spots in dermatomal distribution, low grade fever and rash seems painful but otherwise well.



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**Reactivation of latent VZV (shingles)** in sensory ganglia. Elderly, immunocompromised and children who had chickenpox in utero or in first year of life. Prodrome is unusual in children.

### Case 9

A 15 year old boy with widespread maculopapular rash, sore throat and fever.



This is **infectious mononucleosis (EBV)** which presents with the triad of fever, tonsillar pharyngitis and lymphadenopathy, often with palatine petechiae. Generalised maculopapular, urticarial or petechial rash occasionally seen. Can cause Gianotti-Crosti syndrome.



This itchy maculopapular rash appears on extensor surfaces and pressure points 7 to 10 days after treatment with beta-lactams such as amoxicillin and cephalosporins. This rash indicates a hypersensitivity reaction to the antibiotic. It is not a true allergy and does not occur if the antibiotic is given later on in the absence of EBV infection.

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### Case 10

2 year old with painful lesions in mouth (refusing to drink) also seems to have spots on hands and feet.



## Rashes



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### Pityriasis Rosea

Probably viral, HHV7 &8 implicated, not proven. Seen in spring, autumn & winter. At risk 10-35 years. Mild prodrome of malaise, nausea, anorexia, headache and low grade fever.

### Case 12



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This is **hand foot and mouth disease** due to coxsackie A16. Preschool age children are at risk, highly contagious. Incubation period of 4-6 days. Prodrome (1-2 days before the rash) is fever, anorexia and a sore mouth. The spots can be very painful and tender to touch.

### Case 11



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This is **HenochSchnlein Purpura (HSP)**. The distribution of the rash is important- it's normally on the bottom and on the back of the legs. If atypical distribution or the child is unwell, consider meningococcaemia, thrombocytopenia, or other rare

## Rashes

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vasculitides. HSP often presents with the “classic” triad of joint pain, abdominal pain and rash.

**Joint Pain:** Swelling and arthralgia of large joints are often the patient’s main complaint. Generally pain resolves spontaneously within 24-48 hours.  
**Abdominal pain:** Uncomplicated abdominal pain often resolves spontaneously within 72 hours. Serious abdominal complications may occur including intussusception, bloody stools, haematemesis, spontaneous bowel perforation, and pancreatitis so complete a thorough examination.

**Renal Disease:** Haematuria is present in 90% of cases, but only 5% are persistent or recurrent. Less common renal manifestations include proteinuria, nephrotic syndrome, isolated hypertension, renal insufficiency and renal failure (<1%). Renal involvement may only present during the convalescent period.

Subcutaneous oedema (scrotum, hands, feet, sacrum): This can be very painful.

Rare complications – pulmonary and CNS involvement.

Investigations should include: Urinalysis (for blood and/or protein), BP, consider bloods (FBC, U&Es, clotting). Generally supportive management but steroids can be considered.

Hopefully this has given you a background of common neonatal rashes and the classical childhood exanthems and will mean the next time you pick up the card of the baby with a rash you will go and see them with a little more knowledge and confidence.

A close-up photograph of a young boy with light brown hair and blue eyes. He is wearing a red and teal striped shirt. His hands are clasped together behind his head, with his fingers digging into his scalp, suggesting he is experiencing a headache. The background is a plain, light-colored wall.

# HEADACHES

**Authors:** Tessa Davis, Henry Goldstein, Ben Lawton & Andrew Tagg / **Codes:** PAP12

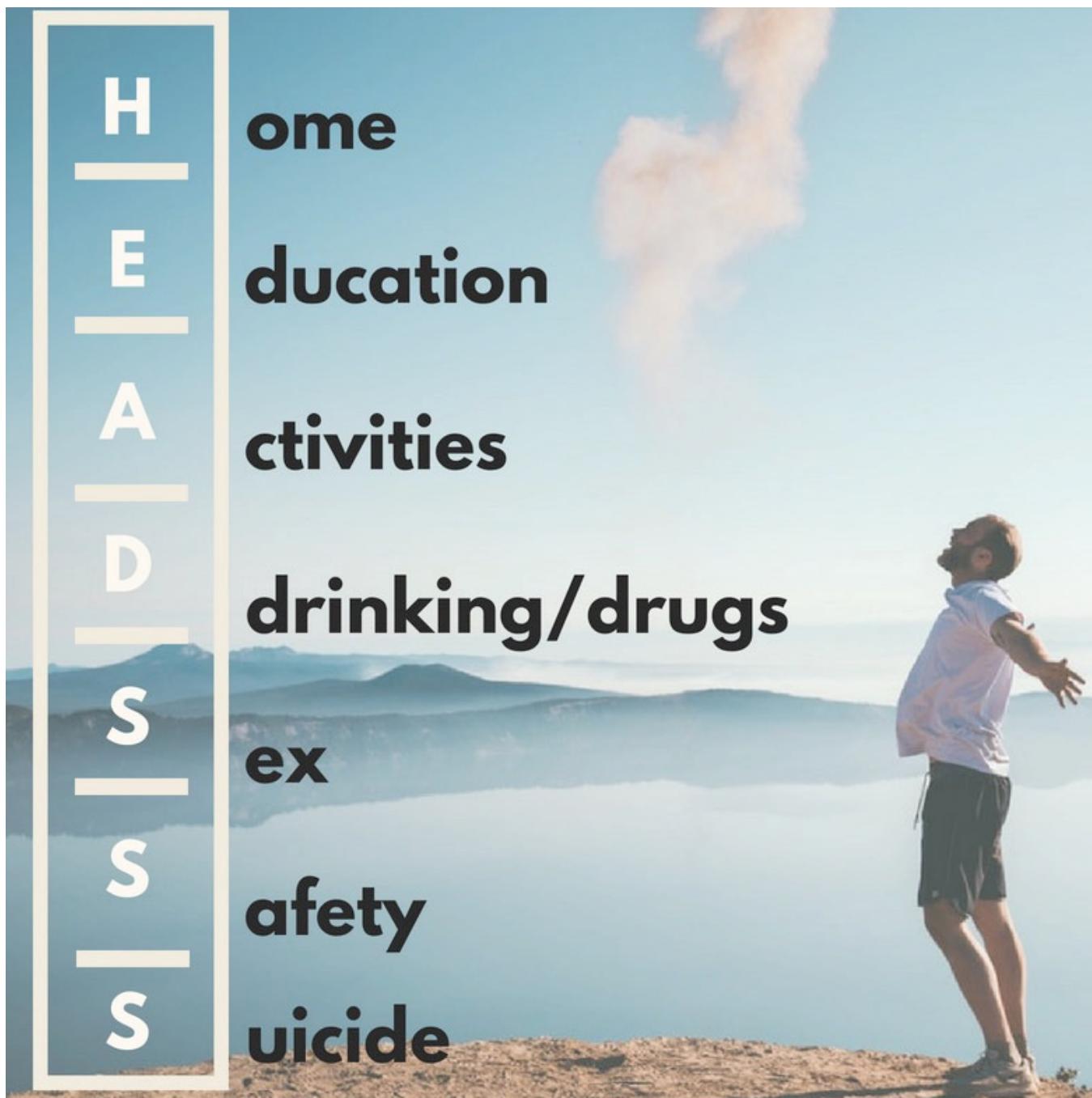


Figure.1 [HEADSSS](#) screen in older kids to look for a cause.

