

Management of acute diarrhoea and vomiting due to gastroenteritis in children under 5

NICE guideline

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If you wish to comment on this version of the guideline, please be aware that all the supporting information and evidence is contained in the full version.

Contents

Introduction	3
Patient-centred care.....	5
Key priorities for implementation.....	6
1 Guidance	11
1.1 Diagnosis.....	11
1.2 Assessment for dehydration and shock.....	13
1.3 Fluid management.....	16
1.4 Nutritional management.....	19
1.5 Antibiotic therapy	20
1.6 Other therapies	20
1.7 Escalation of care	20
1.8 Information and advice for parents and carers	21
2 Notes on the scope of the guidance	24
3 Implementation	24
4 Research recommendations	25
4.1 Assessment for dehydration and shock.....	25
4.2 Fluid management.....	26
4.3 Other therapies	27
5 Other versions of this guideline.....	28
5.1 Full guideline	28
5.2 Quick reference guide.....	28
5.3 'Understanding NICE guidance'.....	28
6 Related NICE guidance	29
7 Updating the guideline	29
Appendix A: The Guideline Development Group	30
Appendix B: The Guideline Review Panel	32

Introduction

Infective gastroenteritis in young children is characterised by the sudden onset of diarrhoea, with or without vomiting. Most cases are due to an enteric virus, but some are due to bacterial or protozoal infections. The illness usually resolves spontaneously within days, however, symptoms are unpleasant and the illness impacts upon both child and family. Those with severe symptoms may quickly become dehydrated - a potentially life-threatening development.

Gastroenteritis is very common. About 2 million children die from diarrhoeal illnesses globally each year although in developed countries death is now quite rare. Parents often manage their child's illness at home, and in some cases they may not even seek professional advice. However, a very large number of parents or carers do seek advice from health professionals who can be based remotely (eg NHS Direct), in the community or in primary or secondary care. Although most children with gastroenteritis do not require admission to hospital, many are treated as in-patients each year. Once admitted, children often remain in the hospital for several days. This is a significant burden for the health services. Admission to hospital brings with it a risk of spread to other vulnerable hospitalised children.

The management of gastroenteritis in children is multifaceted and changing. There is evidence of variation in clinical practice which may have a major impact on the use of healthcare resources. For these reasons this guideline on the "management of acute diarrhoea with or without vomiting in the under 5s" was commissioned by the National Institute for Health and Clinical Excellence (NICE).

This guideline is intended to apply to children under 5 years of age who present to a healthcare professional for advice in any setting. It addresses each of the major management considerations, including diagnosis, assessment of hydration, fluid management, nutritional management and the role of antibiotics and other therapies. It provides advice to parents and also

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considers the complex decisions to be made regarding the escalation of care necessary in some children – from home management through to hospital admission.

The guideline will assume that prescribers will use a drug's summary of product characteristics to inform their decisions for individual patients.

Patient-centred care

This guideline offers best practice advice on the care of children under five with diarrhoea and vomiting.

Treatment and care should take into account children's needs and preferences and those of their parents and carers. Parents and carers of children with diarrhoea and vomiting should have the opportunity to make informed decisions about their care and treatment, in partnership with their healthcare professionals. If parents or carers do not have the capacity to make decisions, healthcare professionals should follow the Department of Health guidelines – 'Reference guide to consent for examination or treatment' (2001) (available from www.dh.gov.uk). Healthcare professionals should also follow the code of practice that accompanies the Mental Capacity Act (summary available from www.publicguardian.gov.uk).

Healthcare professionals should follow the guidelines in 'Seeking consent: working with children' (available from www.dh.gov.uk).

Good communication between healthcare professionals and patients is essential. It should be supported by evidence-based written information tailored to the patient's needs. Treatment and care of children under five with diarrhoea and vomiting, and the information patients are given about it, should be culturally appropriate. It should also be accessible to people with additional needs such as physical, sensory or learning disabilities, and to people who do not speak or read English.

Families and carers should have the opportunity to be involved in decisions about the child's treatment and care.

Families and carers should also be given the information and support they need.

