# NATIONAL CLINICAL GUIDELINES

## ASSESSMENT & MANAGEMENT OF ACUTE DIARRHOEA IN CHILDREN

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المبادئ الإرشادية السريرية لدولة قطر
NATIONAL CLINICAL GUIDELINES FOR QATAR

وزارة الصحـــــة العامـــــة
Ministry of Public Health
State of Qatar • دولـــة قطـــر

## Version History

| Version | Status | Date | Editor | Description |
|---|---|---|---|---|
| 1.0 | Final | 14th December 2016 | Guidelines Team | Final version for publication. |
| 1.1 | Final | 19th March 2017 | Guidelines Team | Minor updates to Section 2. |
| 2.0 | Updated Version | 6th January 2020 | Guidelines Team | Updated Version for Publication. |

## Citation

Suggested citation style:

Ministry of Public Health Qatar. National Clinical Guideline: Assessment and Management of Acute Diarrhoea in Children (2019).

## Abbreviations

The abbreviations used in this guideline are as follows:

| | |
|---|---|
| **FPIES** | Food protein induced enteropathic syndrome |
| **IV** | Intravenous route |
| **MOPH** | Ministry of Public Health of Qatar |
| **ORS** | Oral rehydration salt solution |

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# 1 Information about this Guideline

## 1.1 Objective and Purpose of the Guideline

The purpose of this guideline is to define the appropriate diagnosis and management of acute diarrhoea in children. The objective is to reduce inappropriate investigation, prescribing and referral of patients presenting to provider organisations in Qatar. It is intended that the guideline will be used primarily by physicians in primary care and outpatient settings.

## 1.2 Scope of the Guideline

This guideline covers the following aspects of care:

- Diagnosis and management of symptoms of acute diarrhoea in children.
- Differential diagnosis of acute and persistent diarrhoea.
- Assessment and management of dehydration in children with diarrhoea.
- The appropriate use of antimicrobials in the management of acute diarrhoea.
- Advice to caregivers.
- Public health obligations of healthcare professionals in relation to acute diarrhoea.

Aspects of care not covered in this guideline are:

- Dehydration in children without diarrhoea.
- Management of infectious diarrhoea causing outbreaks in health care settings.
- Detailed prescribing of intravenous fluids for dehydrated patients.

## 1.3 Editorial Approach

This guideline document has been developed and issued by the Ministry of Public Health of Qatar (MOPH), through a process which aligns with international best practice in guideline development and localisation. The guideline will be reviewed on a regular basis and updated to incorporate comments and feedback from stakeholders across Qatar.

The editorial methodology, used to develop this guideline, has involved the following critical steps:

- Extensive literature search for well reputed published evidence relating to the topic.
- Critical appraisal of the literature.
- Development of a draft summary guideline.
- Review of the summary guideline with a Guideline Development Group, comprised of practising healthcare professionals, subject matter experts and patient representatives, from across Qatar.
- Independent review of the guideline by the National Clinical Guidelines & Pathways Committee, appointed by the MOPH, from amongst stakeholder organisations across Qatar.

Whilst the MOPH has sponsored the development of the guideline, the MOPH has not influenced the specific recommendations made within it.

## 1.4 Sources of Evidence

The professional literature published in the English language has been systematically queried using specially developed, customised, and tested search strings. Search strategies are developed to allow efficient yet comprehensive analysis of relevant publications for a given topic and to maximise retrieval of articles with certain desired characteristics pertinent to a guideline.

For each guideline, all retrieved publications have been individually reviewed by a clinical editor and assessed in terms of quality, utility, and relevance. Preference is given to publications that:

1. Are designed with rigorous scientific methodology.
2. Are published in higher-quality journals (i.e. journals that are read and cited most often within their field).
3. Address an aspect of specific importance to the guideline in question.

Further information about the literature search and appraisal process is included in the appendix.

## 1.5 Evidence Grading and Recommendations

Recommendations made within this guideline are supported by evidence from the medical literature and where possible the most authoritative sources have been used in the development of this guideline. In order to provide insight into the evidence basis for each recommendation, the following evidence hierarchy has been used to grade the level of authoritativeness of the evidence used, where recommendations have been made within this guideline.

Where the recommendations of international guidelines have been adopted, the evidence grading is assigned to the underlying evidence used by the international guideline. Where more than one source has been cited, the evidence grading relates to the highest level of evidence cited:

- **Level 1 (L1):**
  - Meta-analyses.
  - Randomised controlled trials with meta-analysis.
  - Randomised controlled trials.
  - Systematic reviews.

- **Level 2 (L2):**
  - Observational studies, examples include:
    - Cohort studies with statistical adjustment for potential confounders.
    - Cohort studies without adjustment.
    - Case series with historical or literature controls.
    - Uncontrolled case series.
  - Statements in published articles or textbooks.

- **Level 3 (L3):**
  - Expert opinion.
  - Unpublished data, examples include:
    - Large database analyses.
    - Written protocols or outcomes reports from large practices.

In order to give additional insight into the reasoning underlying certain recommendations and the strength of recommendation, the following recommendation grading has been used, where recommendations are made:

- **Recommendation Grade A (RGA):** Evidence demonstrates at least moderate certainty of at least moderate net benefit.
- **Recommendation Grade B (RGB):** Evidence is insufficient, conflicting, or poor and demonstrates an incomplete assessment of net benefit vs harm; additional research is recommended.
- **Recommendation Grade C (RGC):** Evidence demonstrates potential harm that outweighs benefit; additional research is recommended.
- **Recommendation of the GDG (R-GDG):** Recommended best practice on the basis of the clinical experience of the Guideline Development Group members.