# KNOW THE RED FLAGS

Headaches are one of the most common presentations to ED and may be primary or secondary. Migraine is the most common type of primary headache, but the majority of headaches are benign in nature and require no investigations

This is an approach to the child presenting to ED with headaches. We want to help you differentiate between those benign ones that just require simple analgesia and reassurance and those that require further investigation.

## History

Getting a good history about the nature and type of the headache is crucial. This will include working out what the course of the headaches are i.e. how frequent they are, when they started, any recent change in frequency. Then ask for a description of the actual headache i.e. was there an aura beforehand, where is the pain, how long does it last, what are the associated symptoms (nausea, vomiting, dizziness, visual disturbance, abdominal pain), what are the aggravating and relieving factors?

# Headaches

It's important to ask about any neurological signs during the attack e.g. weakness, numbness, loss of sensation. Also ask specifically about medications taken and any family history of headache or migraine.

## Examination

The examination should focus on looking for causes of headache. Most of the time there will be nothing to find. It should include an overall growth and developmental assessment, coupled with a head circumference measurement in a younger child. Look for potential secondary causes such as signs of sinusitis, dental problems, otitis media, TMJ dysfunction. Whilst fundoscopy in a young child is pretty much impossible without special equipment you must check their blood pressure. The core part of the examination will be neurological cranial nerves, limb examination, gait, and cerebellar examination.

## Know the red flags

We all worry about missing the child with a brain tumour, and it's important to know the red flags.

[HeadSmart](#) has a wonderful website aiming to provide early recognition of brain tumours and provides advice on concerning features.

You should have a higher index of suspicion if the headache is worse in the early morning, especially when it is associated with vomiting or made worse by coughing or straining (this suggests raised intracranial pressure). Any focal neurological signs during or after the headache should prompt consideration for further investigation too, as should an abnormal neurological exam. If the headache is associated with confusion or reduced consciousness it is much less likely to be a benign primary headache. Occipital headaches are also uncommon in children so should prompt suspicion as should persistent headaches in children under 4 years of age.

## Migraine

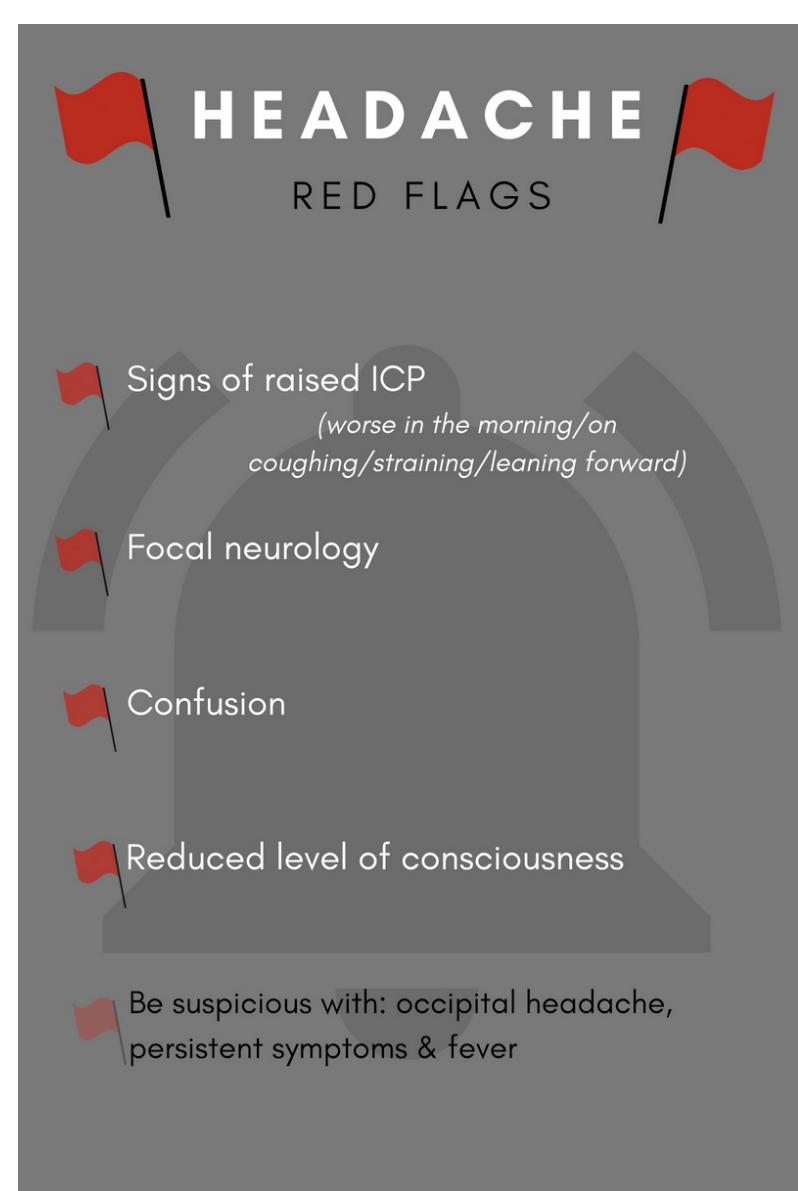
There are two major types of migraine migraine without aura and migraine with aura.

Migraine without aura is a headache with associated symptoms lasting 4-72 hours. Migraines are often associated with photophobia, the pain is commonly fronto-temporal and can be unilateral. It can feel like a throbbing/pulsing pain and children can experience nausea. There is an ICHD-3 classification which gives diagnostic criteria for migraines:

### ICHD-3

#### Diagnostic criteria:

- A. At least five attacks<sup>1</sup> fulfilling criteria B–D
- B. Headache attacks lasting 4–72 hours (when untreated or unsuccessfully treated)<sup>2,3</sup>
- C. Headache has at least two of the following four characteristics:
  1. unilateral location
  2. pulsating quality
  3. moderate or severe pain intensity
  4. aggravation by or causing avoidance of routine physical activity (e.g. walking or climbing stairs)
- D. During headache at least one of the following:
  1. nausea and/or vomiting
  2. photophobia and phonophobia
- E. Not better accounted for by another ICHD-3 diagnosis.



# Headaches

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Migraine with aura is where the child gets transient focal neurological symptoms that either come before or during the headache. Typically there are visual, sensory, or speech symptoms.

When taking the history from a child with migraines, make sure to ask about the family history and also to see if the child/family can identify any triggers e.g. chocolate, MSG, citrus, menstruation.

## Tension headaches

These are usually described as a band-like pain that is persistent but not progressive. Tension headaches may be more common in children undergoing stressful life events, such as parental separation or exams – consider this when you are assessing the child. Use the **HEADSSS** screen in older kids to look for a cause. (Figure.1)

Most tension headaches are managed by reassurance, reducing any stressors, and simple analgesia (paracetamol and ibuprofen).

## Cluster headaches

These are less common but can occur in children. They present as (strictly) unilateral pain in or around the eye or the temporal region. They can last for up to three hours, and can occur as frequently as eight times per day. Often there are associated unilateral facial signs – conjunctival injection, rhinorrhoea, lacrimation, or facial sweating.

Occasionally the child can be treated with triptans for prophylaxis, otherwise they can try simple analgesia (paracetamol and ibuprofen).