Key priorities for implementation

Diagnosis

- Perform stool microbiological investigations if:
 - the child is seriously ill with suspected septicaemia
 - there is bloody and/or mucoid diarrhoea
 - the child is immunocompromised. [1.1.2.1]

Assessment for dehydration and shock

- Assess hydration with Table 1 in order to:
 - classify children as non-dehydrated, clinically dehydrated or shocked
 - use red flags as warning signs for increased risk of progression to shock.
- [1.2.1.3]

Table 1 Candidate symptoms and signs available for the comprehensive assessment and classification of dehydration.

	No clinically detectable dehydration	Clinical dehydration  This category represents a spectrum of increasing dehydration severity. With worsening dehydration clinical manifestations may be expected to become more numerous and severe	Clinical shock (a combination of features shown in this column must be present to determine a diagnosis of shock)
	Symptoms (remote and face-to-face assessments)		
Clinical feature of dehydration	Well child	Perceived to be unwell or deteriorating ^a 	
	Normal conscious state	Excessive or unaccustomed irritability or lethargy 	Depressed conscious state
	Normal level of thirst	Increased thirst	
	Normal urine output ^b	Decreased urine output ^b	
	Normal skin colour	Normal skin colour	Pale or mottled skin
	Warm hands and feet	Warm hands and feet	Cold hands and feet
	Signs (face-to-face assessments only)		
	Normal conscious state	Irritability or lethargy ^a 	Depressed conscious state
	Normal skin colour and warm peripheries	Normal skin colour and warm peripheries	Pale or mottled skin and/or cold peripheries

No sunken eyes	Sunken eyes 	
Moist mucous membranes ^c	Dry mucous membranes ^d	
Normal fontanelle ^c	Depressed fontanelle ^e 	
Normal heart rate	Tachycardia 	Tachycardia
Normal breathing pattern	Tachypnoea 	Tachypnoea
Normal peripheral pulses	Normal peripheral pulses	Weak peripheral pulses
Normal capillary refill time	Normal capillary refill time	Prolonged capillary refill time
Normal skin turgor	Reduced skin turgor 	
Normal blood pressure	Normal blood pressure	Hypotension (decompensated shock)

 Red flags may help identify children at the more severe end of the dehydration spectrum in whom there is an increased risk of progression to shock, and for whom referral to hospital should be considered.

^a Based on parent/clinician global assessment

^b The presence of this symptom may help to rule out dehydration, but did not have sufficient diagnostic utility to do so in isolation

^c Except after a drink

^d Except mouth breather

^e Relevant to younger infants, the fontanelle becoming progressively smaller and usually closing by 18 months

Notes on how to use this table:

- Symptoms and signs have been separated since only the former are available for remote (telephone) assessment.
- Symptoms and signs need to be interpreted in the context of the presence of risk factors for dehydration and the social and family circumstances.
- The distinction between 'clinical dehydration' and 'red flag dehydration' is not absolute and requires clinical judgement. If there is doubt, the child should be managed as for the more severe end of the spectrum.

Fluid management

- In children with gastroenteritis but without clinical dehydration:
 - continue usual fluids, including breast or other milk feeds
 - encourage the drinking of plenty of fluids
 - offer oral rehydration solution (ORS) as supplemental fluid for those at increased risk of dehydration:
 - ◇ children less than 2 years of age, especially those aged less than 6 months
 - ◇ infants who were of low birth weight
 - ◇ children with more than 5 diarrhoeal stools in the previous 24 hours
 - ◇ children with more than 2 vomits in the previous 24 hours
 - ◇ children with signs of malnutrition. **[1.3.1.1]**

- In children with clinical dehydration, including hypernatraemic dehydration:
 - treat with low osmolarity ORS
 - give 50 ml/kg of ORS over 4 hours in addition to maintenance fluids
 - administer the fluid frequently and in small amounts
 - consider supplementation with their usual fluids (including milk feeds or water, but not fruit juices) if they refuse to take adequate quantities of ORS and do not have red flag symptoms or signs of dehydration
 - consider administration of ORS via nasogastric tube if they are unable to drink ORS or vomit persistently
 - monitor the response to ORT by regular clinical reassessment. **[1.3.3.2]**

