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Short Cases - Paediatrics

INTRODUCTION

This module aims to look at recently published evidence on common problems in paediatrics which present in Primary Care. The topics were chosen by a group of GPs who felt they would be of use to PBSGL groups, but not suitable for a whole module in themselves.

Four areas will be discussed:

- constipation
- fever in children
- faltering growth (previously known as “failure to thrive”)
- urinary tract infection

This module will not cover the above topics in great detail. Instead the information given is thought to be the core information that clinicians would “need to know”.

Topics already covered by existing published PBSGL modules will not be discussed. These include modules on Infant Feeding, Chronic Abdominal Pain in Children and Child Protection.

The module has been extensively reviewed by a consultant paediatrician, whose comments are in square brackets throughout [ ] .

The cases are designed to illustrate the problems described in the aims of the module. They are real cases, but are ***not*** meant to be the focus of the group’s discussion. Instead, PBSGL groups are encouraged to think of similar cases in their own place of work.

Studying all the cases is not compulsory. If the group runs short of time, and completing the group feedback is still to be done, it is better to leave out a case completely. The feedback, where group members say what changes they will make in practice as a result of the meeting, is an essential part of the learning process – more important than “completing the cases”.

CASES

Case 1: Charlie, age 3

Charlie’s mum is becoming increasingly concerned about his constipation.

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What else would you like to know?

Charlie first came out of nappies at age 2 and-a-half. Just prior to this, he would only poo when he could go somewhere quiet, and he appeared to be ready to start potty training.

He has started to "hold his poo in" and delay going to the toilet, and is able to go for days without opening his bowels. He has lost his appetite and tends to pick at his food, and has become moody and irritable. He complains that his tummy is sore.

His parents inform you that they noted soiling of his underwear on numerous occasions. When he does finally manage to open his bowels, he has to strain considerably leading to some fresh blood spotting on wiping. The stools are usually very firm and his mother has noted that on occasion stools have blocked the toilet. She is very worried.

On examination there is no abnormality.

Assuming functional constipation is suspected after history and examination, how would you treat Charlie?

Case 2: Zara, age 4

Zara has been booked into one of your emergency appointment slots this morning. Mum reports that she has had a high temperature for the past three days, levels being 38°C.

What else would you like to know?

She has had a cough and coryza, but no history of vomiting nor rash. History reveals no obvious focus for infection apart from her respiratory tract. Her past medical history is unremarkable, with no recent travel nor vaccinations.

Mum has been giving her paracetamol to lower her temperature, which has helped temporarily, but the temperature recurs – and this is mum's main concern.

She is spending a lot of time sleeping, is not interested in play, and her appetite is poor, though she is drinking plenty of fluids.

On examination, her tympanic temperature is 38.8°C, pulse 140, resp rate 22/min, capillary refill time <3 sec and there is no evidence of a rash.

She does not have any intercostal or subcostal recession and her chest is clear. ENT examination shows nasal congestion, mildly enlarged tonsils with no exudate, but is otherwise unremarkable. She responds to questions appropriately and you think she looks well.

How would you manage Zara, and what advice would you give to mum?

Would your management change if she were 2 months old?

Case 3: Ruaridh, age 3

Your last patient in the morning surgery is Ruaridh. Mum is worried that he seems to be smaller and thinner than his peers at nursery.

He was born at term, with no perinatal problems and has achieved all his neurodevelopmental milestones at the appropriate time. His immunisations are all up-to-date. He was growing along the 9th centile for weight and 25th centile for height six months ago when last seen by the health visitor for a routine check.

What other information do you need?

You measure his weight and height today and find that his weight has dropped to the 2nd centile. Height remains on the 25th centile, head circumference is within normal limits. There is no evidence of lung disease or congenital heart problems. Abdomen is normal and there are no glands nor pallor. He is happily playing with the toys in your room and appears healthy and active.

How would you manage this situation?

Case 4: Jemima, age 5

You are on-call at 5 p.m. one afternoon. Your triage nurse has organised an appointment for Jemima to attend, with a history of two or three days of dysuria and frequency. She has not been vomiting nor complained of any back pain, and has not been febrile.

There is no past history of urinary problems, though she is on treatment for constipation. On examination she is well with no fever. There is no evidence of vaginal discharge and abdominal examination is unrevealing. Urinalysis reveals 3+ leucocytes and 1+ protein, but no nitrites nor blood.

How would you manage her?

What features would alert you to an atypical UTI?

Which children, who develop UTI, require further investigation and referral?

The information section is designed to be read before the meeting, Reading the information for the first time, and discussing it simultaneously, is not recommended. The information section is not a complete systematic review of the topic, but rather contains what clinicians "need to know" on the topic. Note that the appendices are important and should also be read before the meeting.

INFORMATION SECTION

Constipation

Definitions and symptoms [1,2,3]

1. In the UK, normal stool frequency in children ranges from an average of

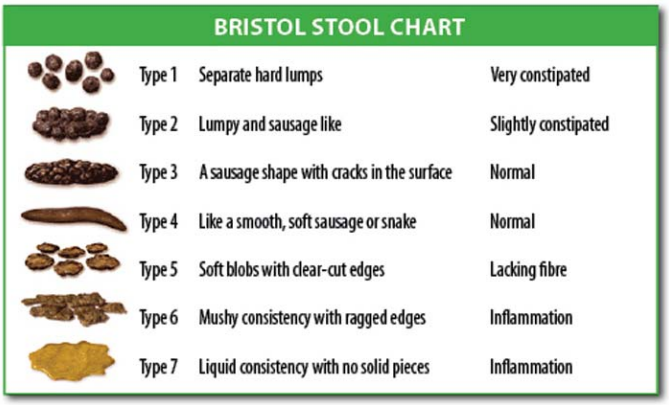
- four per day (in the first week of life) to
- two per day (at 1 year of age)
- the normal adult range (from 3 stools per day to 3 stools per week) is usually attained by 4 years of age.