## Analgesic headaches

These are also uncommon in children and occur when children take regular, daily medication (e.g. paracetamol) for their headache. The headache should resolve within a few weeks of stopping the medication.

## Raised intracranial pressure

We discussed above signs of raised intracranial pressure (morning symptoms).

## Trauma

Always make sure to ask if there has been any recent trauma it's possible that the family hadn't connected the two and therefore forgot to mention it previously. This could be signs of an intracranial bleed or could be part of a concussion.

## Meningitis

This child is often unwell with irritability, photophobia, and neck stiffness though the classical Brudzinskis and Kernig's signs that we all learned about in medical school are very non-specific. Children may have meningitis without these classic signs so be conscious of considering this diagnose in children with irritability and particularly reduced consciousness.

## Treatment

In most children, simple analgesia with paracetamol and ibuprofen are well-tolerated and effective treatments for headaches, especially for migraines. Anti-emetics may be considered if the child gets lots of nausea and vomiting with a migraine (ondansetron or prochlorperazine in older children).

Triptans can be used for treatment of migraine too (can have nasal sumatriptan) as a stat does in ED in children over 12 years of age.

(More serious causes and those with red flag symptoms will need investigation and treatment accordingly).

## Consider the social side

The impact of the headaches on the child's daily life is important, and we know that stress can contribute to headaches too. You should ask about family stressors, school progress, and friends.

Identifying stress or conflict can help reduce headaches, and also trying to pinpoint what the headache triggers are can allow avoidance strategies to be put in place (e.g. avoidance of caffeine, chocolate, extreme tiredness, missing meals). If they get recurrent headaches it is worth asking the parents to keep a headache diary, listing

## Headaches

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intensity and nature of the headaches as well as the daily diet. This may help you or the specialist make links otherwise not appreciable.

Whilst headaches can be distressing for both the patient and the parent alike they are very rarely serious. In the emergency department our role is to rule out any serious causes, provide reassurance and only investigate when clinically appropriate.

### **About the authors:**

*These fantastic four are the creators of the website [dontforgetthebubbles.com](http://dontforgetthebubbles.com). If you go through your PEM rotation without regularly visiting the [dontforgetthebubbles](http://dontforgetthebubbles.com) website, you are missing a trick. This is an excellent resource for acute paediatrics, and has a [bubble wrap](#) section with regular blogs on emerging research. The team also hold an annual conference on a range of acute paediatric topics which is highly recommended. It is usually held in Australia, but the good news is that it will be in the UK for the first time on 17th-19th June in London.*

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# **HEAD INJURY**

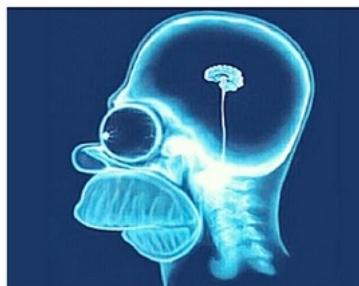
**Author:** Ashleigh Lawrence-Ball / **Codes:** PMP4

### CT head?

Immediately in:

1 of:

- ★ NAI
- ★ Seizure (& no epilepsy)
- ★ Initial assessment:  
GCS <14 or <15 in under 1s
- ★ GCS <15 at 2 hrs from injury
- ★ Sign of BOS#
- ★ Focal neuro deficit
- ★ Under 1 & bruise/swelling/lac >5cm



>1 of\*:

- ★ LOC >5min
- ★ Abnormal drowsiness
- ★ >3 episodes of vomiting
- ★ Dangerous MOI
- ★ Amnesia >5min

\* if only 1: observe for 4 hrs and CT if more vomiting, abnormal drowsiness or GCS <14

Figure.1 NICE CT criteria for children:

# INNOVATE, EXTRAPOLATE AND

**Walk into any Emergency Department in the country and you are bound to find at least one child waiting to be seen with a head injury — it's one of the commonest presenting complaints to EDs in the UK. Approximately 295000 children under the age of 16 will be seen each year (which is why we decided to have an induction blog on it).**

Thankfully, the majority of paediatric head injuries are trivial, but 10% will be classed as moderate to severe. Head injuries account for 30% of traumatic childhood deaths in the UK. The most common

causes of moderate to severe head injuries in childhood are falls (in infants) and road traffic collisions (in older children).

Children have several anatomical and physiological differences to adults that make them more likely to sustain head injuries and more complex to assess. In this blog, we'll go through those differences, talk about the assessment of the child with a head injury and then discuss the treatment of these children, depending on the severity of their head injury.

# **Head Injury**

---

## **General principals for assessing children:**

Remember that children in hospital are often scared and upset, and don't forget their parents (who will also be scared and upset). Children often regress a stage when they present to hospital, so getting the parents onside is really important. Be calm, be friendly and make sure both the parents and child know what you're going to do before you do it. Assessment of the unwell or injured child often involve things that look unpleasant to the outside world (for example, assessing for a pain response), and it's very easy to lose the trust of parents or carers if you're not careful.

Most of the children you will assess will have a minor head injury. Remember proportionality – falling a long way for a child is not the same as for an adult, and vice versa. If a toddler falls their own height – it's not really a long way. And toddlers will fall their own height A LOT, they are fast and nosy.

The way they fall is also different, due to proportionality. A toddler does not fall down stairs in the same way as adults, in that they don't fall down in one projectile movement, but tumble downstairs, meaning they have a collection of small falls, reducing the mechanism of injury (MOI).

You will also have to innovate, extrapolate and economise how you assess them – “head, shoulders, knees and toes” is a great way to assess most of their motor function!

If the child has presented with a head injury as part of a major trauma remember your (C) ABCDE and work systematically. You should always have plenty of friends around to help as part of the major trauma team.

If the child is awake and the parents are present, make sure the child can see them. If the situation allows, let the parent hold the child's hand and offer as much reassurance as possible they will be the best at calming their child down. If the parent is too distressed, or the acuity of the situation means they need to stand away from the bed, assign a member of staff to keep talking to them and keep them calm as this frees you up to deal with the medical side of things.

## **Why children are not little adults:**

Children with have a few important anatomical differences to remember when you see them the ED. Here's a quick run down of what you need to know – for the longer version, check out this blog post we released a while ago.

- Their heads are proportionally bigger to the rest of their bodies than adults, this means it more likely to get injured in a trauma.
- The subarachnoid space is thinner, meaning there is less “cushioning” during any impact.
- The cranial sutures don't fully close until 12-18 months, so in young children there's an increased tolerance for expanding intracranial contents (e.g. haematomas, oedema), which can go unrecognised. Check the fontanelles in all young children presenting with a head injury.
- The unfused cranial sutures also mean a large volume of blood can collect intracranially, leading to hypovolaemic shock.
- Young children can have up to twice the cerebral blood flow of an adult, making them more susceptible to secondary brain injury, particularly due to hypoxia.
- Children are more likely to vomit following a head injury, regardless of their intracranial pressure, and this is reflected in the NICE CT scanning criteria, which we'll address later.

# Head Injury

## GCS assessment of children:

As you can imagine, GCS assessment of children, particularly those who are pre-verbal is tricky. You can use an AVPU score as a general guide, but the NICE criteria work off of a formal GCS. Below is a table for grading a young child's GCS. For children over 4, you can use the adult GCS.

