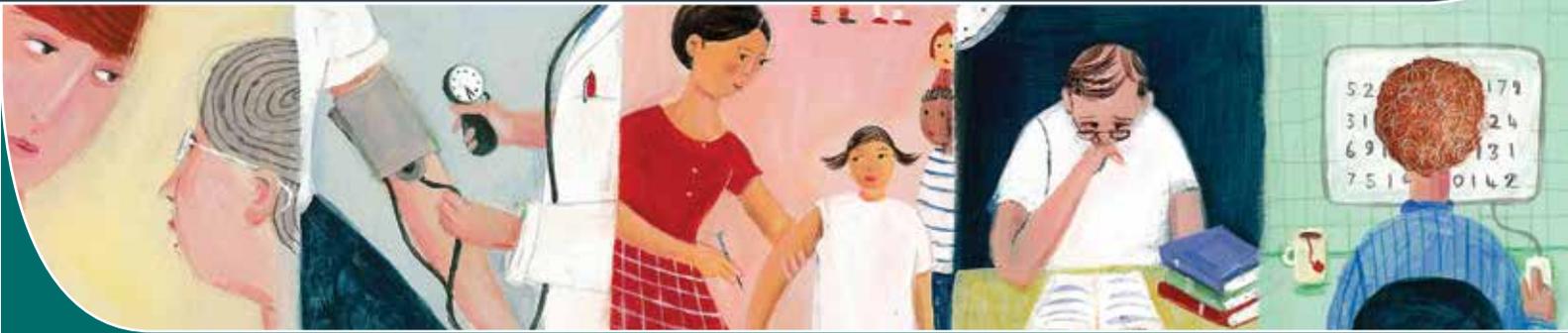


check

Independent learning program for GPs



Unit 493 April 2013

Paediatrics

check

Independent learning program for GPs



Paediatrics

Unit 493 April 2013

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 Applied professional knowledge and skills  Population health and the context of general practice

 Professional and ethical role  Organisational and legal dimensions

The publisher, editors and staff of the RACGP would like to farewell Dr Catherine Dodgshun as Medical Editor for *check* Program over the past 2 years and thank her for her outstanding contribution to the College's publishing program. Dr Dodgshun has been an important part of *check* and she leaves a legacy that will enrich the professional lives of medical professionals for years to come.

This unit of *check* explores several issues common in young children. It covers a broad spectrum, from a 7-month-old baby with a urinary tract infection (UTI) to a 5-year-old child with behavioural issues.

Managing a child in general practice can be difficult, in particular because they are unable to give a history themselves and the communication and history-taking must be done with their parents or guardians. In addition, examining an uncooperative child can be frustrating, regardless of whether the non-cooperation is due to illness or behavioural issues. What investigations are performed also need to take into account the age of the child and the invasiveness of the procedure.

The authors of this unit provide a wealth of clinical research and teaching experience.

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The learning objectives of this unit are to:

- better understand how to manage an infant with a suspected UTI
- develop increased confidence in managing toddlers with a limp
- understand the complexities of investigating a child with a rash
- improve knowledge of how to deal with young children with behavioural problems at home and learning problems at school
- realise the number of illnesses that can present as 'gastro'
- source appropriate support for parents of children with behavioural problems.

We hope that this unit of *check* will assist you to more confidently assess and manage young children.

Kind regards



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ADHD	attention deficit hyperactivity disorder	IBD	inflammatory bowel disease	PEDS-DM	Parents' Evaluation of Developmental Status: Developmental Milestones
CPK	creatinine phosphokinase	LFT	liver function test	RAST	radioallergosorbent test
CRP	C-reactive protein	MAG3 scan	technetium-99m mercaptoacetyltriglycine scan	SUFE	slipped upper femoral epiphysis
CT	computerised tomography	M-CHAT	Modified Checklist for Autism in Toddlers	TSH	thyroid stimulating hormone
DMSA scan	dimercaptosuccinic acid scan	MRI	magnetic resonance imaging	UEC	urea, creatinine and electrolytes
DTPA scan	diethylene triamine pentaacetic acid scan	NICE	National Institute for Health and Clinical Excellence	URTI	upper respiratory tract infection
EEG	electroencephalogram	NSAIDS	non-steroidal anti-inflammatory drugs	UTI	urinary tract infection
ENT	ear, nose, throat	ORS	oral rehydrating solution	WCC	white cell count
ESR	erythrocyte sedimentation rate				
FBE	full blood count				

CASE 1
BILLY IS STRUGGLING AT SCHOOL

Billy, aged 5 years, commenced school 6 months ago. His mother, Sarah, brings him to your surgery because he has been having problems at school. She tells you that his teacher has noticed Billy is inattentive in the classroom and appears to be unable to sit still. He is easily distracted and on occasions, the teacher said, appears to be daydreaming.

According to Sarah, Billy has not made any progress with his learning. During recess he either plays on his own or stands around watching other children at play. He has not made any friends of his own.

You review Billy's file. You check his head circumference, weight and height and compare these with previous data on his growth chart. Billy has been tracking normally since birth. He is up-to-date with his immunisations, and you have seen him several times at your surgery with mild respiratory tract infections as well as an episode of croup at the age of 2 years.

QUESTION 1 

What could be the causes for Billy's behaviour at school and his slow learning?

QUESTION 2 

How would you assess Billy?

QUESTION 3 

What type of dysmorphic features would alert you to a possible genetic problem?

QUESTION 4 

What investigations would you request?

QUESTION 5 

Who would you refer Billy to?

CASE 1 ANSWERS

ANSWER 1

Billy could have problems that affect one or more of the following areas.¹

Physical health

The physical fitness of children affects their ability to pay attention, to learn and to play well with other children. Children with visual or hearing impairment or delayed motor or oromotor skills may struggle in school. Children with genetic disorders, chronic illness (e.g. asthma, food allergies and cardiac, neurological and renal disorders) and disturbed sleep may also have difficulty coping at school.

Social and emotional development

The social and emotional development of a child is the best predictor of academic success in early school years. Children who are ready for school have the capacity to self-regulate, express themselves in an appropriate manner, understand the perspectives of others and have pro-social behaviours such as sharing, turn-taking, and empathy. A child with delayed or disturbed social and emotional development can demonstrate separation anxiety or challenging and disruptive behaviours.

Language development

The development of language includes not only speech and listening, but also literacy skills such as reading and writing. Language is required for attaining knowledge. Receptive language is more important than expressive language in predicting school readiness.

Cognition

A child's intellectual ability (reasoning, learning and problem-solving) and adaptive skills (everyday practical and social skills) affect school function. Most children with an intellectual disability are identified in preschool due to developmental delay. Some children with mild intellectual disability may not be identified until they attend school.

ANSWER 2

Take a thorough history from Billy's mother Sarah, examine him and observe his behaviour.^{2, 3, 4, 5, 6} Validated behavioural tools can also be used.

The history should include:

- antenatal history
- birth and neonatal history
- current symptoms and past medical history
- family history
- developmental history – enquire about Billy's developmental milestones, and whether concerns were raised by his maternal and child health nurse during early childhood developmental screening
- history of behaviour – ask about any behaviour Sarah is concerned about. Ask for a report from Billy's teacher about his classroom behaviour.

Clinical examination:

- check vital signs and look for signs of chronic disease
- check head circumference, weight and height and compare with previous data on Billy's percentile charts
- test hearing and vision.

General observations and growth parameters are summarised below in *Table 1* and *Table 2*.