## 1.6 Guideline Development Group Members

The following table lists members of the Guideline Development Group (GDG) nominated by their respective organisations and the Clinical Governance Group. The GDG members have reviewed and provided feedback on the draft guideline relating to the topic. Each member has completed a declaration of conflicts of interest, which has been reviewed and retained by the MOPH.

| Guideline Development Group Members | | |
|---|---|---|
| **Name** | **Title** | **Organisation** |
| Dr Khalid Jamal Abouhazima | Sr. Attending Physician in Paediatric Gastroenterology, Hepatology & Nutrition | Sidra Medicine |
| Dr Ahmed M. Hussein Babiker | Clinical Pharmacist, Head of Registration & Pricing Section | Dept of Pharmacy and Drug Control, MOPH[1] |
| Dr Mouhammad Samer Hamwy | Paediatric Consultant | Al Ahli Hospital |
| Dr Yasser Mohamed Mosli | Paediatric Specialist, Paediatric Emergency Medicine | Hamad Medical Corporation |
| Dr Mohamed Salem Nasrallah Saleh | Consultant Family Medicine | Primary Health Care Corp |

[1] Dr Ahmed Babiker attended the MOPH in his capacity as a Clinical Pharmacist and advisor on the availability of medications in Qatar.

## 1.7 National Clinical Guidelines & Pathways Committee Members

The following table lists members of the National Clinical Guidelines & Pathways Committee (NCGPC), appointed by the MOPH. The NCGPC members have reviewed and provided their feedback and approval of the guideline document. Each member has completed a declaration of conflicts of interest, which has been reviewed and retained by the MOPH.

| National Clinical Guidelines & Pathways Committee (NCGPC) Members | | |
|---|---|---|
| **Name** | **Title** | **Organisation** |
| Ms Huda Amer Al-Katheeri | Chair of the NCGPC,<br>Director of Strategic Planning & Performance Department | Ministry of Public Health |
| Shk Dr Mohammed Hamad J. Al Thani | Co-Chair of the NCGPC,<br>Director of Public Health | Ministry of Public Health |
| Prof Anthony Akobeng | Chair Clinical Practice Guidelines Committee | Sidra Medicine |
| Dr Alshaymaa Mohammed A. M. Al-Motawa | Consultant Family Medicine | Qatar Petroleum |
| Dr Basil Bashqawi | Accreditation Coordinator, Dept of Health Professions | Ministry of Public Health |
| Dr Abi Khalil Charbel | Associate Professor of Medicine<br>Consultant Cardiology | Weill Cornell Medicine-Qatar |
| Dr Paul Dijkstra | Director of Medical Education | Aspetar |
| Dr Mohamed Elrishi | Consultant Endocrinology and Internal Medicine | Al Ahli Hospital |
| Dr Dahlia Mustafa Hassan | Consultant Family Medicine | Primary Health Care Corp |
| Dr Ghassan Youseph Hommos | Consultant Endocrinology | Al Emadi Hospital |
| Dr Chris Kenny | Executive Director Clinical and Service Development, Office of the Chief Medical Officer | Hamad Medical Corporation |
| Dr Egon Toft | VP and Dean of College of Medicine | College of Medicine, Qatar University |

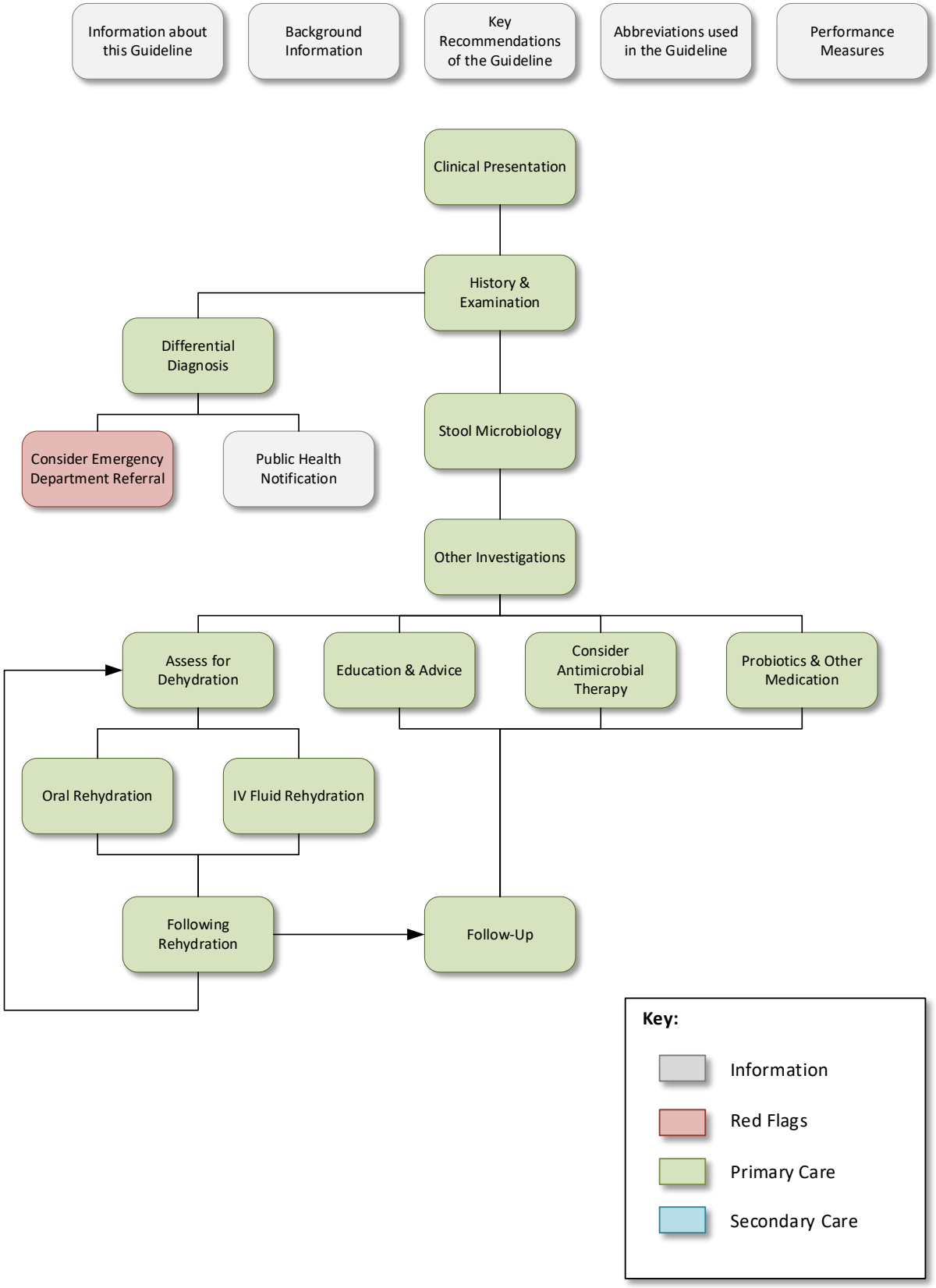
## 1.8 Responsibilities of Healthcare Professionals