- Use intravenous fluid therapy (IVT) for dehydration:
 - if clinical assessment confirms or raises suspicion of shock
 - if, despite appropriate ORT, there are signs of deterioration with red flag symptoms or signs of dehydration. **[1.3.4.1]**

- Following rehydration:
 - give full-strength milk from the outset
 - reintroduce the child's usual solid food
 - avoid giving fruit juice until diarrhoea has stopped. **[1.4.2.1]**

Information and advice for parents and carers

- Advise parents and carers:
 - in children without clinical dehydration and who are not at increased risk of dehydration:
 - ◇ to continue usual feeds including breast or other milk feeds
 - ◇ to encourage the child to drink plenty of fluids
 - in children without clinical dehydration but who are at increased risk of dehydration:
 - ◇ to continue usual feeds including breast or other milk feeds
 - ◇ to encourage the child to drink plenty of fluids
 - ◇ offer ORS as additional supplemental fluid
 - in children with clinical dehydration:
 - ◇ that rehydration is usually possible with oral rehydration solution (oral rehydration therapy)
 - ◇ to make up the ORS according to the instructions on the packaging
 - ◇ to give the specified amount of ORS (50 ml/kg for rehydration plus maintenance volume) over a 4 hour period
 - ◇ to give this amount of ORS in small but frequent feeds
 - ◇ to continue breast feeding in addition to giving the ORS
 - ◇ to be concerned if:
 - ◇ the child refuses to take the ORS or persistently vomits
 - ◇ does not appear to be recovering
 - ◇ appears to have become less well
 - ◇ to seek advice from a specified healthcare professional if they are concerned
 - following rehydration:
 - ◇ child should be encouraged to drink plenty of their usual fluids including milk feeds if these were stopped
 - ◇ to reintroduce the child's usual diet
 - ◇ to give a specified volume of ORS (5 to 10 ml/kg) following the passage of large watery stools in children at increased risk of dehydration

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- that the usual duration of diarrhoea is 5 to 7 days and in most children it resolves within 2 weeks
 - that the usual duration of vomiting is 1 or 2 days and in most children it resolves within 3 days
 - to seek advice from a specified healthcare professional if children's symptoms are not resolving as expected. **[1.8.1.1]**
- Advise parents and child carers that:
 - handwashing with soap (liquid where possible) in warm running water and careful drying is the most important factor in the prevention of spread of diarrhoea and vomiting.
 - handwashing should occur after going to the toilet (children) or changing nappies (parents) and before the preparation, serving or eating of food.
 - towels used by infected children should not be shared.
 - children should not attend any childcare facility or school when diarrhoea or vomiting is present.
 - following any episode of diarrhoea and vomiting, children under 5 years old can return to school or other child care facility 48 hours following the last episode of diarrhoea or vomiting.
 - children should not swim in swimming pools for 2 weeks following the last episode of diarrhoea. **[1.8.2.1]**

1 Guidance

The following guidance is based on the best available evidence. The full guideline ([\[add hyperlink\]](#)) gives details of the methods and the evidence used to develop the guidance.

1.1 *Diagnosis*

1.1.1 Clinical Diagnosis

1.1.1.1 Advise parents that:

- the usual duration of diarrhoea is 5–7 days and in most children will resolve within 2 weeks
- the usual duration of vomiting is 1–2 days and in most children will resolve within 3 days.

1.1.1.2 When considering a diagnosis of gastroenteritis, look for the following key characteristics:

- a recent change in stool consistency to loose or watery stools
- recent onset of vomiting
- recent contact with an individual with acute diarrhoea
- exposure to known source of enteric infection (water or food borne)
- recent foreign travel.