Examination feature	Potential clinical implication
Sad, clingy, separation anxiety	Emotional problems
Intrusive, interrupts conversation, impulsive, restless, very active	Disruptive behaviour problems – attention deficit hyperactivity disorder (ADHD)
Oblivious to the adults, poor response to name, no social smile, poor eye contact, inability to follow verbal instructions converse or communicate, unusual tone and pitch of voice	Autism spectrum disorder Developmental language disorder Hearing impairment
Unwashed hair, skin, nails and dirty unkempt look. Poor dental hygiene	Disadvantaged socio-economic factors and neglect
Many vacant staring episodes	Absence epilepsy

Adapted with permission from Von Hahn LE. Specific learning disabilities in children: Role of the primary care provider. In: UpToDate, Basow DS (Ed), UpToDate, Waltham, MA, 2013.²

Examination feature	Potential clinical implication
Weight percentile that has plateaued or crossed two percentiles, or weight for height below 80%	Indicates poor nutrition and may suggest chronic underlying disease
Height percentile that has plateaued or crossed two percentiles, or poor growth velocity	Indicates poor growth from underlying chronic disease such as coeliac disease, inflammatory bowel disease or endocrine disorders
Height, weight and head circumference below the 10th percentile with dysmorphic features	Suggests a genetic or chromosomal disorder such as Turner or Noonan syndrome, or foetal alcohol syndrome
Tall stature with large head	Soto syndrome
Tall stature with narrow face, prominent ears and jaw	Fragile X syndrome
Tall stature with small testes	Klinefelter syndrome
Short stature with webbed neck, widely spaced nipples, micrognathia, heart disease	Noonan or Turner syndrome

Adapted with permission from Von Hahn LE. Specific learning disabilities in children: Role of the primary care provider. In: UpToDate, Basow DS (Ed), UpToDate, Waltham, MA, 2013.²

Developmental assessment

It is important to use validated tools to assess behavioural problems, such as the Parents' Evaluation of Developmental Status: Developmental Milestones (PEDS-DM). This is a highly accurate,

valid tool that provides developmental screening and behavioural screening, plus ongoing surveillance. The PEDS-DM takes 6–7 minutes to complete (see *Resources*).^{7,8,9,10}

Specific screening for ADHD can be conducted using the Connors Questionnaire or Vanderbilt Assessment. (see *Resources*).^{11,12}

Screening for autism can be performed using the Modified Checklist for Autism in Toddlers (M-CHAT) or by using the Autism Research Centre screening tools for different ages (see *Resources*).

ANSWER 3

The presence of dysmorphic features suggests a genetic disorder, or chromosomal change or foetal exposure to toxins. Look for unusual head shape; slant of the eyes; size of palpebral fissures; space between eyes; epicanthic folds; nasal bridge; size and shape of ears; low set ears; vermilion border of lips; size of mouth and tongue; high arched palate; length of neck; webbed neck; position of hairline; size, shape and number of fingers and toes; and palmar creases.

ANSWER 4

Billy should have his vision and hearing assessed. This should include assessment of short-term auditory memory and auditory figure ground assessment (ability to hear with background noise).

Investigations to consider are:

- full blood evaluation (FBE)
- C-reactive protein (CRP)
- urea, creatinine and electrolytes (UEC)
- thyroid stimulating hormone (TSH)
- iron studies
- liver function tests (LFTs)
- lead levels
- creatinine phosphokinase (CPK)
- urinary metabolic screen
- chromosome karyotype studies
- DNA specific tests (e.g. Fragile X syndrome, Prader–Willi syndrome, Williams syndrome)
- computerised tomography scan (CT scan) of the brain, magnetic resonance imaging (MRI) of the brain and/or electroencephalogram (EEG).

ANSWER 5

Whether Billy needs to be referred depends on your assessment. Often a multidisciplinary approach is needed. If your assessment suggests autism or ADHD, you could refer Billy to a developmental paediatrician or child psychiatrist.

If you have concerns about Billy's social and family situation, refer the family to family support services. If you are concerned about possible abuse, consult child protective services. Billy will need to be referred back to the school (Department of Education) for an educational assessment (including a cognitive assessment and speech and language assessment) and special educational support.

CASE 2

JACK HAS A LIMP

Jack, a 3-year-old boy, has been a patient of yours since his birth. His parents, James and Lisa, bring him into your practice today because they are concerned that he won't bear weight on his left leg.

You have only seen Jack previously for viral illnesses and routine vaccinations. His parents tell you today that 2 days ago they noticed Jack was no longer walking and had started crawling around the house. He commenced walking at 12 months of age and his parents hadn't noticed any issues with his mobility until this current incident.

QUESTION 1

What are your differential diagnoses in Jack?

QUESTION 2

What features would you look for on history and examination to help you make a diagnosis?

FURTHER INFORMATION

You find Jack is afebrile and otherwise well. There is no history of trauma. Clinically, he does not resist passive examination of his hip, which has a good range of movement, although he does complain of pain. His other lower limb joints appear normal and are not painful. You administer some simple analgesia (paracetamol and ibuprofen) and ask Jack's parents to sit with him in your waiting room for a short time.

You call Jack and his parents back into your room and examine Jack again. You note he appears to be putting more weight on his leg, although he still won't walk.

QUESTION 3

What investigations should you order for Jack?

QUESTION 4

How will you manage Jack?

FURTHER INFORMATION

Jack returns for review with you in 48 hours. He remains systemically well. He is still not walking normally, although he is more comfortable and has, on occasion, taken a few steps.

QUESTION 5

What is your working diagnosis?

QUESTION 6

What follow-up would you arrange for Jack?

CASE 2 ANSWERS

ANSWER 1

The potential differentials in a child of Jack’s age are very broad. Age is the most important factor in helping decide potential diagnoses (see *Table 3*).

Rather than deciding on a definite diagnosis on the first visit, it is more important to consider dangerous pathologies that need urgent intervention (e.g. septic arthritis and malignancy), rather than more common self-resolving benign pathologies (e.g. transient synovitis).

As with all children with a potential injury, a non-accidental cause should be considered early.

Table 3. Primary differential diagnosis in a child with a traumatic limp	
0–3 years of age	Septic arthritis or osteomyelitis Developmental hip dysplasia Fracture or soft tissue injury (toddler’s fractures or non-accidental injury)
3–10 years of age	Transient synovitis or irritable hip Septic arthritis or osteomyelitis Perthes disease Fracture or soft tissue injury (stress fracture)
10–15 years of age	Slipped upper femoral epiphysis (SUFE) Septic arthritis or osteomyelitis Perthes disease Fracture or soft tissue injury (stress fracture)
Other diagnoses	Haematological disease, such as sickle cell anaemia Infective disease, such as pyomyositis or discitis Metabolic disease, such as rickets Neoplastic disease, such as acute lymphoblastic leukaemia Neuromuscular disease, such as cerebral palsy or muscular dystrophy Primary anatomical abnormality, such as limb length inequality Rheumatological disease, such as juvenile idiopathic arthritis
Reproduced with permission from Perry DC, Bruce C. Evaluating the child who presents with an acute limp. <i>BMJ</i> 2010;341:c4250. ¹³	

ANSWER 2

The features to be found on history and examination for conditions causing non-weight-bearing in children, particularly those who present with a painful or irritable hip, overlap significantly. The key to not missing dangerous diagnoses is to watch for ‘red flags’, such as a fever and severe pain, and perform timely clinical review. In particular, irritable hip should be regarded as a diagnosis of exclusion.

Some common presenting features are:¹⁴

Irritable hip (transient synovitis)

- Most common reason for a limp in the preschool-age group
- Usually occurs in 3–8-year-olds
- History of recent viral upper respiratory tract infections (URTI) (1–2 weeks)
- Child usually able to walk but with pain
- Child otherwise afebrile and well
- Mild-moderate decrease in range of hip movement – especially internal rotation (severe limitation of hip movement suggests septic arthritis).