2. ***Constipation*** is a decrease in the frequency of bowel movements characterised by the passing of hard stools, which may be large and associated with straining and pain. Soiling of clothes due to the involuntary passage of fluid/semi-solid stool may result from overflow from the overloaded bowel, and faecal impaction may occur.

Chronic constipation refers to symptoms lasting longer than 8 weeks.

Idiopathic constipation (functional) means it cannot be explained by any anatomical or physiological abnormality (see Box 1).

Figure 1. The Bristol Stool Chart



First published: Lewis SJ, Heaton KW (1997) Stool form scale as a useful guide to intestinal transit time. Scandinavian Journal of Gastroenterology 32: 920–4

3. Stool patterns in constipation can vary:
- Fewer than three complete stools a week, typically semi-soft (Bristol type 3 or 4). Note that exclusively breast-fed children can have infrequent stools, and therefore this is normal in that group of children.
- Hard, large stools.
- 'Rabbit droppings' (Bristol type 1).

4. Other symptoms can occur:
- Poor appetite that improves with passage of large stool.
- Waxing and waning of abdominal pain with passage of stool.
- Stool-retaining posture - typically straight-legged, on tiptoes with an arched back.
- Anal pain. [A single episode of pain can lead to with-holding stools, which may be involuntary due to spasm of muscles, and lead to many weeks or months of problems – so it is very important to avoid anal pain in children.]

5. Digital rectal examination is ***never*** recommended for the diagnosis of constipation or faecal impaction. The latter diagnosis can usually be made on the history of retention of stool +/- overflow.

Causes[2,3,4]

6. The causes of constipation in children are poorly understood, and for the individual child the cause is often unknown. ***Organic*** constipation is due to an underlying pathology. It occurs in approximately 5%-10% of cases and is more likely to present in the first month of life. Causes in babies and toddlers include:

- Genetic predisposition.
- Nutritional
    - cow's milk protein allergy – see PBSGL module on infant feeding
    - lack of dietary fibre [which is much more common than milk allergy, often associated with excess milk intake with concomitant lack of fibre intake].
- Behavioural: stool withholding and fear of anal pain.
- Coeliac disease.
- Spina bifida.
- Hirschsprung's disease.
- Anal fissure or anorectal malformations.

7. In school-aged children and adolescents causes of constipation are slightly different:

- Inadequate food intake.
- Toilet training problems not dealt with at a younger age
- Attention-deficit disorders or developmental delay, especially Down's syndrome.
- Toilet phobia and school bathroom avoidance.
- Anorexia nervosa.
- Depression, and there is a rare (but recognised) link to child sexual abuse.

8. The diagnosis of the commonest cause - idiopathic constipation - can usually be made in Primary Care by excluding the above conditions. See Box 1.

Box 1. Definition of idiopathic (functional) constipation

Presence of two or more of the following criteria in the previous one to two months:

- Less than 3 defecations per week.
- At least one episode of faecal incontinence/soiling per week.
- Avoidance of defaecation, or posture suggests retaining stool.
- Painful or hard bowel movements, or large diameter stools that may obstruct the toilet.
- On examination - a large faecal mass in the abdomen (PR examination not recommended). [An abdominal palpable colon suggests a long history of constipation and will suggest needing longer treatment courses].

Management including referral [2.3.4.]

9. In children aged under 18 years old, no specific investigations are required for idiopathic constipation. Abdominal radiographs and ultrasounds should ***not*** be requested for this condition. Other tests, including testing for coeliac disease or hyperthyroidism, only need to be considered when other symptoms, such as faltering growth, are present[2].

10. A red and amber flag system indicates actions to be taken for children with constipation. Red flags indicate that a child should be urgently referred to a specialist. Amber flags indicate a need for treatment and further management outwith Primary Care (see Box 2).

Box 2. Constipation – red and amber flags

Red flags for constipation include:

- Symptoms from birth or during first few weeks of life, including delayed passing of meconium
- Stools described as "looking like ribbons"
- Abdominal distention +/- vomiting, +/- significant abdominal tenderness on examination
- Weakness in legs or locomotor delay
- Abnormal appearance of the anus, or abnormalities in the lumbosacral and gluteal regions e.g. asymmetry of gluteal muscles

NICE suggest that if any red flags are present an urgent referral should be done without any further examinations (i.e. doing no rectal examination).

Amber flags for constipation include:

- Evidence of faltering growth and well-being

Concerns regarding possible maltreatment

11. Treatment regimens should minimise invasive procedures, allow normal social interactions, and prevent relapse. The treatment principles are dis-impaction, prevention of re-accumulation of faecal loading, and continued follow-up and education.

12. Dietary measures are needed to maintain regular, adequate stools in children with constipation. Behavioural management in children > 1 year old includes keeping a diary of bowel movements, using toileting routines, and giving positive reinforcement.

[Explain the mechanism of constipation and mega-rectum to help parents understand the management plan, and avoid reinforcement for actions that the child cannot influence - e.g. don't use 'star charts' for passing stools, before disimpaction has been treated.]

13. However drug treatment should be given without delay, either to clear impaction or to maintain normal pain-free stools. There is no evidence that treatment – even for prolonged periods – leads to a "lazy bowel." See Appendix 1 for details of drug treatments, which may differ from BNF doses.

14. Sources of information and support for families are available on the Education and Resources for Improving Childhood Continence (ERIC) website www.eric.org.uk. ERIC also runs a helpline (0845 370 8008). This organisation can be an enormous help to families.

15. Treatment for idiopathic constipation may be necessary for months to years until the colonic function returns to normal. Treatment of organic constipation is based on the underlying aetiology, and it should resolve once this has been treated.

Fever in Children[5,6]

16. Fever is probably the commonest reason for a child to be taken to the doctor, and is the second most common reason for admission to hospital. Despite advances in healthcare, infections remain the leading cause of death in children under the age of 5 years.