This guideline has been issued by the MOPH to define how care should be provided in Qatar. It is based upon a comprehensive assessment of the evidence as well as its applicability to the national context of Qatar. Healthcare professionals are expected to take this guidance into account when exercising their clinical judgement in the care of patients presenting to them.

The guidance does not override individual professional responsibility to take decisions which are appropriate to the circumstances of the patient concerned. Such decisions should be made in consultation with the patient, their guardians, or carers and should consider the individual risks and benefits of any intervention that is contemplated in the patient's care.

## 2 Acute Diarrhoea Diagnosis & Management Pathway

Click on a box below to see the relevant page of the Pathway.



# 3 Key Recommendations of the Guideline

The key recommendations of this guideline are:

**Investigations:**

- Refer to *Section 8.1* for specific indications for stool microscopy and culture.
- Do not routinely carry out blood biochemical tests in children with gastroenteritis to assess for dehydration [1][**L1**, **RGB**].

**Rehydration:**

- Unless intravenous fluids are needed, ORS solution should be used for rehydration, including for those with hypernatraemia [1][**L1**, **RGA1**].
- During rehydration, breast-fed babies should continue breastfeeding [1][**L1**, **RGA2**].
- If oral rehydration fails, hospital admission is recommended [3][**L3, RGA2**].
- Routine use of lactose-free feeds is not recommended in patients managed in the community [3][**L1**, **RGB**].

**Antimicrobial treatments:**

- Do not routinely give antimicrobials to children with acute diarrhoea [1,3][**L1**].
- Antimicrobials are recommended for children with suspected septicaemia or extra-intestinal spread of bacterial infections [8].

**Probiotics:**

- Probiotics, used as an adjunct to rehydration therapy, have been shown to reduce duration and severity of symptoms of acute gastroenteritis [3][**L1, RGA1**].
- There is limited evidence suggesting probiotics may be effective in treatment of persistent diarrhoea in children [22].

**Other medications:**

- Anti-emetics and anti-diarrhoeal medications are not routinely recommended for children with acute gastroenteritis [1,3,7] but may be justified in certain cases [7].
- Zinc supplementation [2–4] and herbal medicines [25] may be considered alongside ORS in children with acute gastroenteritis.

**Education and advice to care givers:**

- Refer to *Section 9.5* for specific advice to be given to caregivers on aspects of hygiene and safety-netting.

**Follow up:**

- Further assessment should be considered if there is no improvement within 48 hours, or there is worsening of the child's overall condition [4].
- Appropriate notification to Public Health should be made online if notifiable diseases are detected or suspected [27].

**Referral to secondary/specialist care:**

- Refer to *Section 10* for specific referral criteria to secondary/specialist care.

# 4 Background Information

## 4.1 Definitions

*Diarrhoea* is defined as:

- The passage of loose or liquid stools, usually associated with an increase in stool frequency and volume (more than 3 times daily) [1].

However, stool frequency and consistency also varies between well children and an increase in frequency and softness of stool may indicate acute diarrhoea [1]. Stools also tend to be softer and more frequent in breastfed infants than those that are bottle fed [1].

There are three clinical types of diarrhoea [2]:

- Acute watery diarrhoea (includes cholera).
- Acute bloody diarrhoea (dysentery).
- Persistent diarrhoea.

*Acute diarrhoea* is defined as:

- 3 or more episodes of loose or liquid stools in one day, usually lasting less than 7 and not more than 14 days [2,3].

*Persistent diarrhoea* is defined as:

- An episode of diarrhoea that lasts for more than 14 days [2,4].

NB: Diarrhoea is a symptom rather than a diagnosis, which in the majority of cases is found to be related to acute gastroenteritis [**R-GDG**].

## 4.2 Aetiology of Acute Diarrhoea

Collection of data and statistical analysis of gastroenteritis in paediatric population of Qatar is ongoing [5]. However, Norovirus is considered a leading cause of acute gastroenteritis in the general population in Qatar [6]. Adenovirus is also a commonly detected viral pathogen isolated in children under the age of 5 years [6].