1.1.1.3 Consider the following symptoms and signs as possible indicators of diagnoses other than gastroenteritis:

- high fever:
 - age less than 3 months: > 38 °C
 - age more than 3 months: > 39 °C.
- rapid breathing or laboured respirations
- altered conscious level (irritability, drowsiness)
- photophobia, neck stiffness and/or bulging fontanelle (in infants)
- non-blanching (haemorrhagic) rash
- blood and/or mucous in stool
- bilious vomiting (green)
- severe or localised abdominal pain
- abdominal distension or rebound tenderness.

1.1.2 Laboratory investigations in diagnosis

Stool microbiological investigation

1.1.2.1 Perform stool microbiological investigations if:

- the child is seriously ill with suspected septicaemia
- there is bloody and/or mucoid diarrhoea
- the child is immunocompromised.

1.1.2.2 Consider performing stool microbiological investigations if:

- there is a history of recent overseas travel
- the diarrhoea has not improved by day seven
- there is uncertainty about the diagnosis of gastroenteritis.

1.1.2.3 Contact the public health authorities if you suspect a local outbreak of gastroenteritis.

1.1.2.4 If stool microbiology is to be performed:

- collect, store and transport stool specimens as advised by the investigating laboratory
- provide the laboratory with the relevant clinical information.

Other laboratory investigations

1.1.2.5 Perform a blood culture if antibiotic therapy is to be given.

1.1.2.6 Consider measuring C-reactive protein (CRP) in young infants and in children with immune deficiency presenting with diarrhoea and fever.

1.1.2.7 Monitor full blood count, platelets, urea and electrolytes in children with *E. coli* 0157:H7 infection

1.2 *Assessment for dehydration and shock*

1.2.1 Clinical assessment

1.2.1.1 Recognise the following as being at increased risk of dehydration:

- children aged less than 2 years of age, with even greater risk for those aged less than 6 months
- infants who were of low birth weight
- children with more than 5 diarrhoeal stools in the previous 24 hours
- children with more than 2 vomits in the previous 24 hours
- children who have not been offered or have not been able to tolerate supplementary fluids prior to presentation
- infants in whom breastfeeding has stopped during the illness
- children with signs of malnutrition.

1.2.1.2 During direct or remote assessment ask whether:

- the child has seemed to the carer to be unwell
- there has been excessive or unaccustomed irritability or lethargy
- the child has seemed unusually thirsty
- there has been a reduction in urine output
- the child's appearance has changed (e.g., sunken eyes)
- the skin colour is normal
- the hands and feet are warm.

1.2.1.3 Assess hydration with table 1 in order to:

- classify children as non-dehydrated, clinically dehydrated or shocked
- use red flags as warning signs for increased risk of progression to shock.

Table 1 Candidate symptoms and signs available for the comprehensive assessment and classification of dehydration.

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		Signs (face-to-face assessments only)	
Normal conscious state	Irritability or lethargy ^a 	Depressed conscious state	

Normal skin colour and warm peripheries	Normal skin colour and warm peripheries	Pale or mottled skin and/or cold peripheries
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Normal heart rate	Tachycardia 	Tachycardia
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 Red flags may help identify children at the more severe end of the dehydration spectrum in whom there is an increased risk of progression to shock, and for whom referral to hospital should be considered.

^a Based on parent/clinician global assessment

^b The presence of this symptom may help to rule out dehydration, but did not have sufficient diagnostic utility to do so in isolation

^c Except after a drink

^d Except mouth breather

^e Relevant to younger infants, the fontanelle becoming progressively smaller and usually closing by 18 months

Notes on how to use this table:

- Symptoms and signs have been separated since only the former are available for remote (telephone) assessment.
- Symptoms and signs need to be interpreted in the context of the presence of risk factors for dehydration and the social and family circumstances.
- The distinction between 'clinical dehydration' and 'red flag dehydration' is not absolute and requires clinical judgement. If there is doubt, the child should be managed as for the more severe end of the spectrum.

1.2.1.4 Suspect hypernatraemic dehydration if any of the following signs are present:

- jittery movements
- hypertonicity
- hyperreflexia
- convulsions
- drowsiness or coma.