Age <4:

<b>Eye opening:</b>	
-Spontaneous	4
-To verbal stimuli	3
-To pain	2
-None	1
<b>Best motor response (if pre-verbal, use best grimace response):</b>	
-Spontaneous / obeys command	6
-Localises to pain or withdraws to touch	5
-Withdraws from pain	4
-Abnormal flexion to pain (decorticate)	3
-Abnormal extension to pain (decerebrate)	2
-No response	1
<b>Best verbal response:</b>	
-Alert, babbles and coos words to normal ability	5
-Less than usual words, spontaneously irritable cry	4
-Cries only to pain	3
-Moans to pain	2
-No response	1

## Best grimace response for pre-verbal children:

Spontaneous normal facial or oromotor activity	5
Less than usual spontaneous activity or only responsive to touch	4
Vigorous grimace to pain	3
Mild grimace to pain	2
No response to pain	1

## NICE CT criteria for children:

Like adults, NICE have very particular criteria for performing a CT scan in children with a head injury, and we generally base our assessment of these children off of those criteria. (Figure.1)

## Children who need an immediate scan:

- Suspicion of non-accidental injury (we'll talk a bit more later)
- Post traumatic seizure, but no history of epilepsy
- Initial GCS <14 if over 1 year or <15 if under 1 year
- GCS at 2 hours <15
- Suspected open or depressed skull injury
- Tense fontanelle
- Any sign of a basal skull fracture (haemotympanum, 'panda' eyes, CSF leak from ears or nose, Battle's sign)
- Focal neurological deficit
- If <1 year, a bruise, laceration or swelling of more than 5cm on the head

# Head Injury

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## Additional “Risk factors”

- Witnessed loss of consciousness >5 minutes
- Abnormal drowsiness
- 3 or more discrete episodes of vomiting
- Dangerous mechanism (high speed RTC, fall from >3m, high speed injury from an object)
- Amnesia (antegrade or retrograde) lasting >5 minutes (children older than 5)

If one risk is present, children need observation for at least **4 hours post head injury**

If there is more than one risk factor present, children need an **immediate CT scan**

If children are taking warfarin (or another anti-coagulant) they should have a **CT scan within 8 hours of injury**.

## A word on vomiting:

A lot of children vomit after a head injury. We don't know why and there has been a fair bit of research into the significance of **isolated vomiting** in children following a head injury, which suggests that the likelihood of a significant intracranial injury is unlikely. However, my advice would be to always follow the guidelines and discuss with a senior when unsure.

Make sure you take a good history from the parents when it comes to any vomiting as children will often retch and vomit several times in quick session. This would be classed as one discrete episode, rather than several separate ones. Giving analgesia and anti-emetic to help with this is generally considered a good thing to do.

## Don't forget the C-Spine:

As with adults, you should always consider a concurrent C-spine injury in all children presenting with a head injury, although the incidence is low. NICE have a full set of criteria regarding imaging selection, but essentially, if the child has a significantly reduced GCS or neurology they should

have an immediate CT scan of their neck. If they have pain with a dangerous mechanism but normal neurology, they should have plain films. We have a blog on Paediatric trauma imaging which covers this [here](#).

## Safeguarding issues:

Unfortunately, there will be a proportion of children who present with head injury who will have a Non-Accidental Injury (NAI). We have a duty of care to all children and you should consider the possibility of NAI in all children you see. We have a whole blog on safeguarding in this iBook, but for head injuries making sure the mechanism of injury meets the child's milestones is imperative!

## Treating and discharging childhood head injuries in the ED:

The aim in managing those with a moderate or severe head injury is about limiting secondary brain injury. Children should be treated using the same principals as adults: maintain normothermia, normocapnia and normoglycaemia. Nurse with a 30 degree head up tilt and avoid **hard collars** if a C-Spine injury can't be ruled out, as they can prevent venous drainage, increasing ICP further. Neurosurgical intervention in children with traumatic brain injury is rare but paediatric trauma centre referral is mandated.

Lots of children with a head injury will have a wound of some description. Superficial grazes can be cleaned and left alone. Small, superficial lacerations can often be glued but some will need sutures. Depending on the age of the child, you may be able to do it in the department, either with subcutaneous local anaesthetic, or if you don't think they'll tolerate multiple injections, you can consider a topical local anaesthetic (for example LAT gel). Ultimately, some children, especially those who are very young won't tolerate awake closure of the wound and will need referral for closure under general anaesthetic.

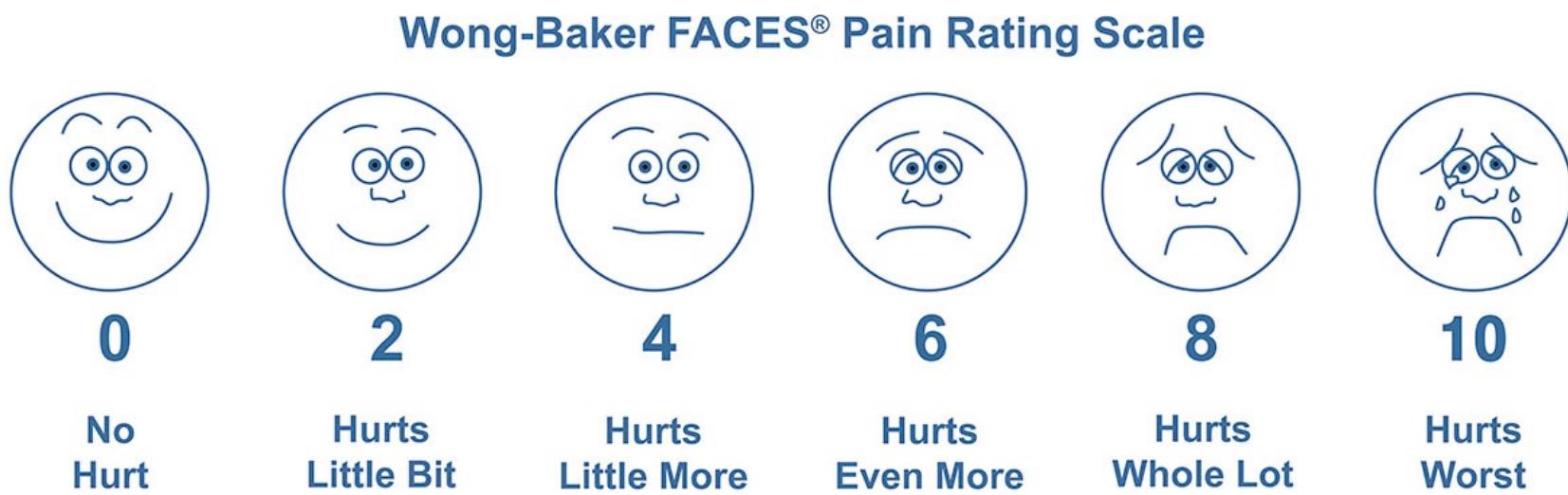
Thankfully, the vast majority of children will go home straight from the ED. They should be discharged with written head injury advice which should include information on when to return and who to contact for advice, and, don't forget to give them a sticker on the way out!