Assessment - temperature

17. The height of a fever is one factor to consider. Any fever ≥ 38°C should trigger the need for paediatric investigation in infants <3 months old. However, for well-appearing children ≥ 3 months, the lowest fever associated with serious bacterial infection is 39°C. Although in general there is a higher rate of serious infections with higher rather than lower fevers, the height and duration should not be used alone to predict the presence of serious illness.

Box 3. Thermometers

- Do not routinely use the oral and rectal routes to measure the body temperature of children aged 0–5 years.
- In infants under the age of 4 weeks measure body temperature with an electronic thermometer in the axilla.
- In children aged 4 weeks to 5 years, measure body temperature by one of the following methods
  - ✓ Electronic thermometer in axilla
  - ✓ Infra-red tympanic thermometer
- Forehead chemical thermometers are unreliable and should not be used

18. For children under the age of 5 years, NICE have a red-amber-green traffic light system which can be used to predict serious illness in children with fever. See Appendix 2.

Assessment – other features[6]

19. The systematic observation of a febrile child is a very useful predictor of serious illness. However, observation alone can miss serious illness (sensitivity: 86%). A good rule of thumb when managing febrile children is: the younger the age, the more you worry about serious bacterial infection. Children less than three months of age, and especially infants under one month, are predisposed to infection by a different group of organisms (group B streptococcus, E-coli and listeria), and their condition can deteriorate rapidly.

20. Routine assessment should include any immediately life-threatening features, including compromise of the airway, respiratory rate, neurological findings (decreased level of consciousness, nuchal rigidity or full fontanelle), and prolonged capillary refill time. Abnormalities in these observations suggest the possibility of a serious illness.

Not all GPs will have the equipment to check blood pressure in small children, but this is recommended by NICE[5]. [Normal BP does not exclude serious illness, as hypotension is a late sign in sepsis].

21. Children with tachycardia are in an intermediate- or high-risk group for serious illness, particularly septic shock. Tachycardia is defined as follows:

Age	Heart Rate / minute
<12 months	>160
12-24 months	>150
2-5 years	>140

22. If symptoms suggest an immediately life-threatening illness then call 999: there have been instances where children have died due to being transported to hospital by their parents, not an ambulance (the latter being equipped with oxygen). Children with any 'red' features should be referred urgently to paediatrics.

23. If any 'amber' features are present and no diagnosis has been reached,

- provide parents or carers with a 'safety net,' or
- discuss with paediatrics.

The safety net should be one or more of the following:

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

24. Children with 'green' features only can be cared for at home with appropriate advice for parents and carers. See patient handout at the end of this module.

Causes[6,]

25. Fever is caused by a resetting of the thermoregulatory centre in the hypothalamus, usually due to viral or bacterial infections. Most cases of fever are likely to involve benign viral illnesses. However, serious bacterial infections can occur — including meningitis, pneumonia and cellulitis. The challenge for clinicians is to identify those children with fever who appear well but who may be developing a serious, potentially life-threatening infection.

26. Urinary tract infection is the most common bacterial infection among febrile infants and young children[6]. In acutely unwell children less than 3 months old, no symptoms or signs (including presence or absence of fever) adequately rule in or rule out a UTI.

27. Recent vaccination may be an aetiological factor for fever. Fever can be expected 12 - 24 hours after DPT vaccination and may last 24 - 28 hours. The meningitis B vaccine can cause a more extreme febrile response, and routine paracetamol is recommended. However recent vaccination has *not* been shown to be associated with an increased risk of occult viraemia or bacteraemia.

Antipyretic interventions and reassuring parents[6]

28. Tepid sponging, or the use of ice and other cold compresses, is not recommended for the treatment of fever.

29. Antipyretic drugs do not prevent febrile convulsions and should not be used specifically for this purpose. When using paracetamol or ibuprofen in children with fever:

- Continue only as long as the child appears distressed
- Consider changing to the other drug if the child remains distressed

- Do not give both drugs simultaneously
- Consider alternating drugs if distress persists or recurs before the next dose is due.

30. Fever is an important part of the physiological response during illness. “The ability to mount a febrile response to infection has been shown to increase survival rates in many animal species….It is difficult to believe that this primitive, almost universal, response would have survived millions of years of evolution it if did not present some overall benefit”.

31. Elevated temperatures associated with infection do not reach levels that cause direct harm. Brain damage has not been shown to be caused by fever associated with infection, even when a temperature reaches 42’C. “It is the underlying illness rather than the fever itself that is responsible for most morbidity.”

32. Several surveys show that many parents worry that fever itself could harm their child — due to seizures, dehydration or brain damage. This phenomenon, called “fever phobia” can result in significant anxiety for parents and unnecessary visits to GPs, A&E and the out-of-hours service.

33. Explaining the benign nature of fever – and that treating the level of temperature itself is not needed – is an important part of reassuring parents. The patient handout (end of module) may be helpful in minimising fever phobia.

Faltering growth[7,8,9]

Assessment and causes

34. Faltering growth is defined as a significant interruption of expected growth compared with other children of similar age and sex during childhood. This definition does not specify being below the 2nd,5th or 10th centile, but instead looks at the change in growth over time.

35. Faltering growth is a common problem and is usually identified during the first 2 years of life. It is seen in all socio-economic groups, but the incidence is especially high among urban and rural families living in poverty. Infants and children who develop it are at increased risk of long-term growth, development, and behaviour problems[9].

36. ***History*** should include:
- parental and siblings' heights
- history of pregnancy and neonatal period, and birth weight
- nutritional history, which may need to be assessed by a dietician
- any relevant systemic symptoms
- social and family history. Puerperal depression may present faltering growth.

37. ***Examination*** should include height, weight, head circumference – see Table 1. Note any dysmorphology, wasting, or organic dysfunction, and look for any features consistent with abuse.