Perthes disease

- Avascular necrosis of the capital femoral epiphysis
- Age range: 2–12 years (majority are 4–8 years of age)
- Twenty per cent bilateral
- Present with pain and limp
- Restricted hip motion on examination.

SUFE

- Late childhood/early adolescence
- Weight often above the 90th percentile
- Presents with pain in hip or knee, and associated limp
- Hip externally rotated and shortened
- Decreased hip movement – especially internal rotation
- May be bilateral.

Osteomyelitis and septic arthritis

These are the key diagnoses to exclude. A careful clinical history and examination with review is essential. There is significant overlap between these two conditions.

Osteomyelitis	Septic arthritis
<ul style="list-style-type: none"> • Subacute onset of limp/non-weight-bearing/refusal to use limb • Localised pain and pain on movement • Tenderness • Soft tissue redness/swelling may not be present and may appear late • With or without fever 	<ul style="list-style-type: none"> • Acute onset of limp/non-weight-bearing/refusal to use limb • Pain on movement and at rest • Limited range/loss of movement (With septic arthritis, the hip is often held in flexion, abduction, external rotation to maximise the joint space.) • Soft tissue redness/swelling often present • Fever

ANSWER 3

Often no investigations are needed.

In Jack's case, his general appearance and clinical examination are compatible with transient synovitis – although this is a diagnosis of exclusion. Most investigations are non-diagnostic and need to be combined with clinical impression and follow-up.

If an urgent or time-critical diagnosis is being considered, consultation with a local orthopaedic service and referral to an emergency department at this stage is appropriate.

Some possible investigation choices are outlined below.

Blood tests

- CRP is useful for monitoring disease, but not sensitive or specific enough to make a diagnosis. In a small retrospective study, children with a CRP <1 mg/dL had a likelihood of 87% of not having septic arthritis.¹⁵
- FBE/ESR – white cell count (WCC) and erythrocyte sedimentation rate (ESR) are poorly sensitive and specific individually, although when combined (in Kocher's criteria¹⁶ [see *Table 4*]), they perform moderately well¹⁷ (although this finding failed to be supported on external validation¹⁸).

Table 4. Kocher's criteria for differentiating septic arthritis from transient synovitis

Factors for predicting septic arthritis

- Fever >38.5°C
- Cannot bear weight
- ESR >40 mm in the first hour
- WCC >12×10⁹/L

Probability of septic arthritis

- No factors: <0.2%
- 1 factor: 3.0%
- 2 factors: 40%
- 3 factors: 93.1%
- 4 factors: 99.6%

Reproduced with permission from Kocher MS, Zurakowski D, Kasser JR. Differentiating between septic arthritis and transient synovitis of the hip in children: an evidence-based clinical prediction algorithm. *J Bone Joint Surg Am* 1999 Dec;81(12):1662–70. PubMed PMID:10608376.¹⁶

Radiology

- Plain X-ray
 - Usually non-contributory in children younger than 10 years
 - Useful early if trauma is suspected
 - Essential (with frog leg lateral – supine position with femur externally rotated, flexed and abducted) if SUFE suspected (can be subtle)
 - Changes occur late (<10–14 days in osteomyelitis; <4 weeks in Perthes disease).

- Ultrasound
 - Sensitive for hip effusion, but will not distinguish aetiology (i.e. synovitis vs arthritis)
 - May demonstrate Perthes disease, SUFE
 - Operator dependent.
- Bone scan
 - Sensitive early, better for osteomyelitis than septic arthritis
 - Requires IV access, child needs to hold still, high radiation exposure.
- MRI
 - Provides a lot of detail, but can be difficult to access and often needs general anaesthesia
 - Usually not required to make diagnosis.

ANSWER 4

Jack should be managed with expectant observation. He should be reviewed within 24–48 hours. His parents should be warned about criteria for earlier review or attendance to an emergency department, which include progression of pain (rather than improvement), fever, lethargy or parental concern.

ANSWER 5

The working diagnosis is transient synovitis. Jack appears to be improving with simple analgesia, and he remains well.

ANSWER 6

Review Jack within 1–2 weeks. The natural history of transient synovitis is for return to normal activity within this time frame. If the limping persists past 2 weeks, other diagnoses (such as Perthes disease or bone malignancy) need to be considered, and suitable investigation and follow-up arranged. Plain X-ray, if not already performed, and discussion with an orthopaedic service would be appropriate.

CASE 3

LUCIA HAS A RASH

Lucia, a 2-year-old girl, is brought in by her mother Sue with an itchy rash that has been present for the past 4 months. Recently, the rash has been crusty and weeping and Lucia has sometimes scratched herself to the point where her skin bleeds. The rash is particularly troublesome around her elbows and behind her knees and ankles. She occasionally gets spots on her chin and cheeks.

Sue says the rash got worse after a family camping holiday when she regularly applied sunscreen to Lucia. She has tried a steroid cream, purchased over the counter at the local pharmacy, but is reluctant to use the cream as she has been cautioned about the side effects. When she applied the cream sparingly, it did not appear to make any difference. Sue is regularly applying a greasy moisturiser after Lucia's bath. She has, however, reduced the number of Lucia's baths to 2–3 per week as she has been told that bathing will dry her skin more.

Sue says Lucia had sensitive skin as a baby, and she would become 'rashy' after bubble bath was used in her bath or after being washed with soap. She now generally avoids these products.

Lucia is otherwise well. She was breastfed exclusively until she was 5 months of age, with Sue maintaining a normal diet herself while breastfeeding. Solid foods were introduced into Lucia's diet from 5 months, and Lucia now enjoys a varied family diet with no restrictions.

Her diet includes eggs, milk, wheat, soy, peanuts, tree nuts, fish and shellfish. Lucia's favourite food is peanut butter sandwiches.

Lucia has a baby sister Jessica, who is 3 months of age and well and thriving. She also has a 5-year-old brother, Harry, who recently had school sores.



Figure 1. An example of Lucia's rash. Photo from Science Photo Library

Lucia's father Paul had eczema as a child, and Sue gets hayfever during the pollen season.

Lucia has just commenced sleeping in a single bed. She sleeps with a lambs' wool underlay, woollen blankets and several soft cuddly toys. There are two family cats that sleep in the laundry. Sue asks you whether she should withdraw milk and gluten-containing foods as well as peanut butter from Lucia's diet in case these are contributing to her rash. She also requests allergy testing to see what might be causing the rash.

QUESTION 1 📖

What is the likely diagnosis?

QUESTION 2 🧠📖

Are any investigations required?

ANSWER 3

There are two components to treatment for Lucia.

1. Treat the infection – use an appropriate antibiotic such as cephalexin or flucloxacillin.
2. Treat atopic dermatitis by:
 - a. cleansing – bath daily. A significant proportion of patients with moderate atopic dermatitis have a filaggrin gene defect that predisposes to a defective skin barrier with resultant increased skin colonisation with *Staphylococcus aureus*.²⁰ This necessitates vigilant daily bathing. Adding bleach (sodium hypochlorite 6%) to the bathwater (12 mL per 10 L of water) has been shown to be effective in reducing skin staphylococcal colonisation levels with resultant improved atopic dermatitis control²¹
 - b. moisturising – regularly apply an unperfumed product. The frequency of application should be dictated by degree of dryness, but morning and night as a minimum
 - c. treating inflammation – apply topical corticosteroid ointments to sites of active inflammation until clear. Potent topical corticosteroids (e.g. mometasone [Elocon™ or Novasone™] or methylprednisolone [Advantan Fatty Ointment™]) for atopic dermatitis on the body, and 1% hydrocortisone (Sigmacort™ or DermAid™) are recommended for the more sensitive skin on the face (between the brow and chin). It is important to address parental concerns about topical corticosteroid use and steroid phobia
 - d. minimising irritants – avoid soaps, bubble bath, certain sunscreens, woollen garments and blankets
 - e. providing a management plan – if possible, give a written atopic dermatitis management plan to parents or carers detailing the measures above (see *Resources*).

