Diarrhoea

Essential History

Diarrhoea is defined as the passage of three or more loose or liquid stools per day (or more frequent passage than is normal for the individual). Frequent passing of formed stools is not diarrhoea, nor is the passing of loose stools with a mushy or creamy consistency by breastfed babies.

Ask about:

- Length of illness
- Character of stools
  - Frequency
  - Looseness (eg, watery versus mushy) (see The Bristol Stool Form Scale)
  - Presence of blood and mucus (see Melaena / Bleeding Per Rectum)
  - Colour
  - Odour
- Oral intake
  - Type of fluid given
  - Quantity of fluids and solids taken (some fluids such as diet drinks and squashes may contribute to diarrhoea)
  - Diet
- Presence of vomiting
- Bilious vomiting (green / yellow)
- Associated symptoms
  - Fever
  - Rash
  - Shortness of breath (see Dyspnoea)
  - Altered state of consciousness
  - Neck stiffness
  - Bulging or depressed fontanelle in infants
  - Severe or localised abdominal pain
  - Abdominal distension
- Urine output
  - Frequency
  - Volume
- Recent contact with anyone with acute diarrhoea and / or vomiting
- Attendance at childcare settings, such as nursery

  - Nurseries often have sickness policies that exclude children with diarrhoea for a defined period of time.
- Recent visit to farms
- Exposure to a known source of enteric infection (eg, possibly contaminated water or food)
- Recent travel abroad
- Medication eg, antibiotics, sugar-free oral solutions.

‘Red Flag’ Symptoms and Signs

Ask about:

- Altered state of consciousness
- Green bilious vomiting
- Shortness of breath (see Dyspnoea)
- Severe or localised abdominal pain
- Non-blanching rash
- Oliguria / anuria

Look for:

- Altered responsiveness (irritable, lethargic)
- Decreased level of consciousness
- Pale or mottled skin
- Cold extremities
- Tachycardia, tachypnoea
- Prolonged capillary refill (> 3 seconds)
- Hypotension
- Abdominal distension or rebound tenderness

Differential Diagnosis / Conditions

Acute diarrhoea

Neonates with acute diarrhoea must be considered differently from older infants and children.

Babies under 6 weeks

- Epidemics of diarrhoea associated with:
  - Rotavirus
  - Enteropathogenic *Escherichia coli*
  - *Salmonelleae*
  - Other organisms, including *Klebsiella*

- Onset of diarrhoea associated with initial feeds
  - Consider congenital digestive defects, especially sugar intolerance
- Hirschsprung's disease
  - May produce acute diarrhoea and enterocolitis in the neonatal period
  - Should be considered, especially in the infant who has not passed meconium in the first 24 hours
- Bloody diarrhoea (see Melaena / Bleeding Per Rectum)
  - Infective causes
  - May result from cow's milk protein allergy
    - Consider even in the absence of blood in stools
    - Resolution and exacerbation on removal and reintroduction of cow's milk or soy formula, as well as an atopic family history, are clues to the diagnosis.
- Necrotising enterocolitis
  - Gastric retention (frequently bilious)
  - Abdominal distension
  - Occult or bright-red blood in the stool
- Rare congenital causes:
  - Chloride diarrhoea
  - Glucose–galactose malabsorption
  - Autoimmune enteropathy

Older infants and children

- Viral enteritis
  - Typically without blood in stool
  - Viral diarrhoeal illnesses can cause febrile and afebrile seizures
  - Examples:
    - Rotavirus
    - Norovirus
    - Adenovirus
    - Cytomegalovirus, especially in immunocompromised children
- Bacterial enteritis
  - May be bloody diarrhoea (dysentery) or no blood in stool (see Melaena / Bleeding Per Rectum). Organisms or toxins ingested from contaminated foods including:
  - *Salmonella*
    - A common cause of food-borne illness, especially from poultry and eggs
    - Dysentery associated with tenesmus, urgency, and lower abdominal pain
    - Symptoms may be less marked than with other pathogens.