Table 1. Interpreting measurements of child growth

	Head circumference	Weight	Height
Congenital disease	decreased	decreased	decreased
Constitutional growth delay or dwarfism, endocrine disorders	normal	slightly decreased, compared to height	decreased (in endocrine disorders, there can be decreased height with normal weight)
Faltering growth	normal	decreased, compared to height	usually normal unless severe malnutrition

38. Repeated measurements of height and weight on growth charts are much more important than a single measurement. The frequency of measurements will depend on the clinical situation and age of the child:

- 2 weeks to 6 months - no more than once monthly
- 6-12 months – no more than once every 2 months
- over 12 months – no more than once every 3 months.

For premature babies a corrected age should be used based on time since birth, minus prematurity. Various charts are available on-line including charts for special groups e.g. Down's syndrome. The charts are free, but may require a licence agreement. http://www.rcpch.ac.uk/Research/UK-WHO-Growth-Charts.

39. There are a wide range of causes of faltering growth, in the following categories:

- inadequate intake of nutrition
- physical feeding problems, including reflux and neurological swallowing problems
- poor absorption or metabolism of nutrients, including inborn errors of metabolism
- increased metabolic demands e.g. due to heart conditions, respiratory or urinary infections, uncontrolled asthma,
- non-organic or 'functional' problems e.g. child neglect, emotional deprivation, and extreme selective eating patterns including inappropriate exclusion diets for suspected food allergy.

The most common cause is under-nutrition, particularly inadequate intake of energy or proteins. Occasionally there can be lack of minerals, e.g. zinc. No underlying medical cause of under-nutrition is identified in > 80% of cases, and causes can combine - e.g. a chronic illness (with increased metabolic demand) can combine with inadequate intake (due to loss of appetite).

40. Many families struggle financially to get food on the plate for their children. In 2014/15 over 1,000,000 people in the UK needed a 3-day emergency supply from a foodbank (which contrasts sharply with five years previously = 40,000 people). Over a third of these people were children[10]. A two-question screen may identify families at risk:

- "Within the past 12 months have you ever worried whether your food would run out, before you got money to buy more?"
- "Within the past 12 months has the food you bought ever not lasted, and you didn't have money to buy more?"

Management

41. Management will depend on the underlying cause, particularly if a disease process is discovered during clinical assessment. Thereafter most dietary advice is based on "expert opinion", with little evidence for any single intervention. Usually, replacing nutrients will produce weight gain and return to normal growth curve, but consider the possibility of potential harms of this, in some children. For example, in those with a history of intrauterine growth restriction, excess nutrients may result in metabolic syndrome later in life.

42. In children with both poor weight and height growth, catch-up height gain lags behind catch-up weight gain, so continue nutritional intervention until catch-up height is achieved. To do this properly, most cases need to be managed by a health visitor or dietician, and follow-up advice may be needed for some years.

43. Refer to paediatrics if

- features suggest an underlying illness
- severe faltering growth (a fall through two or more centile spaces on UK-WHO chart) persists despite community and dietetic interventions.

Referral to social work or psychology teams may be needed, in cases of abuse/neglect, or pronounced food refusal due to psychological or behavioural issues.

Urinary Tract Infection[11,12,13]

44. The diagnosis of urinary tract infection (UTI) in young children is important as a marker for urinary tract abnormalities, and it may cause life-threatening sepsis in the newborn.

Box 4. – UTI Definitions

- Bacteriuria: bacteria in urine uncontaminated by urethral flora. There may be few (or no reported) symptoms. It should be considered significant in infants/early school-age children where it may lead to renal scarring.
- Symptomatic bacteriuria: this term is synonymous with UTI
- Vesico-ureteric reflux: urine flow retrograde up the ureters during micturition. Identified by a micturating cystourethrogram.
- Chronic pyelonephritis: this is an histological/radiological diagnosis. Juxtaposition of a renal cortical scar and a dilated calyx is the key to its diagnosis. It is a major cause of renal failure.
- Atypical UTI includes: seriously ill children, those with poor urine flow, an abdominal mass, septicaemia, and/or failure to respond to suitable antibiotics within 48 hrs. There can be infection with non-E. coli organisms.
- Recurrent UTI means

- two or more episodes of UTI with acute pyelonephritis/upper urinary tract infection, or
- one episode of UTI with acute pyelonephritis/upper urinary tract infection plus one or more episode of UTI with cystitis/lower urinary tract infection, or
- three or more episodes of UTI with cystitis/lower urinary tract infection.

45. In the first three months of life, UTIs are present in 7.5% of girls, 2.4% of circumcised males and 10% of uncircumcised males who present with a fever (but note info point 26). In the first year of life (mostly the first three months), UTI is more common in boys than in girls, after which the incidence changes, to approximately 3% of pre-pubertal girls and 1.1% of pre-pubertal boys. Risk factors are listed in box 5.

Box 5. Risk factors for UTI in childhood

- Any condition that leads to urinary stasis (renal calculi, obstructive uropathy, vesico-ureteric reflux or family history of this, voiding disorders) or poor urine flow – (e.g. phimosis, or posterior urethral valves in neonates).
- Previous UTI or history suggestive of a previous UTI.
- Constipation.
- Evidence of spinal lesion.
- Antenatally diagnosed renal abnormality.
- Poor growth.
- High blood pressure.

History and Examination

46. Symptoms in neonates differ to those in older children. Neonates are more likely to develop urosepsis and their infections are less likely to be due to Escherichia coli.

- Infants younger than 3 months: fever, vomiting, lethargy and irritability are common. Poor feeding and faltering growth may occur. Abdominal pain, jaundice, haematuria and offensive urine are less common. However, note info point 26.
- Infants and preverbal children aged 3 months or older: these commonly have a fever. Fewer also have abdominal pain, loin tenderness, vomiting and poor feeding. Lethargy, irritability, haematuria, offensive urine and faltering growth are less common.
- Children aged over 2 years: these most commonly present with frequency, dysuria and suprapubic, abdominal or lumbar pain. Dysfunctional voiding and changes to continence are less common. Fever, malaise, vomiting, haematuria, offensive urine and cloudy urine are least likely to be seen in this group.