ANSWER 4

Allergy testing is not required for mild to moderate eczema that is well controlled by the measures outlined in *Answer 3*. Allergy testing may be considered where there is a clear history of an associated immediate IgE-mediated food allergy or where environmental allergens such as house dust mites, pets or pollens are believed to be contributing to eczema flares.

Allergy testing can be either by skin prick testing (generally only available in specialist practice) or by blood test for serum-specific IgE (formerly RAST or radioallergosorbent test). Screening allergy testing to food allergens is not recommended in the absence of a history of an immediate allergic reaction to that food.²²

ANSWER 5

Lucia has a full and varied diet inclusive of the usual commonly allergenic foods without reaction. Dietary manipulation in this situation is unlikely to be of benefit and is not recommended. It could also pose a risk for nutritional inadequacy. Atopic dermatitis and food allergy are commonly associated, but food allergy does not cause atopic dermatitis. The risk of coexistent food allergy is increased in early onset (under 12 months of age) moderate to severe eczema.²²

ANSWER 6

Any patient who has ongoing significant atopic dermatitis who fails to respond to appropriate topical therapies, or who has associated multiple food allergy should be referred for specialist advice.

CASE 4

JOEL'S BEHAVIOUR CONCERNS HIS PARENTS

Joel, a 4-year old boy, has been your patient since his birth. He presents with symptoms of a mild respiratory tract infection. He has come in today with his mother, Alison, although his father, Jake, also brings him to your surgery sometimes. Six months ago Joel's parents had another baby, who they named Carla.

After you examine and assess Jake, Alison appears reassured, but then confesses she is not coping with Joel's behaviour. She says she is frustrated and confused about how to manage his defiant behaviour and tantrums.

Joel was born at term by normal delivery after an uneventful pregnancy. His growth and development were appropriate through infancy and early childhood, although he was admitted for feeding and settling issues at a clinic for new mothers when he was a baby. His vaccinations are up-to-date, he has a history of viral infections and two emergency department presentations for croup at 2 years of age. His croup required oral prednisone but no admission.

You heard Joel in the waiting room before you called him and his mother in to see you.

Alison speaks to Joel in your presence in an irritable and negative fashion. Joel's behaviour reflects a difficult temperament, including characteristics of impulsivity and restlessness. He appears defiant and resists Alison's attempts to control him. He tries to open and explore the drawers of your desk and occasionally grabs the computer mouse from your desk. Alison's reaction is to shout at her son and grab his arm forcibly, which Joel ignores. Alison appears embarrassed by his behaviour and her inability to deal with it.

QUESTION 1 

What safety aspects of this situation should you explore?

QUESTION 2 

How would you assess this situation?

QUESTION 3 

What sociocultural aspects need to be considered?

QUESTION 4 

What advice could you give Alison on how to improve her communication with Joel, and what other resources could she access?

QUESTION 5 🗣️ 🏡 🚑

What advice could you give with respect to discipline issues?

QUESTION 6 🗣️ 🏡 🚑

What diagnoses and possible referrals would you consider for Joel?

CASE 4 ANSWERS

ANSWER 1

Safety assessment should always come first for all members of the family. For Joel, there could be a risk of physical abuse that may be happening out of sight. Punishments occurring at home, either from Alison or Jake, may be inappropriate. A physical examination may reveal bruising or signs of physical abuse.

Alison’s behaviour and poor coping skills may reflect a perinatal mood disorder. Carla’s safety is also an issue as Alison has confided in you that she is having trouble coping. It is important to sensitively but firmly explore safety issues for the entire family. This should include directly talking to and physically examining Joel, and also examining Carla at the next opportunity.

ANSWER 2

A great deal of your assessment has already taken place, by virtue of your position as their family doctor. You have knowledge of the family dynamics, which extends to family and friends. An Ecological Framework for Human Development, developed in the 1970s by Bronfenbrenner, reflects this dynamic.²³

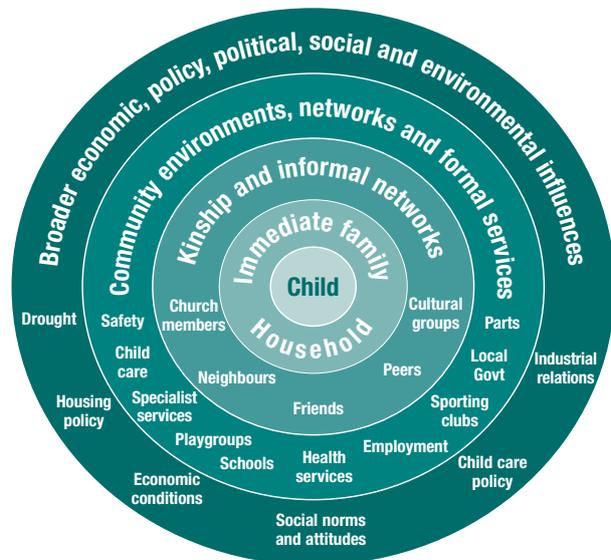


Figure 2. Reproduced with permission from Bronfenbrenner, U. (1977). Toward an experimental ecology of human development. *American Psychologist*, 32, 513–531²³

Assuming safety has been established, assessment should follow a patient- and family-centred approach. Exploring the parents’ views on behaviour, communication and discipline in a non-judgemental manner is the most likely way to explore the family dynamic. It will also make the patient (in this case the parent) feel they are being taken seriously, and this will develop a sense of ownership and improve parent compliance. You should ask Alison how she and Jake discipline Joel. Do they share the same views on discipline?

ANSWER 3

Sociocultural issues strongly influence attitudes to discipline of children, as the ecology model illustrates. Developing an understanding of these issues will help in our assessment, and also enable us to be a more effective guide. Exploring the parents' schema (how they view the world based on their own experiences) will help this. How were they brought up? Do the parents' attitudes to discipline match up? What are the parents' cultural backgrounds, and how do these influence their own beliefs about parenting?

ANSWER 4

Communication requires consideration of how people listen and respond to each other. A prerequisite for effective listening skills is taking what others say seriously, and treating what they say with respect even if they are small children. This is demonstrated by showing an interest in what children say, and exploring and expanding any leads they provide. Alison should be counselled that this 'teasing out' approach requires effort and patience, but will ultimately enhance Joel's confidence and self-image.²⁴

A useful publication from the Raising Children Network website 'Positive ways to talk to children' (see *Resources*) could be provided to Alison. When Joel misbehaves encourage her to stop what she is doing for a moment, kneel down and make eye contact with him. She can acknowledge his feelings, for example, by asking: 'You look sad, can you tell me what happened?' Suggest to Alison that she repeats what Joel tells her and asks him more specific questions.

Emotional delivery can get in the way of understanding, so sticking to the facts, explaining why you are saying what you are saying and doing so without negative emotion will enhance communication. Negativity can manifest as threats, orders, sarcasm, accusations and name-calling.^{24,25}

As well as reducing negativity, increasing positive language – such as recognising and praising desired behaviours – will help reduce what has been called a 'praise deficit' (see Brooks and Goldstein²⁴).

ANSWER 5

Children learn by watching adults respond to their behaviour, both wanted and unwanted. Because a central driver of child behaviour is parental attention, paying attention to wanted behaviour and withholding attention from unwanted behaviour is the 'ace in our hand'. Convincing parents such as Alison of this can prove challenging, but will ultimately enhance their ability to appropriately discipline and, consequently, nurture their children.