1.2.2 Laboratory investigations in assessment of dehydration

1.2.2.1 Do not routinely perform blood biochemical testing.

1.2.2.2 Monitor serum sodium, potassium, glucose, venous blood gas, chloride, urea and creatinine concentrations if:

- IVT is required for shock
- there are clinical manifestations suggestive of hypernatraemia or acidosis.

1.3 Fluid management

1.3.1 Primary prevention of dehydration

1.3.1.1 In children with gastroenteritis but without clinical dehydration:

- continue usual fluids, including breast or other milk feeds
- encourage the drinking of plenty of fluids
- offer ORS as supplemental fluid for those at increased risk of dehydration:
 - children less than 2 years of age, especially those aged less than 6 months
 - infants who were of low birth weight
 - children with more than 5 diarrhoeal stools in the previous 24 hours
 - children with more than 2 vomits in the previous 24 hours
 - children with signs of malnutrition.

1.3.2 Treatment of dehydration

1.3.2.1 Rehydrate children, including those with hypernatraemia, using ORS unless they are in shock.

1.3.3 Oral fluids – optimal composition and administration

1.3.3.1 Use low osmolarity ORS (240–250 mOsm/l) for oral rehydration therapy.

1.3.3.2 In children with clinical dehydration, including hypernatraemic dehydration:

- treat with low osmolarity ORS
- give 50 ml/kg of ORS over 4 hours in addition to maintenance fluids
- administer the fluid frequently and in small amounts
- consider supplementation with their usual fluids (including milk feeds or water, but not fruit juices) if they refuse to take adequate quantities of ORS and do not have red flag symptoms or signs of dehydration
- consider administration of ORS via nasogastric tube if they are unable to drink ORS or vomit persistently
- monitor the response to ORT by regular clinical reassessment.

1.3.4 Intravenous fluid therapy (IVT)

1.3.4.1 Use IVT for dehydration:

- if clinical assessment confirms or raises suspicion of shock
- if, despite appropriate ORT, there are signs of deterioration with red flag symptoms or signs of dehydration.

1.3.4.2 Treat shock with a rapid intravenous infusion of 20 ml/kg of 0.9% sodium chloride solution.

1.3.4.3 If the child remains shocked:

- give another rapid intravenous infusion of 20 ml/kg of 0.9% sodium chloride solution
- consider other possible causes of shock.

1.3.4.4 If IVT is required for rehydration of non-shocked children:

- use 0.9% sodium chloride with 5% glucose as the initial infusion fluid
- give 50 ml/kg of intravenous fluid over 24 hours (48 hours in hypernatraemic dehydration) in addition to maintenance fluids
- give an additional bolus of 5–10 ml/kg of 0.9% sodium chloride with 5% glucose for each large watery stool passed
- monitor serum electrolytes
- consider monitoring acid/base status
- change to 0.45% sodium chloride with 5% glucose if hypernatraemia or hyperchloraemic acidosis develop.

1.3.4.5 During IVT, attempt introduction of ORT and, if tolerated:

- stop IVT and complete rehydration with ORT
- give 5–10 ml/kg of ORS for each large watery stool passed.

1.3.5 Preventing recurrence of dehydration

1.3.5.1 Following rehydration children should be encouraged to drink plenty of their usual fluids or feed.

1.3.5.2 If dehydration recurs ORT should be recommenced.

1.3.5.3 Following rehydration, in those at increased risk of dehydration, give 5–10 ml/kg of ORS following the passage of each large watery stool. These children include:

- children less than 2 years of age, with even greater risk for those aged less than 6 months
- infants who were of low birth weight
- children with more than 5 diarrhoeal stools in the previous 24 hours
- children with more than 2 vomits in the previous 24 hours.

1.4 Nutritional management

1.4.1 Feeding during rehydration

1.4.1.1 During oral rehydration therapy – typically a 4-hour time period:

- continue breast feeding
- other milk feeds should normally be withheld
- consider supplementation with the child's usual fluids (including milk feeds or water, but not fruit juices) if they refuse to take adequate quantities of ORS and do not have red flag symptoms or signs of dehydration
- withhold solid foods.