47. Gastroenteritis may co-exist with UTI, although true incidence of this is unknown, due to urine sample contamination. Differential diagnosis of UTI includes vulvovaginitis, urethritis, irritation (use of soaps and bubble baths, and poor hygiene), threadworms, and balanitis

48. Severe and simple forms of UTIs should be differentiated, as to some extent the severity of symptoms dictates the degree of urgency with which investigation and treatment are to be undertaken. Severe UTI presents with fever >39,C, vomiting, and dehydration

49. As well as checking temperature, examine the abdomen looking for constipation, and a tender or palpable kidney. Look at the back for stigmata of spina bifida or sacral agenesis, and the genitalia for phimosis, labial adhesions, vulvitis or epididymo-orchitis.

Investigations

50. A clean catch urine sample is possible in the majority of cases. This requires patience on the part of the parents of babies, who will have to wait with a semi-naked child on their knee for a prolonged period, bowl at the ready, until the sample appears.

Although this is time-consuming, there seems to be a good correlation between the results of urine culture obtained by this method and suprapubic aspiration, with a false-positive rate of only 5% and false-negative rate of 12%. For older children, a potty washed with hot water prior to use is another method used.

51. If a clean catch urine sample is not possible, a plastic bag attached to cleaned genitalia can be used. However, if the genitalia are not cleaned and culture is delayed, there can be a high incidence of false-positive results (85-99%). Other non-invasive methods include urine collection pads, but do not use cotton wool balls, gauze or sanitary towels.

52. Nitrites are not a very sensitive dipstick test in infants. This is because not all urinary pathogens reduce nitrate to nitrite. However, false negatives are rare. See Box 6.

Box 6. Dipstick urine testing in children – what to do with the results

- If leukocyte esterase and nitrite are positive: start antibiotic treatment for UTI and, if the child has a high or intermediate risk of serious illness or a history of infection, send urine sample for culture.
- If leukocyte esterase is negative and nitrite is positive: start antibiotic treatment if a fresh sample was tested and send urine sample for culture.
- If leukocyte esterase is positive and nitrite is negative: send urine sample for microscopy and culture. Only start antibiotic treatment for UTI if there is good clinical evidence of such infection.
- If leukocyte esterase and nitrite are negative: do not start treatment for UTI, and explore other causes of illness.
- Dipsticks are unreliable <3 years old, so always send an MSU as well in this age-group.

53. See appendix 3 for NICE guidelines on imaging, but there is still some debate about what test should be performed at what stage. These are usually arranged by secondary care, though GPs can usually order ultrasound.

Treatment and Prevention

54. Children with a high risk of serious illness and/or aged younger than 3 months should be referred immediately to secondary care. Do not delay treatment if the sample cannot be obtained and the infant or child is at high risk of serious illness.

55. Carefully assess the degree of toxicity, dehydration and ability to maintain oral fluid intake. Encourage fluids, avoid or correct constipation, and encourage full voiding.

- Aged <3 months: if UTI is suspected clinically, refer to a paediatrician.
- Aged >3 months but <3 years: send a sample for urgent microscopy and culture. Await the result before starting treatment, unless they are very systemically unwell.
- Aged >3 years: use dipstick test to diagnose UTI: see Box 6

56. Older children with acute pyelonephritis or upper UTI can be treated in primary care with 10 days of oral antibiotics. Children aged 3 months and over with cystitis or infection of the lower urinary tract should be treated with three days of oral antibiotics according to local guidance. However, there is some evidence that outcomes of short courses (1-3 days) are inferior to those of 7- to 14-day courses.

[I suggest 3 days for lower UTI and 7 to 10 days for upper UTI depending on response the treatment. Always do an MSU after treatment.]

57. There is little evidence to favour a particular antimicrobial. Trimethoprim 50 mg/5 ml, 50 mg bd orally is commonly used. Other agents used include nitrofurantoin, cefalexin (expensive, some resistance), amoxicillin (not useful for empirical treatment, as there are high resistance rates, but good for known sensitive organisms), and co-amoxiclav, which is

a useful second-line agent. [Co-amoxiclav is no more useful than amoxicillin, unless an MSU specifically suggests it].

NB: quinolones should be avoided due to safety concerns.

58. The choice of antibiotic should be determined by local guidelines and the MSU result. Cases of trimethoprim resistance in children are rising – up to 33% in Tayside[13] – so if a second UTI occurs <3 months after the first, use another drug such as nitrofurantoin. Paracetamol can help to relieve pain and high temperature. Always repeat the MSU after treatment.

59. Relief of voiding dysfunction, good hygiene, wiping from front to back after micturition in girls, and avoiding constipation/bubble baths/chemical irritants and tight clothing are sensible recommendations.

NICE recommends the following regarding prophylaxis:

- Antibiotic prophylaxis should not be routinely recommended in infants and children following first-time UTI.
- Antibiotic prophylaxis may be considered in infants and children with recurrent UTI.
- Asymptomatic bacteriuria in infants and children should not be treated with prophylactic antibiotics.
- Antibiotic prophylaxis may also be used after an acute episode of UTI until the diagnostic work-up is completed. The most common antibiotics are nitrofurantoin, trimethoprim, cefalexin and cefaclor.

60. Advice regarding referral for outpatient assessment varies from region to region. NICE suggest referral should mirror the indications for USS (see Appendix 3) i.e. referring children less than 6 months old, or those with recurrent or atypical UTI. Referral is not routinely required for a single episode of uncomplicated UTI, which settles with treatment.

The case commentaries which follow are designed to be read ***after*** groups have discussed the cases and their own experiences. Reading them is optional for groups. They are ***not*** intended to be the "right answer", but instead are a check for groups, that they have looked at the relevant parts of the information section, rather than having a "general chat" which excludes the relevant evidence base.

CASE COMMENTARIES

Case 1: Charlie, age 3

What else would you like to know?