For more extreme unwanted behaviour the use of consequences is effective. Consequences only work with children over the age of 3 years, and should only be used in response to a small fraction of the child's behaviour, regardless of the child's temperament (a small fraction means that the majority of unwanted behaviour is ignored, and only the more extreme behaviours receive a consequence).²⁵

If consequences are overused, their effectiveness diminishes and relationships can be damaged.

There are three types of consequences and they are listed below.

- 1. Natural consequences** where there is a natural flow from the misdemeanour to the consequence, for example, if a child refuses to have dinner they go to bed hungry. Natural consequences have a momentum of their own and, assuming they do not result in harm, can provide many valuable lessons.
- 2. Related consequences** where there is some link between the unwanted behaviour and the result (this is also sometimes called a 'logical consequence'). For example, if a child makes a mess, she must clean it up, or if two children are fighting over a toy, the toy gets taken away for a while. Related (and natural) consequences allow a child to link the unwanted behaviour with the consequence.
- 3. Losing a privilege** because of an unwanted behaviour. This can be a very powerful technique as it focuses the child's attention, but is more punitive than natural and related consequences and there is no logical link between behaviour and consequence. Parents should only withdraw a privilege with care as it can cause resentment, and the child should be warned beforehand that they are going to lose a particular privilege for a particular unwanted behaviour.

What doesn't work is screaming, constantly explaining, repeatedly warning, threatening, pleading, arguing, bribing, giving in and smacking.^{25,26} Smacking undermines the parent's respect for their child (hence eroding their ability to teach), teaches the child that violence is a good solution to a problem, and denies the parent what they actually want – their child to learn from the experience – as the message is lost in the emotional mess.^{25,26,27}

ANSWER 6

Joel's behaviour may be a result of his temperament, the parenting style used to date, or a combination of the two. However, sometimes a diagnosis may need to be considered such as conduct disorder, oppositional defiant disorder or ADHD. Further assessment and input by a paediatrician or a psychologist may be warranted, depending on local and family resources.

CASE 5

JADE IS VOMITING

Jade, a 4-year-old girl, is brought to see you by her mother Joanna. She has been vomiting since 3 am this morning. Jade is not interested in eating and is only sipping water. Joanna tells you that ‘everything she drinks she brings straight up’. Jade has not opened her bowels and has no urinary symptoms. Joanna says that Jade ‘was perfectly well yesterday’.

Jade does not appear to be her usual self, but is still able to return your smile and walk independently to be examined. You check for dehydration by pinching her cheeks and abdomen to ensure adequate elasticity and capillary refill. The physical examination is unremarkable and her growth charts show no signs of weight loss.

QUESTION 1 

What is the most likely diagnosis?

QUESTION 2 

What is the differential diagnosis?

QUESTION 3 

Would your provisional diagnosis change if Jade was febrile?

QUESTION 4 

What are the main concerns in diagnosing gastroenteritis in Jade at this stage?

QUESTION 5  

How would you manage Jade?

FURTHER INFORMATION

Several days later, Joanna brings Jade back to see you. She is concerned that there is blood in Jade’s stools, which are quite loose.

QUESTION 6 

What is the most likely explanation for blood in Jade's stool?

QUESTION 7 

Is there a place for medication?

QUESTION 8 

Has the introduction of rotavirus vaccines had a significant public health benefit?

CASE 5 ANSWERS

ANSWER 1

The most likely diagnosis is viral gastroenteritis. However, it is important to remember that 'all that vomits is not gastro'. It is important to exclude other pathology.

ANSWER 2

Acute vomiting may be a symptom of:

- sepsis – e.g. septicaemia, pneumonia, UTI
- head injury – e.g. meningitis, raised intracranial pressure
- abdominal conditions – e.g. surgical obstruction, appendicitis, torsion of testes
- endocrine and metabolic disorders – e.g. ketoacidosis, Addison disease and inborn errors of metabolism
- medication – e.g. antibiotics, non-steroidal anti-inflammatory drugs (NSAIDs), laxatives
- poisoning
- envenomation
- cyclical vomiting syndrome.²⁸

FEEDBACK

Experience suggests that children with gastroenteritis are perfectly well prior to the onset of vomiting. It is important to exclude ketoacidosis as this is misdiagnosed as gastroenteritis often enough to be of concern.²⁹ If a child is vomiting because of ketoacidosis there should be a history of deteriorating wellbeing over recent time. If that is the case, ask about polyuria, polydipsia, weight loss or recent onset of bedwetting.

Signs and symptoms of other illnesses may be non-specific in very young children and they are at risk of dehydrating quickly. Children younger than 6 months of age with acute onset of vomiting should initially be managed in hospital.

Admission is also indicated for children who are malnourished or who have depressed immunity.

ANSWER 3

The presence of fever does not change the provisional diagnosis. However, it would trigger a search for sepsis as well as ongoing monitoring.

FEEDBACK

Urine culture is indicated in younger, pre-verbal children with fever and vomiting even if they look well at presentation. Children less than 6 months of age with acute onset of vomiting should be managed in hospital initially, irrespective of fever or current wellbeing.

An Australian guideline³⁰ regards the trio of vomiting, diarrhoea and fever as characteristic of gastroenteritis. Experience in the community suggests that fever is not a universal feature. The authors of a UK guideline³¹ did not find a cohort study that was conclusive in the clinical presentation of gastroenteritis in children.

ANSWER 4

Two principle concerns early in an episode of gastroenteritis are getting the diagnosis correct and excluding dehydration. There are no symptoms or signs of early dehydration. However, Jade’s history suggests that her fluid balance is negative and she is at risk of developing detectable dehydration.

FEEDBACK

The National Institute for Health and Clinical Excellence (NICE) suggests determining where the patient lies on a continuum from no dehydration to detectable dehydration to clinical shock³¹ rather than attempting to assess severity.

Table 5. Symptoms and signs of clinical dehydration

Symptoms of clinical dehydration
<ul style="list-style-type: none"> • Appears to be unwell or deteriorating • Altered responsiveness (e.g. irritable, lethargic) • Decreased urine output
Signs of clinical dehydration
<ul style="list-style-type: none"> • Altered responsiveness (e.g. irritable or lethargic) • Sunken eyes • Dry mucous membranes • Reduced skin turgor
Adapted with permission from the NICE guideline. ³¹ NICE includes tachycardia and tachypnoea under signs of clinical dehydration.

ANSWER 5

It is important that Joanna leaves your surgery both confident and competent to look after Jade and monitor her progress.

Her tasks are to:

- promote adequate hydration and nutrition
- ensure medical review if needed
- reduce the risk of others becoming infected.

Step 1.

It is crucial to empathise and engage Jade’s mother as your partner in managing Jade’s illness.

Step 2.

Explain the expected course of the illness and ask Joanna to return if Jade’s progress varies from this course.

The expected course of gastroenteritis is:	
0–6 hours	frequent vomiting, sometimes to dry retching but with no blood or bile in the vomitus
6–30 hours	vomiting becomes less frequent and mostly resolves completely in 3 days
6–30 hours	diarrhoea begins. Initially frequent, most resolves within 2 weeks

Be aware of the following:

- persistent and frequent vomiting beyond 6 hours. The risk of dehydration increases and so does the need to rethink the provisional diagnosis
- blood or bile in the vomitus
- a progressive unrelieved deterioration in the four As (alert, aware, active and appropriate) of social interaction
- episodes of unusual pallor need urgent review. Consider intussusception and sepsis
- reduced skin elasticity/reduced capillary return.