Other pathogens causing acute diarrhoea in children include [4]:

- Norovirus.
- Rotavirus.
- Adenovirus.
- Astrovirus.
- Cytomegalovirus.
- *Escherichia coli (E. coli).*
- *Campylobacter jejuni.*
- Shigella species.
- *Clostridium difficile.*
- Nontyphoidal salmonellae.
- *Yersinia enterocolitica.*
- *Vibrio cholerae.*
- *Cryptosporidium parvum.*
- *Giardia intestinalis.*
- *Entamoeba histolytica.*

The use of antibiotics, especially broad spectrum antibiotics, can lead to antibiotic-associated diarrhoea as a side effect [7].

Studies carried out in the Qatar population have identified that breastfeeding is a factor reducing the incidence and severity of infantile diarrhoea in the first 6 months of life [8,9].

The risks of diarrheal infection in children seems to increase during dry seasons of the year [10] with rotavirus being most prevalent during dry seasons and bacterial pathogens – during hot and rainy seasons [11].

## 5 History

The following key points in the history should be elicited and recorded where relevant [1,4]:

- Onset of diarrhoea.
- Stool frequency.
- Nature and volume of stool.
- Nausea and vomiting.
- Fever.
- Abdominal pain or distension.
- Appetite.
- Previous medical history.
- Underlying conditions.
- Presence of blood in the stool.
- Exposure to potential sources of infectious pathogens:
    - Recent contact with someone with acute diarrhoea and/or vomiting.
    - Contaminated water or food:
        - May be suspected by affected persons sharing the same water source/meal.
    - Recent travel abroad.
    - Contact with ruminant animals (such as camels, cattle, goats, and sheep), their faeces and any faecally-contaminated environments.
- Medication review.

## 6 Examination

Examine for and record the following [1,4]:

- Body weight and comparison with recent recorded weight, if available.
- Temperature, heart rate, and respiratory rate.
- Blood pressure (where available).
- Abdominal examination.
- Level of consciousness.
- Assess for clinical features of dehydration and shock [1]:
    - Features of clinical dehydration:
        - Appears to be unwell or deteriorating*.
        - Altered responsiveness – irritable, lethargic*.
        - Decreased urine output.
        - Sunken eyes*.
        - Dry mucous membranes – take mouth breathing into account.
        - Tachycardia*.
        - Tachypnoea*.

        - Reduced skin turgor*.
    - Features of clinical shock* – usually indicated by increased severity in symptoms of moderate dehydration, plus:
        - Decreased consciousness.
        - Pale or mottled skin.
        - Weak peripheral pulses.
        - Prolonged capillary refill time (>2 secs).
        - Hypotension – decompensated shock.

*Red flag features that help to identify children at increased risk of progression to shock.
NB: There is a spectrum of severity for children who have features of clinical dehydration; increased severity is indicated by increasingly numerous and more pronounced features [1].

The following features may indicate the patient is at an increased risk of dehydration [1]:

- Younger than 1 year, particularly those younger than 6 months of age.
- Infants of low birth weight.
- More than five diarrhoeal stools in the previous 24 hours.
- Protracted vomiting in the previous 24 hours.
- Children who were not able to tolerate supplementary fluids prior to presentation.
- Infants who have stopped breastfeeding during the illness.
- Signs of malnutrition.
- History of chronic gastrointestinal or renal disease.

## 7 Differential Diagnosis

The differential diagnosis of acute diarrhoea includes [1,12]:

- Gastrointestinal infections:
    - Viral – most common.
    - Bacterial.
    - Parasitic.
- Non-gastrointestinal infections:
    - Pneumonia:
        - Cough, shortness of breath, chest pain, tachypnoea, tachycardia.
    - Urinary tract infection:
        - Frequency, dysuria.
    - Acute otitis media:
        - Earache.
    - Meningitis:
        - Persistent vomiting, altered consciousness, irritability, photophobia, petechial purpuric rash, neck stiffness, bulging fontanelle in infants.
    - Immunodeficiency.
- Surgical causes:
    - Consider if patient presents with the following [1]:
        - Bilious vomiting.
        - Severe or localised abdominal pain.
        - Mucoid/bloody stools.
        - Abdominal distension.
        - Rebound tenderness.
    - Diagnoses include [1,13]:
        - Appendicitis.
        - Intussusception.

        - Bowel obstruction.
        - Short bowel syndrome.
        - Ischaemic bowel.

Differential diagnoses of a first-time presentation of persistent diarrhoea:

- Non-infective gastrointestinal disorders:
    - Suspect particularly if the patient presents with the following [1]:
        - Bloody diarrhoea.
        - Failure to thrive.
        - Weight loss.
    - Causes include [1,12,14]:
        - Inflammatory bowel disease.
        - Coeliac disease.
        - Hirschsprung's enterocolitis.
- Consider endocrinopathy [13]:
    - Diabetes mellitus.
    - Hyperthyroidism.
    - Congenital adrenal hyperplasia.
    - Addison's disease.
    - Hypoparathyroidism.
- Consider drug related causes [1,12,15]:
    - Antibiotics.
    - Antimalarials.
    - Magnesium-containing antacids.
    - Laxative abuse.
- Consider dietary disturbance [1,15]:
    - Food hypersensitivity and/or allergy, e.g.:
        - Congenital lactose intolerance.
        - Transient lactose intolerance following an episode of gastroenteritis.
        - Cow's milk protein – IgE or non-IgE mediated.
        - Sorbitol (toddler's diarrhoea).
    - Food protein induced enteropathic syndrome (FPIES) – severe presentation.
- Consider other non-coeliac causes of malabsorption [1]:
- Consider idiopathic/psychogenic causes [12]:
    - Irritable bowel syndrome.
    - Bulimia.
- Consider secretory tumours [12]:
    - Carcinoid tumours.
    - Medullary tumour of the thyroid.
    - Vasoactive intestinal peptide-secreting adenomas.
- Other causes [1,13,15]:
    - Constipation with overflow diarrhoea, especially in older children.