  - *Shigella*
    - Often associated with bloody, foul-smelling stools
    - Patients may appear severely ill and may have meningism or seizures.
    - Can cause haemolytic–uremic syndrome (HUS)
  - *E. coli*
    - Enterohaemorrhagic *E. coli* (especially serotype O157:H7) is the most common cause of HUS in children.
    - The major source for *E.coli* O157:H7 infection is ground beef and shop-bought sliced 'cooked' meats.
  - *Campylobacter*
    - Common cause of food-borne illness, especially from poultry and eggs
- Bacterial toxin-induced diarrhoea
  - *Clostridium difficile* toxin
    - Should be considered in children who take proton pump inhibitors and those with a history of recent antibiotic use
    - The cause of most cases of pseudomembranous colitis
    - May be associated with chronic childhood diarrhoea in the absence of colitis
  - *E. coli* enterotoxin C
  - *Vibrio cholerae* enterotoxin (rare)
    - Consider if positive travel history and profuse watery diarrhoea
- Parasitic infection
  - *Giardia lamblia*
  - *Entamoeba histolytica*
    - Produces a picture of acute colitis
  - *Cryptosporidium*
  - *Cyclospora*
  - *Dientamoeba fragilis*
  - *Blastocystis hominis*

Chronic diarrhoea

Diarrhoea lasting more than 2 weeks needs further evaluation. Dividing the causes of chronic diarrhoea between those occurring in infancy and those in older childhood is somewhat arbitrary because there is overlap between the groups; however, it is helpful in guiding initial evaluation.

Infants

- Chronic non-specific diarrhoea (toddler's diarrhoea)
  - The most common persistent diarrhoea that occurs during the latter half of the first year and in the second year of life
  - No apparent cause
  - Sometimes follows an apparent acute gastroenteritis (eg, post-infectious irritable bowel)
  - Child appears healthy and thriving, with normal growth parameters
- Malabsorption syndromes
  - The diarrhoea is often associated with steatorrhoea and growth failure
    - Cystic fibrosis
    - Coeliac disease (gluten-sensitive enteropathy)
    - Carbohydrate (monosaccharide or disaccharide) intolerance
    - Congenital deficiency of trypsinogen
- Food allergy (note that food protein can be passed to an infant via breast milk)
  - Consider the possibility of this in an infant with chronic diarrhoea with any of the following
    - Eczema
    - Weight loss
    - Dietary triggers
  - Implicated food proteins include:
    - Milk
    - Egg
    - Peanut
    - Soy
    - Wheat
    - Fish
- Infection
  - *Salmonella* infection may be associated with persistent diarrhoea in infants.
    - More commonly associated with a prolonged, asymptomatic carrier state
  - *Campylobacter* enteritis may also have a protracted course
  - Persistence of rotavirus or enteric adenovirus excretion has been identified in immunocompromised individuals.
  - *Clostridium difficile* toxin
  - Parasites
    - *Giardia lamblia*
    - *Cryptosporidium*
      - Causes diarrhoea in immunocompetent individuals
    - *Cyclospora*

    - *Blastocystis hominis*
    - *Entamoeba histolytica*
    - *Dientamoeba fragilis*
- Short-bowel syndrome
- Intestinal lymphangiectasia
- Acrodermatitis enteropathica
    - Associated with severe nappy rash
- Factitious diarrhoea (see When to suspect child maltreatment [NICE clinical guideline CG89, section 1.2.12])
    - May be suspected when an infant has persistent diarrhoea that does not seem to fit any known pattern
- Hormonal
    - Adrenal insufficiency
    - Hyperthyroidism
- Immunodeficiency states
    - Chronic parasitic and viral (eg, cytomegalovirus, adenovirus, rotavirus) infections can cause diarrhoea in patients with immunodeficiency.
- Rare causes include:
    - Autoimmune enteropathy
    - Microvillus inclusion disease
    - Tufting enteropathy
    - Congenital disorders of electrolyte absorption
    - Lactase deficiency
    - Disaccharide intolerance
    - Monosaccharide intolerance

Older children

- Irritable bowel syndrome
- Inflammatory bowel disease (IBD)
    - Crohn's disease
    - Ulcerative colitis
- Chronic constipation
    - Chronic constipation with overflow incontinence can be mistaken for diarrhoea.
- Factitious diarrhoea (See When to suspect child maltreatment [NICE clinical guideline CG89])

Investigations

See Diarrhoea and vomiting in children [NICE clinical guideline CG84, section 1.1.2].