# **MINOR INJURIES**

**Author:** Atul Kapur / **Codes:** PAP15, PAP17

Figure 1. Wong-Baker Faces Scale



# ACCIDENTS DO HAPPEN

**It's safe to say you will likely see a few of these, as minor injuries are a very common occurrence in childhood with around 20-30% of all paediatric attendances to the Emergency Department involving minor injuries or trauma.**

The vast majority of injuries are accidental. In the UK many households involve a single parent looking after multiple children of different ages. Some younger children may have a short period of time where they are not properly supervised and boom! Something happens. They fall, hit their head, break their wrist or burn themselves with a cup of tea. Accidents do happen.

Saying that, think of non-accidental injury (NAI) as a differential diagnosis in all children presenting to ED with minor injuries. Do not ask every parent whether they did something to intentionally cause harm, but think of it in the back of your head. Always ask yourself if there is some part of this story that doesn't fit. If in doubt speak to a senior physician about it.

### Analgesia

Assess the pain score and give analgesia appropriately. Useful pain assessment scores (like the Wong-Baker Faces, Figure 1) involve visual representation of the child's pain.

#### Analgesia examples according to pain are:

For mild (1-3) pain oral/rectal paracetamol and/or oral ibuprofen should be adequate

For moderate (4-6) pain you may add oral morphine (Oramorph) if a combination of the above is not enough

For severe (7-10) pain you may need to use Entonox as an interim measure before getting in some stronger analgesia. Intranasal Diamorphine is great for severe pain and is commonly used, it has a rapid (2-5 minutes) mode of action and gives you 30-60 minutes of analgesia, giving you time for other measures like splints and plaster.

## **Minor Injuries**

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It also has an anxiolytic effect which will help if you need IV access. IV morphine may also be suitable for severe pain.

You will find that every department has a typical analgesia ladder according to pain score so do as the nurses what is usually used for patients according to how much pain they are in. Also remember that children's pain is exacerbated by fear, so use distraction techniques and get someone (play specialists especially) to help you.

### **Wounds**

Clean all wounds thoroughly before deciding how to repair them. If this is new to you, ask someone to show you how. Make sure there are no small foreign bodies. Xrays may be needed to exclude this but specifically mention on your request that you are excluding foreign body.

See if the wound edges come together. You can then use adhesive strips, tissue glue, or sutures to close. Get advice from a senior nurse or doctor to help you choose the right method.

Wounds in areas like the face, lips, forehead, neck or hands may need closure from specialist plastics or maxillofacial services as scars in these areas can obviously have significant cosmetic consequences. Ask a senior if unsure. Many departments have local anaesthetic gel which can be applied to the wound for analgesia.

Wounds of the internal mucosa of the lips and wounds of the tongue heal very well and quickly (in just a few days) without any intervention. Just remind parents to make sure food does not get stuck in these wounds until they heal.

Always remember to consider tetanus risk with any wounds and document the child's vaccination status.

### **Fractures and x-rays**

Children's bones are quite soft/less brittle than those of adults and incomplete fractures occur (like torus or greenstick fractures), and the growth plate is commonly involved. We tend to have a lower threshold to xray limbs to look for fractures.

Consider that even if the Xray is normal, but the child is clinically symptomatic, there may still be an injury to the bone. In this case the safest thing to do is to immobilise the limb and reassess either in a review clinic in a week or even in fracture clinic. Xrays of the axial skeleton such as thoracic or lumbar spine expose children to a large amount of radiation so if considering these xrays get senior input. Interpreting Xrays in children is difficult takes practice so routinely get a senior or nurse practitioner to cast their eye on it.

### **Upper Limb injuries**

Remember your **CRITOE!**

Clavicle Heal spontaneously very well, apply a broad arm sling and refer to your local guidelines for followup (many places will discharge without followup if appropriate criteria are met). The main worry is when the overlying skin is compromised from tenting or if there is neuromuscular compromise.

### **Clavicle**

Heal spontaneously very well, apply a broad arm sling and refer to your local guidelines for followup (many places will discharge without followup if appropriate criteria are met). The main worry is when the overlying skin is compromised from tenting or if there is neuromuscular compromise.

# **Minor Injuries**

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## **Supracondylar humeral fracture**

Common, peak age around 7 years, examine and document neurovascular status carefully. To detect subtle fractures in a true lateral elbow xray draw a line along the anterior humerus, this line should intersect the middle third of the capitellum, if not it's a fracture. Remember to also look for your anterior and posterior fat pad signs.

## **Radial head fracture**

May not be visible on xray, look for raised anterior or posterior fat pads on the xray which indicate joint effusion.

## **Pulled elbow**

Common in ages 1-3 years, usually present with a clear history of pulling the arm by the hand and feeling a click. Requires a simple manipulation to fix and the child should be back using their arm normally in 10-20 minutes. Does not require an xray.

## **Radius/ulna fracture**

I call this the trampoline injury, check neurovascular status, if severely angulated or displaced refer to orthopaedics.

## **Distal radius fractures**

The most common fracture in all ages in children. Can be very subtle on xray, commonly are “buckle” fractures. Refer to orthopaedics if severe displacement or angulation. However, most of these will heal well, a futura splint is usually all that's required for immobilisation.

## **Lower limbs injuries**

Knee injury Xray if non-weight bearing, large effusion or significant mechanism. The “Ottawa knee rules” can be applied from puberty. Check for ligament laxity, anterior/posterior cruciate ligaments, and medial/lateral collateral ligament. Also check extensor mechanism by using the straight leg raise test. If any of these are abnormal discuss with orthopaedics or a senior.

## **Patellar dislocation**

Due a direct blow or twisting of the knee. Generally very painful and distressing for children and parents. It will be clinically obvious so xrays are not needed pre-reduction. Give strong analgesia as well as Entonox and reduce by applying pressure to the lateral aspect while extending the knee. Xray post reduction, apply a cricket pad splint and refer to fracture clinic.