Take a full history to exclude organic causes (info point 6) and red/amber flags (Box 2). Ask about diet, including fluid intake, and examine him to exclude organic disease which may have been missed at earlier examinations e.g. locomotor delay (info point 6). A rectal examination is not recommended, even if you suspect impaction (info point 5) though you should have a look his anus to check it appears normal (info point 6).

[You should be able to diagnose impaction with a careful abdominal examination].

Using the Bristol Stool Chart (figure 1) can be useful to ensure that you and mum are talking about the same consistency of stool, and the stool pattern (info point 3).

Assuming functional constipation is suspected after history and examination, how would you treat Charlie?

Explain that most cases of idiopathic constipation resolve and are treatable without further investigation (info point 9). The next step would be to give

- dietary advice and information on recommended fluid intake if needed – the latter can be more than most parents expect it to be (appendix 1)
- laxatives at an early stage - do not delay (info point 13 and appendix 1). If impaction is suspected, treat using a recommended dis-impaction regimen, and then commence maintenance treatment.

- behavioural interventions – your health visitor may be able to help here (info point 12).

Charlie should be followed up regularly to assess adherence and response to treatment, and to advise on when to reduce and stop laxatives. He may need to remain on treatment for months to years (info point 15) and explaining this to mum may be helpful. Refer her to the ERIC website for further information (info point 14).

In the absence of red and amber flags, referral would only be needed for idoiopathic constipation if there is an unsatisfactory response to treatment.

Case 2: Zara, age 4

What else would you like to know?

Assess a) whether there is any signs of serious illness and b) if there are any symptoms indicating the focus of infection. Zara's temperature should be taken, but note that the height of the fever is only aspect in assessment, and does not always correlate with severity of disease (info point 17).

Appendix 2 describes the traffic light system which includes looking for tachycardia, tachypneoa, and delayed capillary refill time. Note that simple observation ("eyeballing") is not 100% accurate (info point 19).

Looking for the source of infection should include considering recent vaccinations and the possibility of UTI (info point 26, 27).

How would you manage Zara and what advice would you give to mum?

Zara has an "amber" feature - a tachycardia (info point 21). Tachycardia is an important sign, however there are no other worrying signs and it looks like she has an upper respiratory tract infection. The key steps are to set up a safety net (info point 23) and give mum reassurance.

Whether you arrange follow-up or advise mum to contact "at any time" would depend on your clinical experience and personal preference. In the meantime advising mum that the fever itself is not the reason for being concerned, may be helpful (info points 31 – 33) – "fever

phobia" may be a problem here. The patient handout at the end of this module may help. Advise her what to do about lowering the temperature (info points 28, 29).

Would your management change if she were 2 months old?

The younger the child, the more concerned you should be (info point 19). One possibility which is hard to exclude in this age-group, is UTI (info point 26), and don't forget to ask about vaccination (info point 27). Depending on your observation of the child, this could be a case you might wish to discuss with the paediatric team, especially if fever is at or above 38'C (info point 17). The traffic light system suggests that a child who "appears ill to a healthcare professional" should be treated as "red" or "high risk".

Case 3: Ruaridh, age 3

What other information do you need?

All cases of faltering growth are assessed on a trend in measurements (info point 34), so you should measure him today, and try and get some older readings charted too, on up-to-date UK-WHO charts (info point 38). Assessing height, weight and head circumference over time should help pin down the cause (info point 37).

Ask his mother about his medical history and her own too – especially in pregnancy. How tall is she and Ruaridh's father, exactly (info point 38)? Any evidence of acute or chronic illness here? In most cases you will not find the reason for faltering growth but you should consider the causes, and eliminate them all before considering the commonest cause, under-nutrition (info point 39).

How would you manage this situation?

Consider plotting mid-parental heights, so that you can assess how tall he is expected to grow. Taking a full eating history could include gently asking about their financial situation (info point 40). Other questions can reveal what exactly his diet contains, and in most cases a health visitor and/or dietitician will be needed (info points 41, 42).

Further referral to paediatrics would only be required if you find an underlying illness, or your own team (plus dietician) cannot help him, or he continues to lose weight (info point 43). Faltering growth is more common in socially disadvantaged children so keep an eye out for signs of abuse, both now and later (info points 35, 37).

Case 4: Jemima, age 5

How would you manage her?

Jemima has typical UTI symptoms (info point 46) with one risk factor – constipation (Box 4) Dipstick suggests a UTI though the nitrites are negative (info point 52 and Box 6). In this late afternoon presentation, start antibiotics after sending the urine for microscopy – urine keeps well overnight, refridgerated in a boric acid container. The choice of drug depends on local guidelines, but note that trimethoprim resistance is rising (info point 57, 58).

There are some lifestyle measures which can be useful to help prevent future UTI (info point 59).

What features would alert you to an atypical UTI?

Jemima could have an atypical UTI if she became seriously ill, had poor urine flow, an abdominal mass, septicaemia, and/or failure to respond to suitable antibiotics within 48 hrs. The distinction is important as infection can be with organisms other than E Coli, and NICE suggests an immediate ultrasound in these cases (Appendix 3).

Which children, who develop UTI, require further investigation and referral?

Jemima would not require any further investigation or referral if her symptoms settle in 48 hrs and UTI does not recur (info point 60). Some children require more urgent care in the immediate stages – including children under 3 months and those with atypical and severe UTI (info points 46, 48, 54).

Imaging at a later date may be necessary if she demonstrates any atypical features or develops another UTI, as described in appendix 3. Apart from ultrasound, it is unlikely that GPs will be organizing any of the other imaging tests in that appendix, which are usually arranged by a paediatric clinic.

[As mentioned below info point 56, repeat an MSU after treatment].

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Useful sources of further information

Constipation

- ERIC – charity that supports children with continence problems. Lots of useful information leaflets and advice for parents and carers as well as children.
- http://patient.info/health/constipation-in-children-leaflet and http://patient.info/health/fibre-and-fibre-supplements - leaflets on childhood constipation and sources of fibre.