# 8 Investigations

## 8.1 Stool Microbiology

Consider stool microscopy (with or without *ova and parasites* or *rotavirus antigen testing*) if the following are present [1,3][**L1**]:

- Food poisoning is suspected (see *Section 9.6* on notification of Public Health).
- Diarrhoea persists for more than 3-5 days.
- Fever.
- Abdominal pain.
- Mucus or blood is reported in the stool.
- Recent travel.
- There is uncertainty about the diagnosis of gastroenteritis.
- The child has underlying chronic gastroenterological, renal or other conditions.

Consider performing a stool culture if acute diarrhoea is present and [1,15][**L1**]:

- Food poisoning is suspected (see *Section 9.6* on notification of Public Health).
- The child is systemically unwell.
- Hospital admission is indicated.
- Abdominal pain.
- Fever.
- Mucus or blood is reported in the stool.
- The child is immunocompromised.
- There is a history of:
    - Recent antibiotic use.
    - Chronic proton pump inhibitor use.
    - Recent hospital admission (in the last two months).

A repeat sample is not usually required unless [16][**L1**]:

- Ova or parasites are suspected.
- Repeat sample has been advised by a microbiologist.
- Diarrhoea lasts for more than 7 days after the initial visit [**R-GDG**].

## 8.2 Other Investigations

Do not routinely carry out blood biochemical tests in children with gastroenteritis to assess for dehydration [1][**L1**, **RGB**].

The following additional investigations may be appropriate:

- Blood cultures:
    - Standard practice is to carry out blood cultures if commencing antibiotic therapy for suspected or confirmed bacterial diarrhoea [1][**L1**].
- Blood tests (e.g. urea, electrolytes, creatinine and glucose):
    - Tests may be carried out in selected cases such as:
        - In moderately dehydrated or severely dehydrated children [3][**L3**, **RGA**].
        - In children starting and undergoing intravenous therapy [1,3][**L3**, **RGA**].
        - If hypernatraemia is suspected [1][**L3**].
- Urinalysis [**R-GDG**].
- Endoscopy:

- May be indicated in selected cases (e.g., when inflammatory bowel disease is suspected) but is not routinely recommended [3][**L3, RGA**].
- Abdominal imaging (if surgical causes of diarrhoea are suspected) [**R-GDG**].

# 9 Management

## 9.1 Rehydration

### 9.1.1 Children Without Dehydration

For children without clinical symptoms or signs of dehydration [1][**L1, RGA**]:

- Advise continuing with usual feeds, including breastfeeding and other milk feeds.
- Encourage fluid intake.
- Discourage drinking fruit juice or carbonated drinks.
- Offer oral rehydration salt (ORS) solution as a supplemental fluid to children at increased risk of dehydration.

### 9.1.2 Children With Dehydration

#### 9.1.2.1 Oral Rehydration

In children with clinical symptoms or signs of dehydration [1,17]:

- Unless intravenous fluids are needed, ORS solution should be used for rehydration, including for those with hypernatraemia [1][**L1**, **RGA**]:
  - Use low osmolarity ORS (240–250 mOsm/l) [1][**L1**, **RGA**]. Examples include: Pedialyte®.
- In children age 5 years or younger, give 50 mL/kg over 4 hours plus maintenance volume.
- In children older than age 5 years, give 200 mL ORS solution after each loose stool.
- Give ORS solution frequently and in small amounts.
- Consider supplementation with the child's usual fluids if they refuse to take sufficient quantities of ORS solution, and do not have serious symptoms and signs.
- Monitor response to rehydration by regular clinical assessment.

Maintenance fluid volume requirements per day [17,18]:

- Less than 10 kg body weight: 100 mL/kg.
- 10-20 kg body weight: 1L plus 50 mL/kg for each kg over 10 kg.
- More than 20kg body weight: 1.5L plus 20 mL/kg for each kg over 20 kg.

During rehydration:

- Breast-fed babies should continue breastfeeding [1][**L1**, **RGA**].
- Oral fluids other than ORS should not be given to children with red flag signs or symptoms (see *Section 6*)[1][**L1**].
- If oral rehydration fails, hospital admission is recommended [3][**L3, RGA**].

Modified formulas:

- Routine use of lactose-free feeds is not recommended in patients managed in the community [3][**L1**, **RGB**].
- There is insufficient evidence to make recommendations on the use of diluted lactose-containing milk [3].

#### 9.1.2.2 Intravenous Rehydration

Intravenous (IV) fluid therapy is recommended if:

- Shock is suspected or confirmed [1][**L1**].
- Dehydration is associated with an altered level of consciousness or severe acidosis [3][**L2, RGA**].
- The child with any of the following symptoms/signs shows clinical deterioration despite oral rehydration therapy [1][**L1**]:
    - The child appears to be unwell or deteriorating.
    - Altered responsiveness – irritable/lethargic.
    - Sunken eyes.
    - Tachycardia.
    - Tachypnoea.
    - Reduced skin turgor – 1-2 seconds to recoil from pinch of skin.
- A child persistently vomits the ORS solution given orally or via a nasogastric tube [1][**L1**].
- If child fails to respond to oral rehydration therapy [3][**L3**].
- Severe abdominal distension and ileus are present [3][**L3**].

NB: The prescription of IV fluids in secondary care settings is out of scope for this guidance.