1.4.2 Feeding following rehydration

1.4.2.1 Following rehydration:

- give full-strength milk from the outset
- reintroduce the child's usual solid food
- avoid giving fruit juice until diarrhoea has stopped.

1.5 *Antibiotic therapy*

1.5.1 Do not routinely give antibiotics to children with gastroenteritis.

1.5.2 Give appropriate antibiotic treatment to the following:

- those with suspected septicaemia
- those with extra-intestinal metastatic bacterial infection
- infants under 6 months of age with salmonella gastroenteritis
- malnourished or immune deficient children (including HIV/AIDS) with salmonella gastroenteritis
- those with *Clostridium difficile*-associated pseudomembranous enterocolitis, dysenteric shigellosis, dysenteric amoebiasis, or cholera.

1.5.3 Consider antibiotic therapy for those recently returned from overseas travel.

1.6 *Other therapies*

1.6.1 Antidiarrhoeal agents

1.6.1.1 Do not use antidiarrhoeal medications.

1.7 *Escalation of care*

1.7.1.1 During remote assessment:

- arrange emergency transfer of those with symptoms suggestive of shock to a secondary care facility
- refer for face-to-face assessment those with:
 - symptoms suggesting an alternative serious condition
 - factors indicating an increased risk of dehydration
 - symptoms suggesting clinical dehydration
 - adverse social or family circumstances
- provide appropriate safety netting arrangement to ensure continuity of care and early recognition of clinical deterioration.

1.7.1.2 During community face-to-face assessment:

- immediately refer (by emergency transfer) to a secondary care facility all children with symptoms and signs of shock
- using clinical judgement, consider early repeat face-to-face reassessment or referral to a secondary care facility those with:
 - symptoms and signs suggesting an alternative and serious diagnosis
 - dehydration associated with red flag symptoms or signs
 - adverse social or family circumstances
- provide appropriate safety netting arrangement to ensure continuity of care and early recognition of clinical deterioration.

1.8 *Information and advice for parents and carers*

1.8.1 Caring for a child with diarrhoea and vomiting at home

1.8.1.1 Advise parents and carers:

- in children without clinical dehydration and who are not at increased risk of dehydration:
 - to continue usual feeds including breast or other milk feeds
 - to encourage the child to drink plenty of fluids
- in children without clinical dehydration but who are at increased risk of dehydration:
 - to continue usual feeds including breast or other milk feeds
 - to encourage the child to drink plenty of fluids
 - offer ORS as additional supplemental fluid
- in children with clinical dehydration:
 - that rehydration is usually possible with oral rehydration solution (oral rehydration therapy)
 - to make up the ORS according to the instructions on the packaging

- to give the specified amount of ORS (50 ml/kg for rehydration plus maintenance volume) over a 4 hour period
- to give this amount of ORS in small but frequent feeds
- to continue breast feeding in addition to giving the ORS
- to be concerned if:
 - ◇ the child refuses to take the ORS or persistently vomits
 - ◇ does not appear to be recovering
 - ◇ appears to have become less well
- to seek advice from a specified healthcare professional if they are concerned

- following rehydration:
 - child should be encouraged to drink plenty of their usual fluids including milk feeds if these were stopped
 - to reintroduce the child's usual diet
 - to give a specified volume of ORS (5 to 10 ml/kg) following the passage of large watery stools in children at increased risk of dehydration

- that the usual duration of diarrhoea is 5 to 7 days and in most children it resolves within 2 weeks
- that the usual duration of vomiting is 1 or 2 days and in most children it resolves within 3 days
- to seek advice from a specified healthcare professional if children's symptoms are not resolving as expected.

1.8.2 Prevention of primary spread of diarrhoea and vomiting

1.8.2.1 Advise parents and child carers that:

- handwashing with soap (liquid where possible) in warm running water and careful drying is the most important factor in the prevention of spread of diarrhoea and vomiting.
- handwashing should occur after going to the toilet (children) or changing nappies (parents) and before the preparation, serving or eating of food.
- towels used by infected children should not be shared.
- children should not attend any childcare facility or school when diarrhoea or vomiting is present.
- following any episode of diarrhoea and vomiting, children under 5 years old can return to school or other child care facility 48 hours following the last episode of diarrhoea or vomiting.
- children should not swim in swimming pools for 2 weeks following the last episode of diarrhoea.