Fever

- https://www.spottingthesickchild.com This is a new interactive tool commissioned by the Department of Health to support health professionals in the assessment of the acutely sick child.

Faltering growth

- Weight faltering and Faltering growth. BMJ 2012; 345: e5931
- New NICE guideline is in the pipeline, expected 2017

UTI

- http://patient.info/health/urine-infection-in-children Information leaflet for parents
- http://pathways.nice.org.uk/pathways/urinary-tract-infection-in-children

APPENDIX 1. Treatment of constipation.

Laxatives.

Impaction. First-line treatment is with macrogols. These can be used in escalating doses, with advice to families about inevitable initial soiling and pain. A stimulant can be added if macrgols are not effective alone.

Maintenance. Again macrogols, +/- stimulants as needed. If stools are hard, use lactulose or docusate. Treatment needs to continue for several weeks after regular toileting is established, and withdrawal of treatment should be gradual, over several months

Macrogols

Macrogols - Paediatric formulation: [Macrogols are completely ineffective unless you give the large amounts of fluid with each dose, as recommended on the packet].

Disimpaction

- under 1 year: ½–1 sachet daily
- 1–5 years: 2 sachets on 1st day, then 4/day for 2 days, then 6/day for 2 days, then 8/day
- 5–12 years: 4 sachets on 1st day, increased in steps of 2 sachets/day to max of 12/day

Ongoing maintenance

- under 1 year: ½–1 sachet daily
- 1–6 years: 1 sachet daily; adjust dose to produce regular soft stools (max 4 sachets daily)
- 6–12 years: 2 sachets daily; adjust dose to produce regular soft stools (max 4/day)

Macrogols - adult formulation:

Disimpaction

- age 12–18 years: 4 sachets on 1st day, increased in steps of 2/day daily to max 8/day

Ongoing maintenance

- age 12–18 years: 1–3 sachets daily in divided doses adjusted according to response; maintenance, 1–2 sachets daily

Lactulose [this does not work on already constipated stool – it only prevents future stool from becoming hard]

- 1 month to 1 year: 2.5 ml twice daily, adjusted according to response
- 1–5 years: 2.5–10 ml twice daily, adjusted according to response
- 5–18 years: 5–20 ml twice daily, adjusted according to response

Stimulant laxatives

Sodium picosulfate

Elixir (5 mg/5 ml)

- 1 month to 4 years: 2.5–10 mg once a day
- 4–18 years: 2.5–20 mg once a day

Perles (1 tablet = 2.5mg)

- 4–18 years: 2.5–20mg once a day

Bisacodyl

- 4–18 years: 5–20 mg once daily by mouth
- 2–18 years: 5–10 mg once daily by rectum (suppository)

Senna syrup (7.5 mg/5 ml)

- 1 month to 4 years: 2.5–10 ml once daily
- 4–18 years: 2.5–20 ml once daily

Senna tablet (7.5 mg)

- 2–4 years: ½–2 tablets once daily
- 4–6 years: ½–4 tablets once daily
- 6–18 years: 1–4 tablets once daily

Docusate sodium

- 6 months–2 years: 12.5 mg three times daily (use paediatric oral solution)
- 2–12 years: 12.5–25 mg three times daily (use paediatric oral solution)
- 12–18 years: up to 500 mg daily in divided doses

Recommended fluid intake

Encourage children with a poor fluid intake to increase fluids to a recommended level. Approximately three-quarters of the daily fluid requirement in children is obtained from water in drinks. Higher intakes of total water will be required for children who are physically active, exposed to hot environments, or obese.

The following is a guide to adequate total water intake per day, including water contained in food. It should not be interpreted as a specific requirement:

Infants 0–6 months of age: 700 mL, assumed to be from milk.
Babies 7–12 months of age: 800 mL from milk and complementary foods and beverages, of which 600 mL is assumed to be water from drinks.

Children 1–3 years of age: 1300 mL (900 mL from drinks).
Children 4–8 years of age: 1700 mL (1200 mL from drinks).
Children 9–13 years of age:

- Boys 2400 mL (1800 mL from drinks)
- Girls 2100 mL (1600 mL from drinks).

Young people 14–18 years of age:

- Boys 3300 mL (2600 mL from drinks).

- Girls 2300 mL (1800 mL from drinks).

(adapted from the Institute of Medicine of the National Academies, 2005)

[I suggest avoiding fizzy drinks and encourage physical exercise – but note that almost all children will need treatment with medication in addition to this advice].

More information is available on the following links:

http://www.refhelp.scot.nhs.uk/dmdocuments/Paediatric_GI/Guidelines%20for%20management%20of%20idiopathic%20childhood%20constipation.pdf

APPENDIX 2. Fever – the Traffic Light System

Traffic light system for identifying risk of serious illness*

	Green – low risk	Amber – intermediate risk	Red – high risk
Colour (of skin, lips or tongue)	• Normal colour	• Pallor reported by parent/carer	• Pale/mottled/ashen/ blue
Activity	• Responds normally to social cues • Content/smiles • Stays awake or awakens quickly • Strong normal cry/not crying	• Not responding normally to social cues • No smile • Wakes only with prolonged stimulation • Decreased activity	• No response to social cues • Appears ill to a healthcare professional • Does not wake or if roused does not stay awake • Weak, high-pitched or continuous cry
Respiratory		• Nasal flaring • Tachypnoea: – RR >50 breaths/ minute, age 6–12 months – RR >40 breaths/ minute, age >12 months • Oxygen saturation ≤95% in air • Crackles in the chest	• Grunting • Tachypnoea: RR >60 breaths/minute • Moderate or severe chest indrawing
Circulation and hydration	• Normal skin and eyes • Moist mucous membranes	• Tachycardia: – >160 beats/minute, age <12 months – >150 beats/minute, age 12–24 months – >140 beats/minute, age 2–5 years • CRT ≥3 seconds • Dry mucous membranes • Poor feeding in infants • Reduced urine output	• Reduced skin turgor
Other	• None of the amber or red symptoms or signs	• Age 3–6 months, temperature ≥39°C • Fever for ≥5 days • Rigors • Swelling of a limb or joint • Non-weight bearing limb/not using an extremity	• Age <3 months, temperature ≥38°C • Non-blanching rash • Bulging fontanelle • Neck stiffness • Status epilepticus • Focal neurological signs • Focal seizures