### 9.1.3 Following Rehydration

Following rehydration of the child [1,4][**L1**]:

- Encourage breast-fed babies to continue breastfeeding and intake of fluids.
- Give full-strength milk straight away.
- Avoid fruit juices and carbonated drinks until diarrhoea has stopped.
- Reintroduce the child's usual diet:
    - Advise small, frequent meals throughout the day.
- Consider giving the following groups of children, 5 mL/kg of ORS solution after each large watery stool [1][**L1**]:
    - Younger than 1 year of age, particularly those younger than 6 months.
    - Infants of low birth weight.
    - More than five diarrhoeal stools in the previous 24 hours.
    - More than two vomits in the previous 24 hours.

If dehydration occurs after rehydration, restart oral rehydration therapy [1][**L1**].

## 9.2 Antimicrobial Treatment

Antimicrobial treatment:

- Do not routinely give antimicrobials to children with acute diarrhoea [1,3][**L1**].
- Seek specialist advice when [1]:
    - The child has recently been abroad.
    - Stool culture reveals a causative organism.
- Consider antimicrobial treatment (following stool sampling) for infectious causes of acute diarrhoea, including [1]**:**
    - *Salmonella* gastroenteritis, if the child is:
        - Younger than age 6 months,
        - Malnourished; or
        - Immunocompromised.
    - *Clostridium difficile*-associated pseudomembranous enterocolitis.

    - *Campylobacter jejuni* [**R-GDG**].
    - Giardiasis [1][**L1**].
    - Dysenteric shigellosis [1,3][**L1**, **RGA**].
    - Dysenteric amoebiasis [1][**L1**].
    - Cholera [1,3][**L1**, **RGA**].
- Antimicrobials are recommended for children with suspected septicaemia or extra-intestinal spread of bacterial infections [8].
- Note that parenteral rather than oral antimicrobials are indicated if [3][**L3**, **RGA**]:
    - The child is unable to take oral medication.
    - The child has an immune deficiency and presents with acute gastroenteritis and fever.
    - Severe septicaemia or bacteraemia is suspected or confirmed.
    - Neonates and infants younger than age 3 months with acute diarrhoea and fever.

If antibiotics are required for the treatment of acute diarrhoea, consider the following [19,20]:

- Fluoroquinolones (e.g., ciprofloxacin).
- β-lactams.
- Cephalosporins.
- Macrolide azithromycin for patients with ciprofloxacin non-susceptibility.

Empiric antimicrobial therapy is not routinely recommended but can be justified in certain circumstances. A third-generation cephalosporin (first line) or azithromycin (second line) are recommended for infants <3 months of age and others with neurologic involvement [21][**L1, RGA**].

## 9.3 Probiotics

Probiotics, used as an adjunct to rehydration therapy, have been shown to reduce duration and severity of symptoms of acute gastroenteritis [3][**L1, RGA**]:

- Probiotic effects are strain-specific and so safety and efficacy of each should be established.
- Safety and effectiveness of a single probiotic organism cannot be extrapolated to other organisms.
- There is limited evidence suggesting probiotics may be effective in treatment of persistent diarrhoea in children [22].

Probiotics are also recommended to supplement triple therapy in children [23][**L1, RGA**].

The use of prebiotics in the management of acute gastroenteritis in children is not recommended [3][**L1**, **RGA**].

## 9.4 Other Medications

Consider the following alongside ORS:

- Zinc supplementation [2–4]:
    - For children older than 6 months: dispersible 20 mg/day zinc tablets for the period of 10-14 days.
    - For children younger than 6 months: dispersible 10 mg/day zinc tablets for the period of 10 days.
- Racecadotril [3,24]:
    - For children older than 3 months.
- Antinausea and antiemetic drugs (e.g., ondansetron) [7]:
    - For children >4 years of age.
    - To facilitate tolerance of oral rehydration.

Review herbal medicines that have been shown to reduce symptoms of diarrhoea in children[25]:

- *Potentilla erecta.*
- Carob bean juice.
- *Matricaria chamomilla.*
- Apple pectin (Diarrhoesan).
- Fennel preparations (infantile colic).
- Psyllium fibres.
- Peppermint oil (Colpermin).

The following medication are NOT routinely recommended for children with gastroenteritis [1,3,7]:

- Anti-emetics for children with nausea and vomiting.
- Anti-diarrhoeal medications for children with diarrhoea.
- Bismuth subsalicylate.
- Folic acid.
- Gelatin tannate.
- Loperamide.

## 9.5 Education and Advice to Caregivers

### 9.5.1 Hygiene

Advise parents/carers and children to [1,21]:

- Wash hands thoroughly with soap in warm running water and dry carefully.
- Avoid sharing towels used by infected children.
- Wash soiled clothing and linen separately from other clothes at the highest temperatures they will tolerate.
- Remain absent from school or other childcare facilities while the patient has diarrhoea or vomiting, or within 48 hours of the last episode.
- Extend period of childcare facility absence until there is evidence of microbiological clearance in cases where [26]:
    - The child is infected with *Escherichia coli*, *Typhoid* or *Shigella* and the child is either aged 5 years or younger, or has difficulty adhering to hygiene practices.
- Avoid swimming pools for 2 weeks after the last episode of diarrhoea [1][**L1**]:
    - Particularly if cryptosporidiosis is suspected or confirmed [26].

### 9.5.2 Safety-Netting Advice

Advise parents/carers [1][**L1**]:

- That the usual duration of diarrhoea in acute gastroenteritis is 5-7 days and should stop within 2 weeks.
- That the usual duration of vomiting in acute gastroenteritis is 1-2 days and should stop within 3 days.
- Advice should be sought from a healthcare professional if symptoms do not resolve within these time frames.
- How to access medical help.
- How to recognise symptoms and signs of dehydration.
- To seek immediate help from a healthcare professional if symptoms of dehydration develop, such as:
    - Appearing to get more unwell.
    - Changing responsiveness, e.g. irritability, lethargy.