Checking for skin turgor over the mastoids eliminates the effect of subcutaneous fat.

Reduced capillary return sought centrally on the abdomen suggests clinical shock.³¹

Step 3.

Explain how to use fluids designed to reduce the risk of dehydration. Breastfed infants should continue breast-feeding with frequent small feeds. They can be offered additional sips of oral rehydrating solution (ORS).

In the early period of frequent vomiting Jade should be offered 0.5mL per kg of ORS every 5 minutes.³⁰ This may be offered by teaspoon, cup or syringe. As small frequent feeds are tolerated, volumes can increase and frequency decrease.

The aim is to reduce vomiting and maximise water absorption from the upper intestine – water follows sodium – and sodium absorption is facilitated by glucose. ORS have an appropriate amount of electrolytes and glucose with an osmolality that does not promote diarrhoea. Hydralyte™ has slightly less sodium than other ORSs and being less salty may be more palatable, especially when frozen.³⁰

A less desirable option, and only for a child with no clinically detectable dehydration, is dilute juice or lemonade diluted one part of juice or lemonade to four parts of water.³⁰

According to the NICE clinical guideline there is ‘great variation in the concentration of sodium and potassium and in the osmolality of readily available juices, soups and carbonated drinks’.³¹

FEEDBACK

The recommendations for preventing dehydration are based on expert consensus.³¹

Some parents withhold and some children refuse fluids for fear of causing further vomiting. It is important to explicitly address this fear if it is present.

Low calorie beverages are sweetened with sorbitol, which can cause osmotic diarrhoea – these are best avoided.

When a child's appetite returns, reintroduce solids. The NICE guideline recommends the reintroduction of palatable solids as early as possible. Some parents are reluctant to do this in case it promotes diarrhoea. Delay may result in calorie-protein malnutrition. The NICE guideline does not support diluting milk or the use of lactose-free fluids.³¹

Step 4.

Remind Joanna of the importance of hand washing, not sharing towels, avoiding school and childcare until 48 hours after last vomit or diarrhoea. Also avoid swimming pools until there has been no diarrhoea for 2 weeks.

ANSWER 6

Blood in diarrhoea is called dysentery. Blood in the stool suggests a bacterial cause for the gastroenteritis. *Campylobacter* and *Salmonella* are common pathogens causing childhood gastroenteritis.

FEEDBACK

The management of a bacterial gastroenteritis in the community is the same as for a viral gastroenteritis. However, it is worth culturing the stool in this situation as a positive culture alleviates concern about other causes of blood in the stool, e.g. inflammatory bowel disease (IBD). Four per cent of childhood IBD presents in children less than 5 years old.³²

ANSWER 7

Until recently, best practice has been to avoid antibiotics, antiemetics and anti-diarrhoeal medications in childhood gastroenteritis.

Antibiotics are not required for bacterial gastroenteritis that can be managed at home.

Studies are investigating the use of ondansetron as an antiemetic.

While the evidence is not conclusive it may have some clinical benefit as a single dose when used by an experienced clinician.³⁰

The roles of probiotics and other dietary supplements are currently being investigated.³¹

ANSWER 8

Rotavirus is the most common cause of severe gastroenteritis in children less than 5 years of age. From July 2007, two vaccines were included in the National Immunisation Program. By June 2010, there was a 71% reduction in rotavirus hospital admissions in children in this age group. The impact of vaccination in Indigenous children in hyperendemic areas was not as high.³⁴ It is anticipated that vaccination will significantly reduce hospital admissions for rotavirus gastroenteritis by 85–100%, as well as reducing any rotavirus gastroenteritis by up to 70%.³³

CASE 6

EVIE HAS A FEVER

Evie, a 7-month-old baby, is brought into your surgery by her mother Laura.

Evie completed her third vaccination 3 weeks ago.

Laura reports that Evie had a high fever of 39°C overnight. She tells you there are no other associated symptoms, and no history of vomiting or diarrhoea.

On examination, Evie looks relatively well, does not have any tachypnoea, cough or increased work of breathing, has good peripheral perfusion and is well hydrated. Ear, nose, throat and respiratory examinations are clear. There is no abdominal tenderness and no skin changes present.

QUESTION 1  

How would you manage Evie, and what advice would you give to Laura?

FURTHER INFORMATION

You suggest to Laura that Evie has a viral infection, and request that she brings her back for review the following day.

Evie is reviewed the following day. She is reported to be still miserable but active, and she has been taking reasonable amounts of fluids. Her temperature is 39°C, and the physical examination has not changed, with no new signs of a focal infection being present.

You order a FBC, CRP and urine microscopy and culture. The blood count identifies a WCC of 15 000, CRP of 50 and urine clean-catch specimen shows 2+ bacteria with white cells and red cells.

QUESTION 2  

What is your management plan, and are any further investigations needed at this stage?

FURTHER INFORMATION

Evie was prescribed trimethoprim+sulfamethoxazole in two divided doses. On the following day, Laura reports that Evie appears a little better, but she is still having fevers. You advise that the antibiotics should be continued without change pending definitive culture results and antibiotic sensitivities. The next day Evie is well and afebrile, with the urine culture results identifying an *E. coli* organism with broad sensitivities, including to trimethoprim+sulfamethoxazole.

QUESTION 3  

What immediate management is necessary?

QUESTION 4  

Should Evie have follow-up management?

FURTHER INFORMATION

Evie is followed up with a renal ultrasound, which is completely normal.

QUESTION 5 

What other investigations could be considered?

FURTHER INFORMATION

Evie responds well to antibiotics, but she presents 2 months later with symptoms suggestive of another urinary tract infection, which is confirmed on urine culture. Treatment is again effective, using amoxicillin for 10 days, and Laura enquires about the need for further investigation.

QUESTION 6  

What would you advise Laura?

CASE 6 ANSWERS**ANSWER 1**

Fever is the most common symptom among children attending for medical care. The majority of young children who present with a significant febrile illness (>38.5°C) have an infection, usually a self-limiting viral infection. It is important, however, that the possibility of occult or emerging bacterial infection be considered to prevent or detect potentially serious and life-threatening conditions early (e.g. UTI, pneumonia, meningitis, septicaemia, cellulitis and osteomyelitis).

The approach to a child who has a fever is greatly influenced by the following factors:^{35,36,37}

- age of the child (0–3 months, 3–36 months, older than 36 months)
- immunisation status
- whether a focal source of infection can be identified on history or physical examination
- whether the child appears ill and toxic or appears well-looking.

Examples of a focal source of infection include otitis media, URTI and gastroenteritis. Toxic and unwell infants need hospital treatment, irrespective of whether a focal or specific cause of their infection is identified.

Even in the case of a relatively well-looking child with a fever, the possibility of occult bacterial infection, which may further develop into a serious and life-threatening infection, needs to be considered.³⁶

Younger children are more likely to be bacteraemic when febrile than older children. The infant younger than 3 months of age is at significant risk, and should always be referred to a hospital for investigation and treatment if they present with fever, even if they

appear well.

The risk is significantly lower when the child has completed their initial course of immunisations (the third of the initial immunisations is due at 6 months of age). This risk may be less than 1% in these children, but if the child is non-immunised or incompletely immunised, the risk of bacteraemia can be as high as 10%.

It is important in this group of patients to review their condition frequently, usually on a daily basis, to ensure they are not developing invasive bacterial disease.

When evaluating a child who presents with a fever, the doctor should look for symptoms and signs related to the respiratory, neurological, musculoskeletal and urological systems to make as accurate a diagnosis as possible on clinical grounds.

However, most importantly, the degree of illness must be assessed as this is the best indicator for risk of bacterial sepsis being present.^{35,37}

ANSWER 2

No further investigations are needed at this stage for Evie.