To be undertaken by non-specialist practitioners (eg, General Practitioner (GP) Team):

- Most children presenting to primary care do not need any investigations.
- Consider performing stool microbiological investigations if:
  - The child has recently been abroad
  - The diarrhoea has not improved by day 7
  - There is uncertainty about the diagnosis of gastroenteritis
  - There is blood and / or mucus in the stool (see Melaena / Bleeding Per Rectum)
  - The child is immunocompromised
- Urea and electrolyte levels if hydration status is in question and to assess for acute kidney injury (see Acute kidney injury: prevention, detection and management [NICE clinical guideline CG169])
- Full blood count
- Coeliac serology (See Coeliac disease: recognition, assessment and management [NICE guideline NG20]
- Urinalysis in babies < 3 months or if vomiting without diarrhoea

To be undertaken by specialist practitioners (eg, Emergency Department / Paediatric / Paediatric Gastroenterology Team(s)):

- Perform a blood culture if suspecting septicaemia and give antibiotic therapy
- In children with *E. coli* O157:H7 infection, seek specialist advice on monitoring for HUS
- If the child is lethargic or has had a seizure:
  - Do blood culture to look for sepsis
  - Measure urea, electrolyte, creatinine, and glucose levels
  - Consider lumbar puncture if the child is stable
- Faecal calprotectin as a screen for IBD
  - Not specific for IBD - may also be positive in infections
  - False positive results may unnecessarily worry parents about potential IBD
  - Should not be routinely undertaken
- Imaging
  - Abdominal radiography in:
    - Suspected intestinal obstruction
    - Toxic megacolon in IBD
- Diagnostic procedures
  - Ultrasonography by experienced operator to exclude appendicitis, looking for free fluid or bowel wall thickening (IBD)

  - Upper and lower GI endoscopy to diagnose IBD
  - MRI of small bowel to diagnose small bowel Crohn's disease

Treatment Approach

Treatment depends on the cause. For the management of infective diarrhoea see Diarrhoea and vomiting in children [NICE clinical guideline CG84, section 1.3] and Feverish illness in children: Assessment and initial management in children younger than 5 years [NICE clinical guideline CG160].

To be undertaken by non-specialist practitioners (eg, General Practitioner (GP) Team):

- In infants, continue breastfeeding and other milk feeds.
- Encourage fluid intake.
- Discourage the drinking of fruit juices and carbonated drinks.
- Offer oral rehydration solution (ORS) (disodium hydrogen citrate with glucose, potassium chloride and sodium chloride) as supplemental fluid to those at increased risk of dehydration.

To be undertaken by specialist practitioners (eg, Emergency Department / Paediatric / Paediatric Gastroenterology Team(s)):

- Treat dehydration
  - Use ORS to rehydrate children, including those with hypernatraemia, unless intravenous fluid therapy is indicated.
  - In children with clinical dehydration, including hypernatraemic dehydration:
    - Use low-osmolarity ORS (240–250 mOsmol/L) for oral rehydration therapy.
    - Give ORS (20-40 mL/kg/day) for fluid deficit replacement over 4 hours in addition to the maintenance fluid.
    - Give ORS frequently and in small amounts.
    - Consider supplementation with the child's usual fluids (including milk feeds or water, but not fruit juices or carbonated drinks) if they refuse to take sufficient quantities of ORS and do not have 'red flag' symptoms or signs.
- Consider giving ORS via a nasogastric tube if the child is unable to drink it or if the child vomits persistently.
- Monitor the response to oral rehydration therapy by regular clinical assessment.
- Intravenous fluids (0.9% sodium chloride with 5% glucose) are indicated when:
  - Shock is suspected or confirmed.
  - A child with 'red flag' symptoms or signs shows clinical evidence of deterioration despite oral rehydration therapy.
  - A child persistently vomits ORS given orally or via a nasogastric tube.