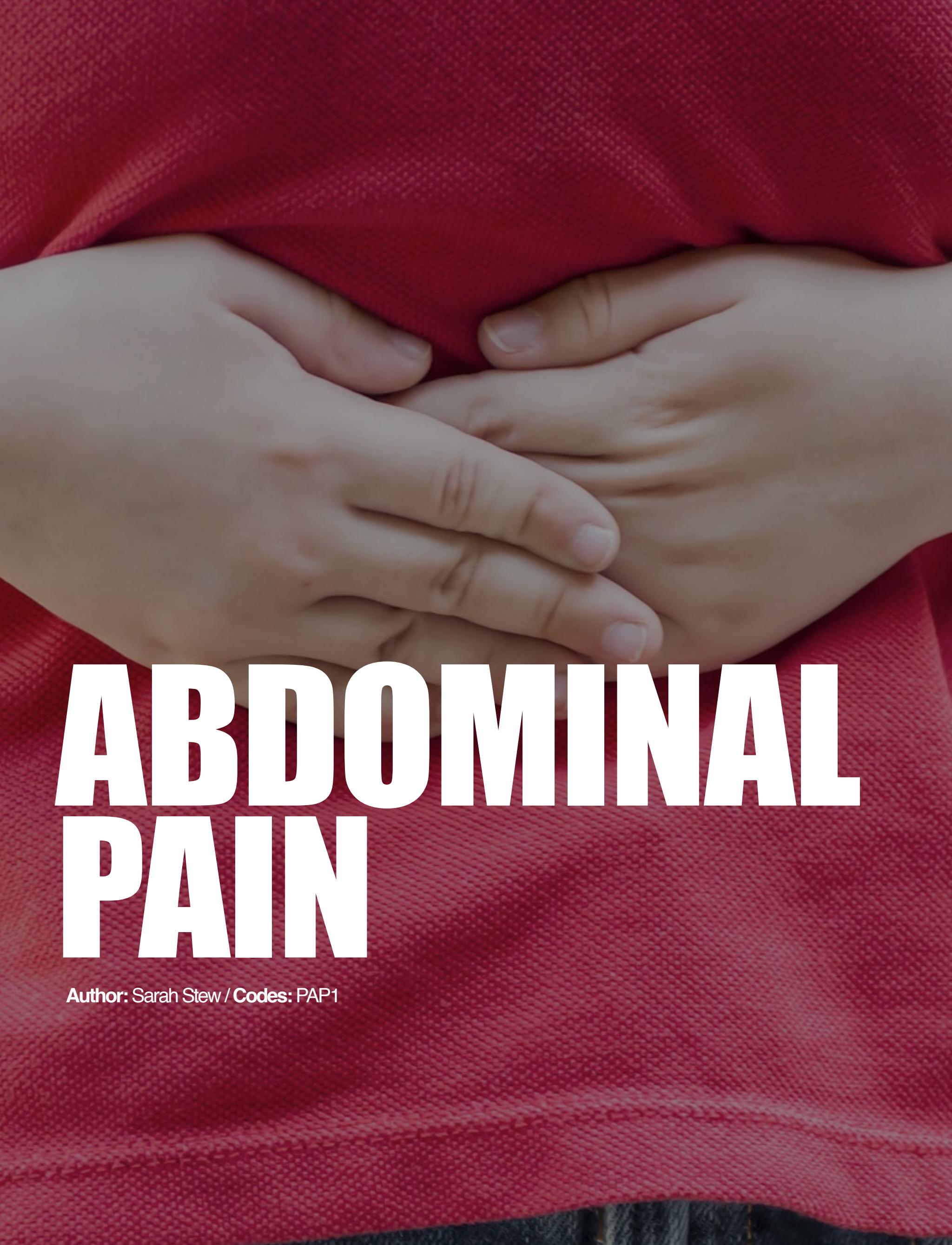
## **Toddler's fracture**

Common, ages 1-3 years, spiral tibial fracture. Due to direct blow or twisting. May be subtle clinically and on xray. More of a clinical diagnosis so if the xray is normal and the child is tender over the tibia, treat it as a fracture, immobilise in plaster and refer to fracture clinic.

The child with an atraumatic limp requires another blog altogether and PEMplaybook has this covered in their post [here](#).

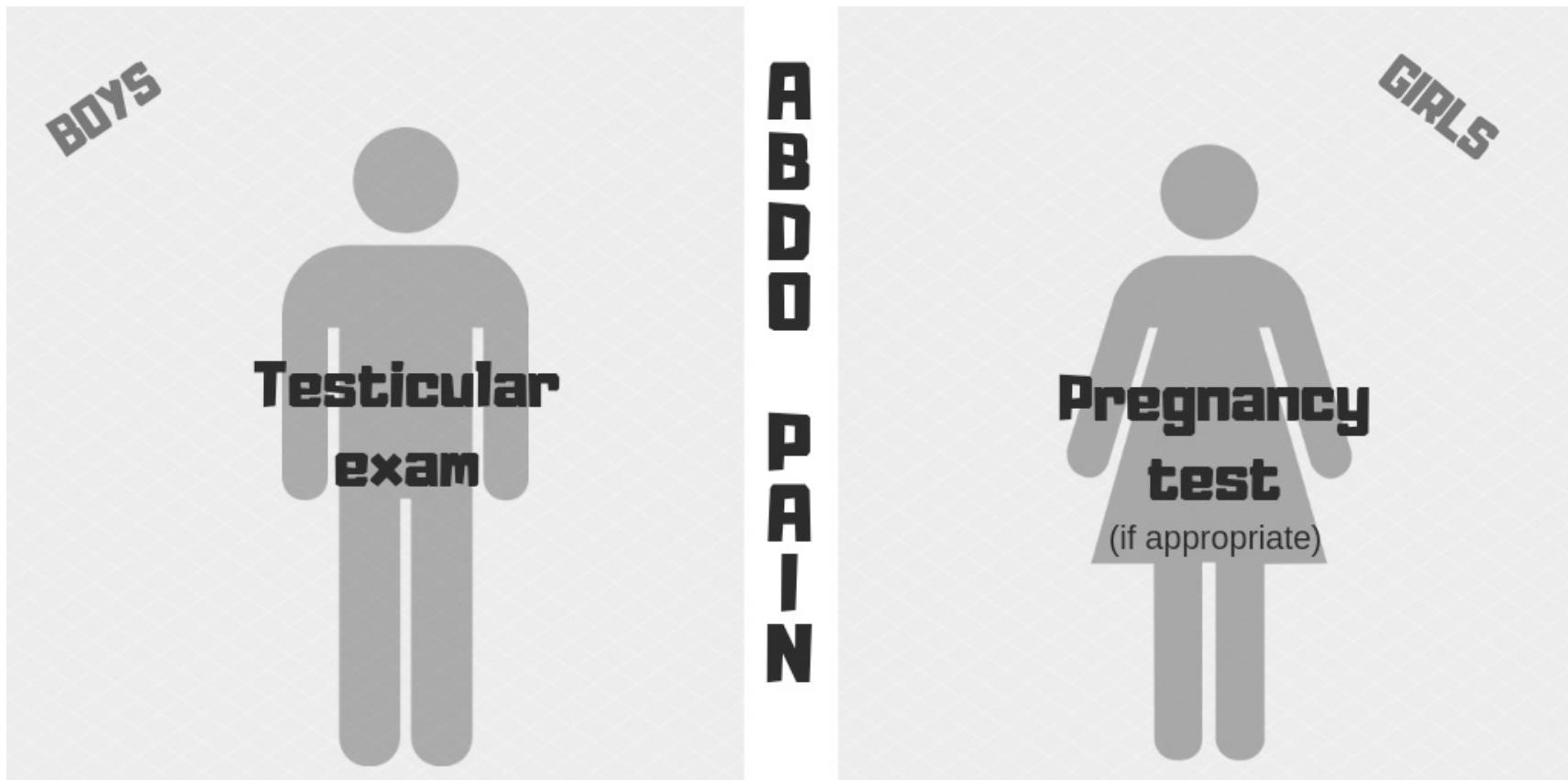
## **References:**

1. [Radiopaedia Elbow Ossification Centres](#)
2. [PEMPlaybook Limping Child](#)



# **ABDOMINAL PAIN**

**Author:** Sarah Stew / **Codes:** PAP1



# REASONABLY COMMON PRESENTATION

## Paediatric Abdominal Pain

**Abdominal pain is a reasonably common presentation in paediatrics-increasing as the child gets older. Babies and toddlers can't usually vocalise or localise their discomfort so we learn to recognise it by watching their behaviour and examination findings.**

In the paediatric ED you'll hopefully learn to recognise those that need referral and admission and those who can be safely discharged home, though this can be difficult.

Children rarely read textbooks before attending the ED and often don't fit the bill classically for any pathology.