    - Decreased urine output.
    - Pale or mottled skin.
    - Cold extremities.
- If necessary, advise on follow-up arrangements, specifying time and place.

## 9.6 Follow-Up and Public Health Notification

Further medical assessment should be considered if there is no improvement within 48 hours, or there is worsening of the child's overall condition [4].

Notification of the MOPH Public Health Communicable Disease Department should be made before stool samples are resulted in the following circumstances. If Public Health notification is planned, stool sample should be taken from affected individuals in order to assist in the identification of the causative agent [27]:

- If diarrhoea has been reported in ≥2 children/persons in close contact. Especially if:
    - Individuals have shared the same meal; or
    - Had contact during a social event e.g. a social gathering/party; or
    - Contact has occurred in a school or similar setting.

Contact details of the child's parents/carers or of any other affected people, should be supplied to the MOPH Public Health Department in order so they can verify patient symptoms, identify locations of the affected persons and determine whether further investigation is required.

**Contact the MOPH Public Health Communicable Disease Department using any of the following:**

- **Email:** cdc@moph.gov.qa
- **Telephone (during working hours):** 04 407 0155; 04 407 0184; 04 407 0195.
- **Fax:** 04 407 0812;
- **Hotlines (urgent queries only):** 06 674 0948 / 06 674 0951.

## 9.7 Persistent Diarrhoea

The pathogens most frequently detected in children with persistent diarrhoea [3]:

- Rotavirus.
- Norovirus.
- Astrovirus.
- Enteroaggregative *E. coli* and atypical *E. coli.*
- Giardia.
- Cryptosporidium.
- *Entamoeba histolytica.*

Risk factors for persistent diarrhoea [3]:

- Age younger than 6 months, due to greater risk of exposure to rotavirus.
- Underlying chronic disease:
    - Immune deficiency.
    - *Clostridium difficile* is a major agent of severe diarrhoea in selected chronic diseases, such as:
        - Inflammatory bowel disease.
        - Oncologic conditions.
    - Clinical condition – persistent diarrhoea is more common in children with:
        - Loss of appetite.

        - Fever.
        - Vomiting.
        - Mucous in stools.
- Lower socioeconomic status.

## 10 Referral Considerations

Consider referral to secondary/specialist care for children with any of the following [1,3,4]:

- Alarm symptoms/signs are present:
    - The child appears to be unwell or deteriorating.
    - Fever:
        - Temperature of 38°C or higher in children younger than 3 months.
        - Temperature of 39°C or higher in children aged 3 months and older.
    - Tachypnoea.
    - Altered consciousness.
    - Neck stiffness.
    - Sunken eyes.
    - Reduced skin turgor – 1-2 seconds to recoil from pinch of skin.
    - Bulging or depressed fontanelle in infants.
    - Non-blanching rash.
    - Blood and/or mucus in stool.
    - Bilious (green) vomiting.
    - Severe or localised abdominal pain.
    - Abdominal distension or rebound tenderness.
    - Urticaria − suggests systemic allergic reaction.
- An increased risk of dehydration, e.g. [1][**L1**, **RGA**]:
    - Younger than age 1 year, particularly those younger than age 6 months.
    - Infants of low birth weight.
    - More than five diarrhoeal stools in the previous 24 hours.
    - More than two vomits in the previous 24 hours.
    - Children who have not been offered or been able to tolerate supplementary fluids prior to presentation.
    - Infants who have stopped breastfeeding during the illness.
    - Signs of malnutrition.
- Changing mental status.
- A history of premature birth.
- Chronic medical conditions (e.g., severe cardiac or renal disease).
- Concurrent illness.
- High output diarrhoea, including frequent and substantial volumes.
- No improvement in 48 hours, or a worsening overall condition.
- No urine output in the previous 12 hours.

## 11 Key Considerations for Patient Preferences

Patient preferences refer to patient perspectives, beliefs, expectations, and goals for health and life, and to the steps employed by individuals in assessing the potential benefits, harms, costs, and limitations of the management options in relation to one another. Patients may have preferences when it comes to defining their problems, identifying the range of management options and selecting or ranking the outcomes used to compare these options.

It is important for healthcare professionals to develop an understanding of the patient as an individual and the unique way in which each person experiences a condition and its impact on their life.

The following recommendations are therefore made for physicians and other healthcare professionals regarding general principles of patient care in Qatar:

- **Respect Patients:** Treat patients with respect, kindness, dignity, courtesy and honesty. Ensure that the environment is conducive to discussion and that the patient's privacy is respected, particularly when discussing sensitive, personal issues. Ask the patient how they wish to be addressed and ensure that their choice is respected and used.

- **Maintain Confidentiality:** Respect the patient's right to confidentiality and avoid disclosing or sharing patients' information without their informed consent. In this context, students and anyone not directly involved in the delivery of care should first be introduced to the patient before starting consultations or meetings, and let the patient decide if they want them to stay.

- **Clarify Third-Party Involvement:** Clarify with the patient at the first point of contact whether and how they like their partner, family members or carers to be involved in key decisions about their care or management and review this regularly. If the patient agrees, share information with their partner, family members or carers.

- **Obtain Informed Consent:** Obtain and document informed consent from patients, in accordance with MOPH policy and guidance.

- **Encourage Shared Decision Making:** Ensure that patients are involved in decision making about their own care, or their dependent's care, and that factors that could impact the patient's participation in their own consultation and care including physical or learning disabilities, sight, speech or hearing impairments and problems with understanding, reading or speaking English are addressed.