Before making a definitive diagnosis of UTI, it is important that the urine taken for microscopy and culture is a reliable specimen. Collection of urine in the young infant can be very difficult. It is important to recognise the limitations of the various modes of collection and not make a definitive diagnosis of UTI based on inappropriately collected specimens. A clean-catch urine is currently the preferred method of collection in the outpatient or general practice setting.^{38,39,40}

Bag urine specimens are not reliable and have a high incidence of false positive culture results. They can be used for screening purposes with urine dipstick testing or when a negative culture result is obtained although, in general, bag specimens should not be sent for culture.^{38,39,40}

Dipstick tests positive for nitrites or leukocytes need to be confirmed with an appropriately collected clean-catch voiding urine, either collected by the pathology service or by the parent at home. It must be sent immediately for culture. Clean-catch specimens are easily obtained from children who are toilet-trained. Sick infants and children who require hospital care will have a catheter or suprapubic aspirate (bladder tap) urine specimen collected urgently and sent for microscopy and culture prior to commencing antibiotic therapy.

Evie's results were obtained from a clean-catch specimen. Hence the results were reliable and consistent with a diagnosis of UTI. Evie should be prescribed trimethoprim+sulfamethoxazole in two divided doses. Amoxicillin or a cephalosporin would also provide suitable cover for urinary pathogens.

FEEDBACK

Reviewing febrile children until they are better is most important as their condition may change, focal infection may emerge, or an unexpected diagnosis evolve.

Presenting symptoms can be nonspecific, and physical examination in the young child can be very difficult. Signs of focal disease can be easily missed or not be present, and if the situation is not clear, the GP may need to perform some simple investigations to aid management.

The most useful investigations that can help detect bacteraemia in a child are a FBC, CRP, urine microscopy and culture and, in some situations, a chest X-ray. A WCC of >15 000 leukocytes is highly suggestive of bacterial infection requiring antibiotic treatment. A properly collected urine culture is often the only way of determining whether a UTI is present. A chest X-ray may identify pneumonia in young children even when respiratory symptoms and signs are minimal.

ANSWER 3

The course of antibiotics must be completed. The course should be between 7 and 14 days and is most usually of 10 days duration. After completion of the antibiotic course, if the child is well, there is no need to repeat the urine culture to confirm eradication of infection.^{38,39,40}

Some children do not respond to treatment as expected, despite being given an appropriate antibiotic to which the identified organism is sensitive. In this situation, a referral to a hospital emergency department or paediatric specialist should be made. In this setting, a renal ultrasound should be immediately included in the investigations because non-response to treatment may indicate the presence of an underlying renal abnormality, which may need urgent surgical intervention in addition to antibiotic treatment. The size and shape of the kidneys, renal pelvis dilatation (which may indicate obstruction), renal or peri-nephric abscess, pyelonephritis, ureteric abnormalities, or a dilated or abnormal bladder can be identified with ultrasound, and may help explain failure to respond to initial therapy.

ANSWER 4

An elective renal ultrasound is a worthwhile follow-up investigation of young children who have had their first UTI. It is a simple and non-invasive test used mainly to screen for renal abnormalities, particularly renal pelvis dilatation, ureteric dilatation and bladder abnormalities. Renal ultrasound is less likely to detect vesicoureteric reflux and renal scarring.

ANSWER 5

A micturating cystourethrogram is used to detect vesicoureteric reflux, but currently it is not recommended for all children as follow-up of a UTI because it is an invasive and expensive procedure involving significant amounts of radiation exposure.

The traditional view that vesicoureteric reflux causes renal scarring has changed. Its presence is of questionable significance in the development of progressive renal damage. This has altered the approach to follow-up investigation of children who have had a UTI.

Increasing grades of vesicoureteric reflux do increase the risk of the development of renal scars, but the benefits of detection and treatment of vesicoureteric reflux are not clear. The role of surgical intervention and the use of long-term prophylactic antibiotics are not proven in the prevention of renal scarring, even for high grades of vesicoureteric reflux. A micturating cystourethrogram is therefore no longer routinely performed. It is recommended only for children who have significant renal tract abnormalities identified on ultrasound or, possibly, in those who have recurrent UTIs.^{38,39,40}

Children who have recurrent UTIs and normal renal ultrasounds probably do have at least low-grade vesicoureteric reflux; however, this can usually be managed without the need for documentation using a micturating cystourethrogram.

Other investigations can further evaluate the urinary tract. Of these, radio-isotope renal scintigraphy, DMSA, DTPA or MAG3 scans are specifically used to define kidney structure and function.

The DMSA isotope scan is used to identify renal structure and particularly identify renal scarring. Its role in the investigation of UTI remains controversial. It involves exposure to radiation, is expensive, and certainly plays no role in the treatment of those children who have had their first UTI and who have normal renal ultrasounds.

DTPA or MAG3 scintigraphy is used to examine renal function and also investigate for pelviureteric obstruction or vesicoureteric obstruction. It is only needed when an abnormality is identified on renal ultrasound, which may suggest obstruction. It can also help distinguish a poorly functioning dysplastic kidney from an obstructed kidney.

ANSWER 6

You advise Laura that even though it is likely that Evie has low-grade vesicoureteric reflux predisposing her to UTIs, further investigation is not required. As Evie's renal ultrasound is normal, there is no need to perform a micturating cystourethrogram. You should explain that the use of preventive antibiotics is not warranted as it does not prevent the development of renal scars, although there may be a role in prevention of further UTIs.

It is worth mentioning that should a further urinary infection occur, referral to a paediatrician or paediatric nephrologist would be indicated.

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RESOURCES FOR DOCTORS

- The Parents Evaluation of Developmental Status Developmental Milestones (PEDS and PEDS-DM) are two highly accurate, valid tools providing developmental screening and behavioural screening, as well as ongoing surveillance. The PEDS-DM takes 6–7 minutes to complete and can be purchased at www.pedstest.com.
- The Pediatric Symptom Check List detects 85–90% of children with behaviour problems and is available at www.brightfutures.org. It is endorsed by the American Academy of Pediatrics.
- ADHD may be screened using the Conners Questionnaires or Vanderbilt Assessment Scales available at the National Initiative for Children's Healthcare Quality. Visit www.nichq.org/adhd.html.
- See management plans and indications for an adrenalin auto-injector at the Australian Society of Clinical Immunology and Allergy. Visit www.allergy.org.au.
- The Royal Children's Hospital's clinical practice guideline for atopic dermatitis is available at www.rch.org.au/rchcpg/hospital_clinical_guideline_index/Eczema_management/.
- The Autism Research Centre offers screening tools for individuals of different ages. Visit www.autismresearchcentre.com/arc_tests for more information.
- A publication of The Committee of Psychosocial Aspects of Child and Family Health at the American Academy of Pediatrics called *Guidance for effective discipline* is available from <http://bit.ly/1674rw4>.
- A good article to help parents develop discipline techniques is 'A brief primary care intervention helps parents develop plans to discipline' by Scholer SJ, Hudnut-Beumler J, Dietrich MS. in *Pediatrics* 2010;125:e242-249.
- *Awakening children's minds: how parents and teachers can make a difference* by Laura Berk, published by Oxford University Press in 2001, examines the importance of communication between children and adults.
- For research on the effect of communication on the developing brain read *Parenting from the inside out*, published by Penguin in 2003, by Daniel Siegel and Mary Hartzell.
- The NSW Department of Health have published clinical guidelines for the management of acute gastroenteritis at http://www.nslhd.health.nsw.gov.au/ppg/PD2010_009%20-%20Flowchart.pdf.
- NICE have published guidelines for the management of diarrhoea and vomiting caused by gastroenteritis at <http://www.nice.org.uk/nicemedia/live/11846/43817/43817.pdf>.
- The National Centre for Immunisation and Research Surveillance has a useful factsheet on rotavirus vaccination for immunisation providers at www.ncirs.edu.au/immunisation/fact-sheets/rotavirus-fact-sheet.pdf.