For instance, I once took a child to theatre to remove a perforated retrocaecal appendix: she'd just eaten nuggets and was jumping on the bed and her only surgical sign was a bit of a funny facial twitch when percussing her right iliac fossa. And there was the girl with the non-tender abdomen who had ovarian torsion...there are always the odd ones. But hopefully this will serve as a guide of what to look for, when to refer and when to panic!

# **Abdominal Pain**

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## **Appendicitis (all ages)**

Typically there's a history of central perumbilical colicky pain that moves over the course of a day or two to the right iliac fossa and becomes constant. Often they vomit (non-bilious) and the vomiting usually starts AFTER the abdominal pain has started. They can be either constipated (ill, dry, not eating) or have diarrhoea (inflammation of the ilium from an adjacent inflamed appendix, or the rectum from a pelvic appendix). They can report pain on urination: it's not burning urethral UTI pain, it's pelvic pain when they wee. They may run a low grade temperature, can be tachycardic before fluid resuscitation and when febrile. On examination they'll be tender, possibly guarding and have percussion tenderness in their right iliac fossa.

Coyzal symptoms, red throat (children can't always tell when they have a sore throat) and cervical lymphadenopathy may help point you towards an alternative cause of RIF pain.

Remember analgesia. Contrary to some erroneous beliefs morphine will NOT mask peritonitis or hinder examination. So give them some analgesia.

Keep them nil by mouth (this depends on local protocols, we now let children sip water right up until the anaesthetic room doors but other centres, especially those non-paediatric specific, may be twitchy about this).

Fluid resuscitate them, but don't start IV antibiotics until they've been seen by the surgeon.

Don't nail your flag to the appendicitis mast too early, do a careful examination whilst distracting and chatting to the child. If their abdomen shows no signs of peritonism and they're clearly unwell get a chest x-ray and a blood glucose. Pneumonia can present with awful right sided abdominal pain—yes—even without a cough. And no-one wants to miss the child with DKA masquerading as abdominal pain and vomiting.

## **Girl Things (usually peri to post pubertal ages)**

Ovarian torsion and torsion of paratubal cysts can present as appendicitis (especially if on the right side). Typical pain is sudden onset and associated with nausea or vomiting. They can have localised peritonism. But as I've mentioned earlier they can have resolving abdominal pain, no surgical signs, normal observations and just look sick. Ultrasound can help as a normal ovary rarely torts — usually there is enlargement by a cyst or tumour that precipitates it rising out of the pelvis, bobbling around and twisting.

Always do a beta HCG urine on girls with an acute abdomen. Don't be scared to tell the family you need to do it. A hospital I worked at found a fetal skeleton on a 9 year old's abdominal xray: it happens.

## **Boys Bits (any age)**

Torsion of the testes presents with abdominal pain. The examination of the testes should be part of your examination of all boys because:

- a) you'll learn what's normal (vs hydrocele, hernia, lumps and bumps) and
- b) you won't end up in court after sending home a little chap with a testicle in peril!

Pain can be referred into the pelvis, abdomen or loins. They often feel nauseous if they're not vomiting and may have an abnormal gait. They may just present with the abdominal pain. When you examine a tortured testis you can find an abnormal lie, absent cremasteric reflex, swelling, erythema and exquisite tenderness of the testis itself, but as I said before, children neglect to have standard examination findings so refer to someone who can explore the scrotum as soon as you suspect torsion: you've got 6 hours to save the testicle!

# Abdominal Pain

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## Intussusception (Babies and Toddlers)

There's a classic triad of symptoms: episodic screaming with drawing up their legs, vomiting and redcurrant jelly stools but most only have 2/3 of these. As a rough guide it affects those of 3-18 months after a viral illness. The vomiting can be bilious. The episodic crying can be difficult: crying and drawing up the legs is common in babies with most causes of abdominal pain.

Redcurrant jelly stools, if present, don't always look like the red mucousy stuff in the books (think bloody diarrhoea explosion). Sometimes you'll feel a mass, often the child will be tender with a soft abdomen but be too grumpy to allow you a good feel. These kiddies can be completely clapped-out and need IV fluids, analgesia, NG tube on free drainage and urgent surgical referral.

## Malrotation Volvulus (Babies)

You'll soon realise, if you have the misfortune to see a baby with malrotation volvulus that all those babies with "tender abdomens" that you referred were just crying when you touched their abdomens, in the way that babies just cry willy-nilly at any old thing. This is a real tender abdomen in a very sick baby.

There's usually bilious vomiting, abdominal pain, there can be abdominal distension, but a scaphoid abdomen is typical. They can be shocked. A capillary blood gas can show a metabolic acidosis with a raised lactate (but this is not always the case if there is complete venous obstruction due to the malrotation of the midgut). X-ray will often be suspiciously gasless.

These patients are at death's door. They need IV fluid resuscitation and getting to a surgeon yesterday, if you can manage it. If you can't, just work quick: these patients have a dead gut.

Malrotation volvulus usually happens to neonates but it can present at any time. That chap from the Bee-Gees died with it and he was 53!

## Green vomiting and abdominal pain

Green (bilious) vomiting is never normal in a normal human. It's always something to get a bit excited about. Bile is always GREEN, yellow vomiting will occur in everyone if you vomit enough. But be careful – parents will tell you it was bile...read this post from St Emlyn's [here](#).

Small bowel obstruction (bilious vomiting with pain and distension and a loopy looking x-ray) can usually be found in babies/children with a history of previous abdominal operation ... but we never say never in medicine.

Along with being generally unwell, bilious vomiting can be a presenting feature of any abdominal sepsis (such as appendicitis). This is common in appendicitis in the under 4s. They can't localise the pain and their symptoms are non-specific. They will present later and due to lax abdominal wall won't often be "guarding" on examination. This represents an ileus in response to abdominal sepsis.

Always examine the scrotums in male infants as incarcerated inguinal hernias result in bowel obstruction and abdominal pain, although infants will rarely complain directly of abdominal pain-they'll just be miserable and drawing up their legs intermittently. If you find a hernia try and reduce it after giving the babe some analgesia, if it won't budge-stop! I've lost count of the number of battered scrotums and A&E doctors who've sweated trying to reduce a hydrocele that was just there minding its own business in an infant who was unwell with not-an-incarcerated-inguinal-hernia!

## Constipation (Any age)

This is generally the kid that gets the whole department in a tizz: they're rolling around the bed, screaming in agony. The paramedics have given them entonox and morphine and everyone's convinced they need an operation now! You calm everyone down, get the kid to breathe and take a poo history-and NOT one which goes "how are your bowels?" "Normal". Everyone's normal is different. Ask them how often, how much, what colour, does it hurt, do you have to push and get them to point to a poo on a cartoon Bristol stool

## Abdominal Pain

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scale and make it fun. You can then feel the left iliac fossa mass of stuck turd that's causing the worst pain known to man. If you can't feel anything an abdominal x ray (after a full history and a set of normal observations) might reveal the beast. We tend not to PR children.

The beast-once confirmed can be slayed with an enema, they'll get immediate relief after a big poo. (Editor: I find that in children who aren't in agony, suppositories and analgesia can go a long way. An enema can then be plan B if unrelieved within a couple of hours).

peritonism (with the introductory case being one of those exceptions).