CRT, capillary refill time; RR, respiratory rate

** This traffic light table should be used in conjunction with the recommendations in the guideline on investigations and initial management in children with fever. See http://guidance.nice.org.uk/CG160 (update of NICE clinical guideline 47).*

Normal Paediatric Vital Signs

Age	Pulse	Respirations	Systolic BP
<1 year	110-160	30-40	70-90
1-2 years	100-150	25-35	80-95
2-5 years	95-140	25-30	80-100
5-12 years	80-120	20-25	90-110
over 12 years	60-100	15-20	100-120

APPENDIX 3. Imaging in childhood UTI

Ultrasound

This can accurately assess renal size and outline and identify most congenital abnormalities, renal calculi and hydronephrosis or hydroureter, indicating the presence of obstruction or severe reflux. It is less effective in detecting mild or moderate vesico-ureteric reflux in children with UTIs.

As GPs can usually organise this test, it is useful to know NICE's recommended imaging schedule:

	< 6 months old	**> 6 months old**
Arrange an USS within 6 weeks of UTI diagnosis	Yes, in ***all*** cases (if recurrent or atypical UTI, an immediate USS is needed)	Only if recurrent or atypical UTI (in atypical UTI, an immediate USS is needed)

Micturating cystography

This is the gold standard investigation for reflux and is the only imaging technique that provides information about the urethra. The disadvantage of micturating cystography is its invasiveness, as it requires catheterisation.

DMSA scintigraphy

This is the gold standard for detecting renal parenchymal defects, and studies renal function using a radio-pharmaceutical such as technetium 99m. The isotope is concentrated in the proximal renal tubules, and its distribution correlates with functioning renal tissue.

APPENDIX 4. When Your Child has a Fever

Is a fever dangerous?

A fever is very common in children. Usually a fever is a sign of an infection, most commonly caused by viruses that are *not* serious. A fever is a normal part of fighting this infection. Unless the fever is very high (over 42'C), it is not harmful by itself. More important than the actual temperature is the answer to the question, "Does my child seem sick?" So treat the child, NOT the fever.

How can I tell if my child has a fever?

There are four ways you can take your child's temperature: by the mouth (oral), by the bum (rectal), under the armpit (axillary) or in the ear (tympanic). Use a digital thermometer. It's made of unbreakable plastic and is easy to read. It's best not to use fever strips as they are not accurate.

How do I treat my child's fever?

Remember that fever is usually not harmful to your child, and most children are not uncomfortable until fever reaches 39.5°C – 40°C. Lowering the temperature may help your child feel better and less grumpy. You can use either paracetamol or ibuprofen . These medications come in many different forms, such as drops (for infants) and chewable tablets, syrup and tablets for older children.

Never give aspirin to your child as it may cause Reye's syndrome, a serious illness that can lead to death.

How much medication do I give my child?

Children's paracetamol and ibuprofen can help to reduce a fever, but they're not always needed. If your child doesn't seem distressed, there's no need to give them medicine to lower their temperature.

If your child is distressed, don't give them paracetamol and ibuprofen at the same time. Try one on its own first. If they're still distressed before the next dose is due, you could try the other medicine instead. Please follow the doses recommended on the packet unless you have been advised not to by a qualified health professional.

What else can I do?

- Make sure your child is comfortable and resting quietly. Check them during the night, too
- Offer plenty of fluids – which means breast-milk, in breast-fed babies. Call for advice if concerned about dehydration, signs of which include sunken fontanelle ("soft spot"), dry mouth, sunken eyes, poor overall appearance
- Remove extra blankets and clothing, but don't take off all clothing. Your child may become too cold and start shivering, producing more body heat and causing the temperature to rise again.
- Avoid fanning or sponging, cold or ice water baths, and alcohol baths and rubs.
- More info is available at http://www.whenshouldiworry.com/

When should I seek medical attention?

Contact your GP or NHS 24 if your child:

- is overly grumpy, fussy or irritable, or has a fit
- is very sleepy, low in energy or unresponsive
- has a fever and is less than three months old
- has a fever and a purple rash
- has a fever higher than 39'C or a fever that lasts longer than 5 days or is becoming more sick.

Adapted from: 1) Fever, Advice for Parents on Fever & How to Take a Child's Temperature, Canadian Paediatric Society 2000, 2) National Institute for Health and Clinical Excellence (NICE) clinical guideline 47. Feverish illness in children: Assessment and initial management in children younger than 5 years. May 2007. http://www.nhs.uk/conditions/feverchildren/Pages/Introduction.aspx accessed 29.5.17

PBSGL Individual reflection sheet **Topic** **Date:**

Main learning points for me	Application to practice – what will I change?

If it is helpful, you can use this sheet to record your own learning points and how this may impact on your practice. This will help inform the discussion that is focussed on completion of the PBSGL log-sheet towards the end of your meeting and also may form a personal record of your learning for appraisal purposes. **Note to facilitators: the group log sheet – a very different document to this one - is much easier to complete online: Please log in to the CPD connect website http://www.cpdconnect.nhs.scot/login then click on your group code which you will find just under 'My Group(s)/Membership' on the PBSGL page below the menu on the left hand side of screen. Once you click on this you will be taken into Log sheet Administration where you can add new log sheets or view, edit, delete existing log sheets. Completing that is an important part of the group's reflection on a topic, so please leave enough time to do so at the end of each meeting. Thank you.**