2 Notes on the scope of the guidance

NICE guidelines are developed in accordance with a scope that defines what the guideline will and will not cover. The scope of this guideline is available from www.nice.org.uk/guidance/index.jsp?action=download&o=34444

How this guideline was developed

NICE commissioned the National Collaborating Centre for Women's and Children's Health to develop this guideline. The Centre established a Guideline Development Group (see appendix A), which reviewed the evidence and developed the recommendations. An independent Guideline Review Panel oversaw the development of the guideline (see appendix B).

There is more information in the booklet: 'The guideline development process: an overview for stakeholders, the public and the NHS' (third edition, published April 2007), which is available from www.nice.org.uk/guidelinesprocess or from NICE publications (phone 0845 003 7783 or email publications@nice.org.uk and quote reference N1233).

3 Implementation

The Healthcare Commission assesses how well NHS organisations meet core and developmental standards set by the Department of Health in 'Standards for better health' (available from www.dh.gov.uk). Implementation of clinical guidelines forms part of the developmental standard D2. Core standard C5 says that NHS organisations should take into account national agreed guidance when planning and delivering care.

NICE has developed tools to help organisations implement this guidance (listed below). These are available on our website (www.nice.org.uk/CGXXX).

[NICE to amend list as needed at time of publication]

- Slides highlighting key messages for local discussion.
- Costing tools:
 - costing report to estimate the national savings and costs associated with implementation
 - costing template to estimate the local costs and savings involved.
- Implementation advice on how to put the guidance into practice and national initiatives that support this locally.
- Audit support for monitoring local practice.

4 Research recommendations

The Guideline Development Group has made the following recommendations for research, based on its review of evidence, to improve NICE guidance and patient care in the future. The Guideline Development Group's full set of research recommendations is detailed in the full guideline (see section 5).

4.1 *Assessment for dehydration and shock*

Studies and audits should be undertaken to assess the effectiveness and acceptability of the novel clinical hydration assessment scheme and approach to ORT recommended in this guideline.

Why this is important

Previous practice and guidelines have often implied that it is possible to determine the severity of dehydration with some accuracy based on the detection and evaluation of various clinical manifestations. Following a careful review of published research, the GDG concluded that there was little evidence to support this assumption. Many proposed strategies for evaluating the degree of dehydration were based on subjective and arbitrary criteria. The GDG concluded that a simpler approach to clinical evaluation was both practical and sufficient. It was merely necessary to classify children as being 'without clinical evidence of dehydration', 'clinically dehydrated' or 'shocked'.

The only caveat was that a number of specific clinical manifestations ('red flags') might point to a risk of progression to shock. The GDG recommendations for fluid management were then directly linked to this assessment strategy. Those with clinical dehydration should be given ORT in a fixed volume (50 ml/kg over four hours). Regular re-evaluation during the process of ORT would determine whether the child required additional fluid to replace their deficit. Those with shock should receive IVT. The GDG believed that this approach to assessment and fluid management was both rational and safe. It would have the important merit of being simple to implement. However, the GDG recognised this was a novel approach and it would be important to evaluate its effectiveness and acceptability in everyday practice.

4.2 *Fluid management*

Studies should be undertaken in those who require IVT for rehydration:

- to compare the effectiveness and safety of 0.9% NaCl with 0.45% NaCl solution
- to determine the optimal duration for rehydration – 'rapid rehydration therapy' (e.g., 1–4 hours) versus the traditional approach of slow intravenous rehydration (e.g., 24 hours).
- to evaluate the a strategy of changing to ORT to complete rehydration after an initial short period of IVT.