Bloods can be taken with a finger prick, but often aren't necessary.

Bilious vomiters need an NG tube on free drainage. Cannulate and resuscitate any unwell child, there's no excuse not to. Ever.

### Mesenteric Adenitis (Pre-pubertal)

This is probably the most common cause of abdominal pain that I see. It causes right iliac fossa pain so is often mistaken for appendicitis, but they're not off their food and rarely vomiting. Often they've had an URTI, a high temperature (over 39 C), palpable neck lymph nodes and erythematous throat. The pain is due to inflammation of mesenteric lymph nodes and Peyer's patches in the terminal ileum.

### Don't Forget

The other causes of abdominal pain in children: urological problems, biliary pain (congenital abnormalities and gallstones), pancreatitis, ectopic pregnancy, gastroenteritis, IBD, non-specific abdominal pain the list is endless!

### Top Tips

Ask them how they got to hospital and how their journey was. If it hurt every time they encountered a bump in the road, there is indeed (usually) abdominal funny business.

If a child is chatting about their new puppy they won't be taking part in any abdominal guarding/misleading abdominal signs. Believe it or not some children, whether conscious or not, really do ham it up when it comes to abdominal examination, often just living up to parental instructions "do tell them when it hurts little Napoleon, tell them, TELL THEM NOW!"

Reassure them, you're not looking for them to tell you (you're looking for unconscious signs). Getting them to hop or jump is fairly conclusively not

# CHILD ABUSE

**Author:** Nikki Abela / **Editors:** Charlotte Davies, Elizabeth Herrieven / **Codes:** PAP6

### Consider NAI

when:

- The story is vague and lacks detail
- The story changes each time it's told
- There is a delay in seeking medical help
- The history is not compatible with the injury
- The history is not compatible with the child's development stage
- There are multiple previous attendances with injuries or illnesses
- There is a history of violence or domestic abuse in the family
- The child's interaction with carers appears abnormal

**Figure 1.** Checklist of red flags

# A CRUCIAL ROLE

**The dark side of PEM, and what should also be on your differential diagnosis for any patient you are seeing is: “was this inflicted” and “is there something more?”.**

Child abuse is unfortunately something that happens and as doctors we play a crucial role in safeguarding patients from it. You may be the only person who has the single opportunity to do this. Don't dismiss any nagging feeling if you think something isn't quite right: find a friend (senior colleague or nurse) and discuss your concerns.

An abused child who is returned to an unsafe home environment is at 50 percent risk for further injury and 10 percent risk of death over the next five years. You can not afford to let this slide.

Early identification of, and intervention in, households where children have been abused can lower the recurrence rate to less than 10 per cent. Child abuse comes in many shapes and forms: physical, emotional and sexual abuse, neglect or other exploitation.

## Child Abuse

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We should be all ears in the history to think of inconsistent findings and most departments will have a checklist of red flags for abuse which will look something like Figure 1.

**Physical abuse** takes many forms: burns are the most common, followed by fractures and bruises.

When examining the child pay particular attention to:

- Injuries that don't fit the history
- Multiple fractures in various stages of healing, or different types of injuries
- Injuries that are likely to be inflicted
- Evidence of poor caretaking
- Sudden onset of altered mental status not attributable to medical illness
- Any bruising in a child that is not yet cruising
- Bruising to the pinna, neck, or abdomen
- Injury to the genitalia

You can think of these as the 6 Bs Bruises, Breaks, Bonks, Burns, Bites, Baby blues. Looking further at bruises, it is common for children to have many bruises, especially over bony surfaces like shins and chins. However, these bruises should make you think of non-accidental injury:

- Buttocks, trunk, genitals, ears and back of hands
- Bilateral, symmetrical or geometric
- Bruise resembles shape of an instrument (e.g. belt buckle, hand knuckles, spoon)
- Multiple bruises of various colours on the same area

If you like these mnemonics, you can think of these as the [TEN-4 FACES Bruising Rule](#).

## Children who can't cruise shouldn't bruise

Burns can also be accidental, but 15-25% are thought to be the result of abuse, so pay particular attention to patterns that mimic objects, especially hot plates, hair straightening irons, steam irons, cigarettes etc. Remember that although children do like to explore, they won't touch a hot object for long.

Immersion burns on buttocks, hands or feet can occur if the child is lowered into hot water accidentally or non-accidentally. Look out for the absence of splashes, which indicates the child was unable to thrash around.

## Child Abuse

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Fractures are the second most common manifestation of abuse after burns, and you should really be able to match the fracture pattern with the reported mechanism of injury. If it doesn't make sense, don't be afraid to go back and clarify the fine details. Any fracture can be caused by abuse, so it is all about piecing the puzzle together. If the history keeps changing, then start to worry.

Remember, that the very young are non-ambulatory, so there are very few plausible ways for them to sustain injuries. They are particularly at risk because they are non-verbal.

You need to think about NAI in any non-verbal child who presents with a low GCS: the classic triad of retinal haemorrhages, subdural haemorrhage and rib fractures is what diagnoses the abuse, but in the ED you will only have a small piece of the puzzle (the child with signs or symptoms of a head injury) and it is up to you to find the other pieces and form the picture.

**Sexual abuse** may manifest in many ways. Children may say they have been raped, but commonly signs are more subtle and you have to look for them. Things like STIs, excessive sexual knowledge or genital trauma are generally things you need to search for, so do look if the context necessitates. In teenagers you should really be on the lookout for child sexual exploitation, and in young girls and boys of the right age, make it routine practise to ask about their relationships, with whom and how old are they and whether they are sexually active.

**Emotional abuse** occurs when an adult harms a child's development by repeatedly treating and speaking to a child in ways that damage the child's ability to feel and express their feelings. Signs include:

- Parent or guardian constantly criticizing the child
- Child shows extremes of behaviour and displays anxiety
- Delayed physical, emotional, or intellectual development
- Compulsive lying and stealing
- Displays feelings of worthlessness
- Eating hungrily or hardly at all
- Attention seeking
- Reluctance to go home
- Fearfulness when approached by a person known to them

**Neglect** is the commonest form of abuse reported to services. According to the NSPCC, one in 6 (16%) young adults were neglected at some point during childhood with one in 10 young adults (9%) severely neglected during childhood.

It encompasses both actual and potential harm and may be picked up when a child is brought to the ED. Sometimes it may be obvious, but other times it may become evident on taking a detailed history.

Look at the child in front of you as a whole being, not just the simple (and likely accidental) injury they may have been brought in for. Are their clothes inappropriately soiled? Did anyone other than a parent bring them in and why? Are the parents supportive about the interventions you are doing?

## **Child Abuse**

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Remember also the child is part of a family unit which may be under a lot of strain, but do look out for inappropriate interaction between parents (if their relationship is abusive than the child is at risk too), and also compare them to siblings who may accompany them.

On a final note, don't go pointing any fingers in the emergency department, but be honest and open with parents about investigation (except in Munchausen syndrome by proxy, but that is another topic).

Remember things may not always be what they initially seem, and other causes need excluding!

### **Further Reading:**

[Long Bone Fracture and NAI](#)

[Recognition of Child Abuse](#) podcast

[Paediatric Physical Abuse](#)

[RCEM Safeguarding Standards](#)

[Safeguarding e-learning on elfh](#)