RESOURCES FOR PATIENTS

- A useful patient handout on normal development in children can be found in *Murtagh's Patient Education*, 5th edition on page 45.
- The Parents Evaluation of Developmental Status Developmental Milestones (PEDS-DM) takes 6–7 minutes to complete. The PEDS-DM can be purchased at www.pedstest.com.
- The Raising Children Network provides information that can help parents with the day-to-day decisions of raising children. This information is available at www.raisingchildren.net.au.
- The American Academy of Paediatricians hosts a comprehensive online resource for parents at www.healthychildren.org.
- *How to talk so kids will listen and listen so kids will talk* by Adele Faber and Elaine Mazlish, published by Piccadilly Press in 1999, explores communicating with children effectively.
- *Raising resilient children: fostering strength, hope and optimism in your child* by Robert Brooks and Sam Goldstein, published by McGraw-Hill in 2002, looks at how to raise resilient children.
- *Normal children have problems too* by Stanley Turecki and Sarah Wernick, published by Bantam in 1994, offers insights into the social difficulties children can have and suggests ways to find solutions.

Paediatrics

In order to qualify for 6 Category 2 points for the QI&CPD activity associated with this unit:

- read and complete the unit of *check* in hard copy or online at the *gplearning* website at www.gplearning.com.au, and
- log onto the *gplearning* website at www.gplearning.com.au and answer the following 10 multiple choice questions (MCQs) online, and
- complete the online evaluation.

If you are not an RACGP member, please contact the *gplearning* helpdesk on 1800 284 789 to register in the first instance. You will be provided with a username and password that will enable you access to the test.

The expected time to complete this activity is 3 hours.

Do not send answers to the MCQs into the *check* office. This activity can only be completed online at www.gplearning.com.au.

If you have any queries or technical issues accessing the test online, please contact the *gplearning* helpdesk on 1800 284 789.

**FOR A FULL LIST OF ABBREVIATIONS AND ACRONYMS USED IN THESE QUESTIONS PLEASE GO TO PAGE 3.
FOR EACH QUESTION BELOW SELECT ONE OPTION ONLY.**

QUESTION 1

Tim, a 12-month-old boy, presents with a temperature of 38.5°C. He is otherwise well. Urinary dipstick is positive for nitrites and you suggest a clean catch specimen of urine. This confirms a diagnosis of a UTI. Six months later Tim returns with another UTI, and 3 months later he returns with a third UTI. What is the most appropriate initial test to exclude renal abnormalities?

- A. Abdominal X-ray
- B. DMSA isotope scan
- C. MAG3 scintigraphy
- D. Micturating cystourethrogram
- E. Renal ultrasound.

QUESTION 2

Bo, a 4-year-old boy, has just started preschool. His mother brings him in to see you because he started limping yesterday and says it hurts to walk. Bo had a cold 2 weeks ago, but has otherwise been well. On examination he has slightly decreased range of movement of his left hip. What feature in Bo's history would be of most concern to you?

- A. Sudden onset of hip pain
- B. Painful range of hip movement
- C. History of recent viral URTI

- D. Fever of 38°C
- E. Walking with a limp.

QUESTION 3

Violet, a 4-year-old girl, is brought in by her mother Selina who is struggling with her behaviour. Violet has a younger 2-year-old brother. She often has tantrums where she falls to the floor and screams. She is wilful and defiant to her parents' requests and often has meltdowns in public places, such as the supermarket. Selina is embarrassed to visit her friends because Violet is difficult to control, noisy and loves to open cupboards and make a mess. Selina is frustrated and close to tears. What would your priority be when assessing Violet?

- A. Checking for developmental delay
- B. Assessing child and mother safety
- C. Exploring parenting style
- D. Checking for underlying illness
- E. Assessing cultural background.

QUESTION 4

You examine Violet (from *Question 3*) and find no evidence of child abuse, developmental delay or underlying illness. What is the most useful intervention in dealing with unwanted behaviour in this age group?

- A. Constantly explaining
- B. Repeatedly warning
- C. Smacking
- D. Pleading
- E. Improving communication and using consequences.

QUESTION 5

Moshe, a 9-month-old baby boy, is brought in to see you by his parents Ester and Joshua. They have noticed an intermittent dry rash on his cheeks and his abdomen over several months. Moshe tends to scratch the rash, which then becomes worse. Ester has a history of hay fever and Joshua had asthma as a child. You make a diagnosis of atopic dermatitis. What treatment options do you suggest to Ester and Joshua?

- A. Cleanse and bathe daily.
- B. Apply non perfumed moisturiser.
- C. Minimise irritants and avoid soaps, bubble bath, woollen garments, blankets and certain sunscreens.
- D. Apply topical cortisone cream.
- E. All of the above.

QUESTION 6

Jet, a 5-year-old boy, presents with vomiting over the past 6 hours. His mother tells you Jet hasn't been his usual self over the past few days, and has not wanted to go to school. He has been drinking

more than usual and his appetite has decreased. Jet wet the bed last night and his breath smells. He looks pale and unwell, and his temperature is 37°C. What is the most likely diagnosis?

- A. Diabetic ketoacidosis
- B. Viral gastroenteritis
- C. School refusal
- D. Cyclical vomiting syndrome
- E. Food poisoning.

QUESTION 7

Jamila, a 2-year-old girl, presents with a 24-hour history of vomiting and diarrhoea. Her temperature is 37.5°C. Jamila is able to drink small sips of fluids only. You are concerned that she is becoming dehydrated. How would you assess Jamila's level of dehydration?

- A. Assess skin elasticity at the mastoid.
- B. Check capillary refill in the abdomen.
- C. Check for altered responsiveness.
- D. Check for loss of weight.
- E. All of the above.

QUESTION 8

Ivy, a 3-month-old baby, is brought into the surgery by her mother Jane. She is breastfed and has not had her 2-month immunisations. Jane tells you Ivy was difficult to settle last night. On examination Ivy looks flushed, lethargic and unwell, and has a temperature of 39°C. There appear to be no focal signs of infection. What is the most appropriate management for a baby of Ivy's age?

- A. Regular paracetamol
- B. Tepid sponging
- C. Review the following day
- D. Refer to hospital
- E. Reassure Jane that this is normal.

QUESTION 9

Harry, a 3-year-old boy, is brought in by his mother May who is concerned by his behaviour. Harry had a normal vaginal delivery and was breastfed for 9 months. He crawled at 6 months and commenced walking at 14 months. Harry was slow to speak and does not have a large vocabulary now. May has noticed he does not always respond to his name and tends to avoid eye contact. She is frustrated by Harry's apparent inability to follow simple commands. Which of the following is the most likely diagnosis?

- A. ADHD
- B. Absence epilepsy
- C. Fragile X syndrome
- D. Autism spectrum disorder
- E. Foetal alcohol syndrome.

QUESTION 10

Jesse, a 14-year-old boy, limps into the surgery. He is finding it difficult to walk and hobbles slowly to the examination couch. Jesse complains of pain in his right hip and some discomfort in his right knee. On examination Jesse is 167 cm tall and weighs 75 kg. He is afebrile. His right hip is shortened and he has decreased right hip movement on internal rotation. What is the most likely diagnosis?

- A. Osteomyelitis
- B. Transient synovitis (irritable hip)
- C. Perthes disease
- D. SUFE
- E. Stress fracture of the hip.