- **Disclose Medical Errors:** Disclose errors when they occur and show empathy to patients.

- **Ensure Effective Communication:** Explore ways to improve communication including using pictures, symbols or involving an interpreter or family members. Avoid using medical jargon. Use words the patient will understand and confirm understanding by asking questions.

- **Ensure Continuity of Care:** Provide clear and timely sharing of patient information between healthcare professionals especially at the point of any transitions in care.

## 12 Performance Measures

A list of performance measures is given in the table below. Healthcare organisations are encouraged to monitor service performance using the indicator definitions below.

| Number | Numerator | Denominator |
|---|---|---|
| ADC01 | Number of patients who have been prescribed an oral rehydration solution. | All patients aged <18 years with a diagnosis of acute diarrhoea. |
| ADC02 | Number of patients who have been prescribed IV fluids for rehydration. | All hospitalised patients aged <18 years with a diagnosis of acute diarrhoea. |
| ADC03 | Number of patients who are treated with empirical antimicrobials in the absence of septicaemia or extra-intestinal spread of infection. | All patients aged <18 years with a diagnosis of acute diarrhoea. |

**Table 12.1:** Performance Measures.

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# Appendix: Detailed Description of the Literature Search

A systematic search for existing literature on hyperthyroidism was performed in the period April 28th – May 6th, 2019.

The search for clinical practice guidelines on Acute diarrhoea in children diagnosis and/or management was performed in the *PubMed* database and websites of relevant organisations and societies, including the *World Health Organization*.

Peer-reviewed scientific publications were found in *PubMed* and via *Google Scholar* Internet search engine. Non-peer reviewed studies were identified in *bioRxiv*. Books were checked on PubMed. Information published on medical websites and drug prescribing information sheets were found via Google search engine.

The included publications were identified using the term "*diarrhoea*" and specified with the following terms in combinations:

- *Children, hypernatremia, hygiene, probiotics, rehydration, zinc.*

The date limit for the search was set up as March 19th, 2017 based on the last update of the present guideline.

*Figure A.1* below demonstrates graphically the results of the search and application of exclusion criteria.

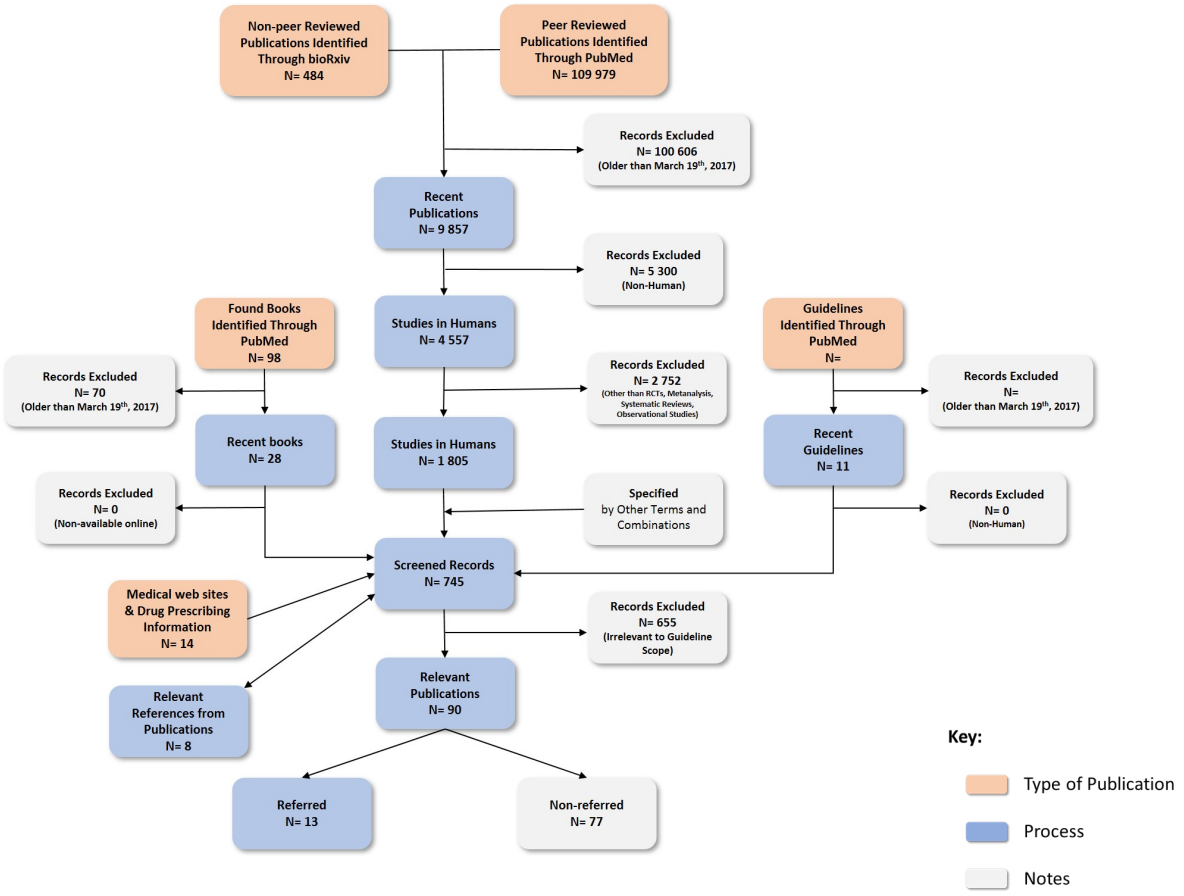


**Fig A.1:** Literature search results and application of exclusion criteria.

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