Why this is important

Most children with clinical dehydration should be treated with ORT, but some require IVT, for example because they do not tolerate ORT or because they develop hypovolaemic shock. It is agreed that those with shock should be given intravenous bolus treatment with 0.9% NaCl solution. The optimal choice of intravenous fluid solution for rehydration is less certain. It has been suggested that the use of 0.9% NaCl might be associated with a risk of hyperchloraemic acidosis, while 0.45% might increase the risk of hyponatraemia. These fluids should be compared in a randomised controlled trial. Rehydration with ORT is usually carried out rapidly, for example over a period of 4 hours. When children undergo rehydration using IVT it is traditional

to replace the fluid deficit more slowly – for example over 24 hours. The consequence is that children remain dehydrated and in hospital for a considerably longer time period. It is important that studies are carried out to compare the effectiveness and safety of ‘rapid rehydration’ with the slower approach. Finally, it is important to determine whether following an initial short period of IVT it is effective and safe to attempt to complete the rehydration process using ORT. If so this might have advantages such as a shorter period of hospitalisation.

4.3 Other therapies

A randomised controlled trial should be undertaken to further examine the safety of oral ondansetron for the management of persistent vomiting in children receiving ORT.

Why this is important

Several randomised controlled trials have now shown that in children with persistent vomiting during ORT administration of oral ondansetron, an anti-emetic agent, can increase the likelihood of successful oral rehydration. However, in two of these there was evidence suggesting that diarrhoea was more pronounced in those given ondansetron than in the placebo groups. In one the number of stools passed during the rehydration phase was significantly greater, while in the other the number of stools passed in the first and second 24-hour period after rehydration was significantly greater. In those studies diarrhoea was not a primary outcome, and was reported as an adverse event. The reliability of the finding was therefore somewhat uncertain. If ondansetron does worsen diarrhoea it would be crucially important to determine the clinical significance of this effect – for example in relation to the risk of recurrence of dehydration or re-admission to hospital. If ondansetron is shown to be both effective and safe in a secondary care setting then studies could also be undertaken to evaluate its use in primary care settings.

5 Other versions of this guideline

5.1 *Full guideline*

The full guideline, 'Management of acute diarrhoea and vomiting due to gastroenteritis in children under 5' contains details of the methods and evidence used to develop the guideline. It is published by the National Collaborating Centre for Women's and Children's Health, and is available from www.ncc-wch.org.uk, our website (www.nice.org.uk/CGXXXfullguideline) and the National Library for Health (www.nlh.nhs.uk). **[Note: these details will apply to the published full guideline.]**

5.2 *Quick reference guide*

A quick reference guide for healthcare professionals is available from www.nice.org.uk/CGXXXquickrefguide

For printed copies, phone NICE publications on 0845 003 7783 or email publications@nice.org.uk (quote reference number N1XXX). **[Note: these details will apply when the guideline is published.]**

5.3 *'Understanding NICE guidance'*

A summary for patients and carers ('Understanding NICE guidance') is available from www.nice.org.uk/CGXXXpublicinfo

For printed copies, phone NICE publications on 0845 003 7783 or email publications@nice.org.uk (quote reference number N1XXX). **[Note: these details will apply when the guideline is published.]**

We encourage NHS and voluntary sector organisations to use text from this booklet in their own information about diarrhoea and vomiting in children under 5.

6 Related NICE guidance

Published

- Feverish illness in children: assessment and initial management in children younger than 5 years. NICE clinical guideline 47 (2007). Available from www.nice.org.uk/CG47

7 Updating the guideline

NICE clinical guidelines are updated as needed so that recommendations take into account important new information. We check for new evidence 2 and 4 years after publication, to decide whether all or part of the guideline should be updated. If important new evidence is published at other times, we may decide to do a more rapid update of some recommendations.

Appendix A: The Guideline Development Group

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Appendix B: The Guideline Review Panel

The Guideline Review Panel is an independent panel that oversees the development of the guideline and takes responsibility for monitoring adherence to NICE guideline development processes. In particular, the panel ensures that stakeholder comments have been adequately considered and responded to. The panel includes members from the following perspectives: primary care, secondary care, lay, public health and industry.

[NICE to add]

[Name; style = Unnumbered bold heading]

[job title and location; style = NICE normal]