When to Refer

Refer to paediatric specialist if:

- Septicaemia is suspected
- Acute or chronic diarrhoea with mild to moderate dehydration cannot be managed successfully with rehydration solution as an outpatient.
- Dehydration is > 10% of body weight.
- Diarrhoea is accompanied by intractable vomiting.
- Diarrhoea persists and the work-up for routine infectious causes is negative.
- Steatorrhoea occurs.
- Diarrhoea or steatorrhoea (or both) causes weight loss or faltering growth.
- Inflammatory bowel disease is a consideration.
- Severe electrolyte imbalance occurs, including hypernatraemic dehydration or the serum potassium level falls < 3.0 mEq/L.
- Evidence of HUS (jaundice, anaemia, and blood film suggestive of haemolysis)
- Chronic diarrhoea or steatorrhoea (or both) with persistent signs of malnutrition remains unresolved with outpatient management.

‘Safety Netting’ Advice

- Parents should be advised to see the GP Team if symptoms are not settling in 2–3 days or if the child is not tolerating suggested fluids.
- A ‘hospital at home’ community nurse or GP can help to assess this via telephone or in person.
  - Ask about urine output, stool output and vomiting, conscious level, and fluid intake.
- Patients undergoing rehydration therapy should be monitored frequently and need close follow-up.

Patient / Carer Information

Please note: whilst these resources have been developed to a high standard they may not be applicable to children.

- Diarrhoea and vomiting in children (Web page), the NHS website
- Gastroenteritis in children (Web page), the NHS website

Resources

National Clinical Guidance

Diarrhoea and vomiting in children: Diarrhoea and vomiting caused by gastroenteritis: diagnosis, assessment and management in children younger than 5

years (Web page), NICE clinical guideline CG84, National Institute for Health and Care Excellence.

Coeliac Disease: recognition, assessment and management. (Web page), NICE guideline NG20, National Institute for Health and Care Excellence.

Feverish illness in children: Assessment and initial management in children younger than 5 years (Web page), NICE clinical guideline CG160, National Institute for Health and Care Excellence

When to suspect child maltreatment (Web page), NICE clinical guideline CG89, National Institute for Health and Care Excellence.

Ulcerative colitis: management (Web page), NICE clinical guidance CG166, National Institute for Health and Care Excellence

Crohn's disease: management (Web page), NICE clinical guidance CG152, National Institute for Health and Care Excellence

Acute kidney injury: prevention, detection and management (Web site), NICE guideline CG169, National Institute for Health and Care Excellence

Medical Decision Support

Perplexing Presentations (Including FII) (Web page), RCPCH Child Protection Companion

Child Sexual Abuse (Web page), RCPCH Child Protection Companion

Suggested Resources

Please note: these resources include links to external websites. These resources may not have national accreditation and therefore PCO UK cannot guarantee the accuracy of the content.

Acute Diarrhoea: Quick Reference Guide (PDF), RCPCH Paediatric Care Online (PCO UK)

Loperamide for diarrhoea (Web page), Medicines for Children

The Bristol Stool Form Scale (Web page).

Dehydration (Web page – requires log-in), Spotting the Sick Child.

Murch S, Jenkins H, Auth M, et al. Joint BSPGHAN and Coeliac UK guidelines for the diagnosis and management of coeliac disease in children. Arch Dis Child. 2013;98(10):806-811. [PubMed]

Kim SC, Ferry GD. Inflammatory bowel diseases in pediatric and adolescent patients: clinical, therapeutic, and psychological considerations. Gastroenterology. 2004;126(6):1550-1560. [Pubmed]

Regina I Ejemot-Nwadiaro, John E Ehiri, DachiArikpo, Martin M Meremikwu, Julia A Critchley. Hand washing promotion for preventing diarrhoea. Cochrane Library. Sept 2015

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