

Standard Treatment Guidelines for Primary Health Care

SECOND EDITION



REPUBLIC OF GUYANA
Ministry of Public Health

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Preface

The Ministry of Health is pleased to provide the second edition of the *Standard Treatment Guidelines* (STGs) for Guyana. This publication is a follow-up of the successful development and launch of the first *Standard Treatment Guidelines* in 2010, which aimed to harmonize the treatment and management protocols for the public health care system locally. This edition builds on the lessons learnt and the challenges encountered when implementing national standards in an environment where several providers with various backgrounds of training and medical practice culture were integrated in to a free common health care delivery system.

The first edition successfully addressed the issue where no guidelines for treatment or standard approaches to the management of a number of illness, conditions, and diseases existed locally. As a consequence, many of these conditions are now treated in accordance with agreed-upon national standards, resulting in compliance with rational medicine use practices and prevention of wastage.

In this second edition, we have increased from 60 to more than 120 the number of common diseases and conditions affecting the population. As in the first edition, a Technical Review Group was appointed to be responsible for review the existing 2010 guidelines and for the drafting the new areas that were selected. This process followed WHO-recommended practices that involved consultation with physicians and specialists for both public and private practice, review of evidence-based literature, and a validation process with stakeholders.

This guideline, therefore, provides evidence-based, cost-effective treatments for common medical conditions and guarantees standardised quality care to patients with effective use of resources. It is envisaged once again that the second edition STGs will be used to orient new prescribers, guide the procurement of medicines, guide the use of medicines at the different levels, prevent the unnecessary stocking of and consequent wastage of medicines, and ultimately promote the rational use of medicines and good health care practice.

This edition, like the previous one, is also recommended for use by the private sector as the minimum standard of treatment thereby truly resulting in the provision of unified high-quality health care for all patients across Guyana.

A handwritten signature in black ink, appearing to read "Shamdeo Persaud".

Dr. Shamdeo Persaud
Chief Medical Officer
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Acronyms and Abbreviations

ABC	airway, breathing, circulation
AFB	acid-fast bacillus
AIDS	acquired immune deficiency syndrome
ASA	acetylsalicylic acid
BCG	bacillus Calmette-Guérin [TB vaccine]
BID	twice a day
BMI	body mass index
BP	blood pressure
BUN	blood urea nitrogen
CBC	complete blood count
CD4	cluster designation 4
CFNI/PAHO	Caribbean Food and Nutrition Institute/Pan American Health Organization
CNS	central nervous system
CPR	cardiopulmonary resuscitation
CSF	cerebrospinal fluid
CT	computerized tomography
CXR	chest x-ray
dL	decilitre
DM	diabetes mellitus
DOTS	directly observed therapy short-term
DVT	deep vein thrombosis
ECG	electrocardiogram
EEG	electroencephalogram
ELISA	enzyme-linked immunosorbent assay
EPTB	extra-pulmonary tuberculosis
ESR	erythrocyte sedimentation rate
FBC	full blood count
g	gram
G	gauge
GCS	Glasgow coma scale

ACRONYMS AND ABBREVIATIONS

GERD	gastroesophageal reflux disease
GFR	glomerularfiltration rate
GI	gastrointestinal
GPHC	Georgetown Public Hospital Corporation
h	hour
HAART	highly active antiretroviral therapy
Hb	haemoglobin
HCTZ	hydrochlorothiazide
HDL	high-density lipoprotein
HF	heart failure
HIV	human immunodeficiency virus
HRZE	isoniazid (H), rifampin (R), pyrazinamide (Z), and ethambutol (E)
HSV	herpes simplex virus
ICU	intensive care unit
IgG	immunoglobulin G
IgM	immunoglobulin M
IM	intramuscular
IMCI	Integrated Management of Childhood Illness
INH	isoniazid
IU	international units
IV	intravenous
kcal	kilocalorie
kg	kilogram
LDL	low-density lipoprotein
LLQ	left lower quadrant
LP	lumbar puncture
LUQ	left upper quadrant
MB	multibacillary
mcg	microgram
MCH	mean corpuscular haemoglobin
mcmol/L	micromole per litre
MCV	mean corpuscular volume
MDR	multidrug resistant

MDT	multidrug therapy
mg	milligram
MI	myocardial infarction
MIU	million international units
mL	millilitre
mmHg	millimetres of mercury
mmol/L	millimole per litre
MOH	Ministry of Health
MSM	methyl sulfonyl methane
MUAC	mid upper arm circumference
N/A	not applicable
NGT	nasogastric tube
NSAID	nonsteroidal anti-inflammatory drug
OCD	obsessive-compulsive disorder
ORS	oral rehydration salts
PAD	peripheral arterial disease
PB	paucibacillary
PCP	pneumocystis pneumonia
PCV	packed cell volume
PID	pelvic inflammatory disease
PO	per os (by mouth)
PPI	proton pump inhibitor
PR	per rectum
PRN	when necessary
PTB	pulmonary tuberculosis
PTSD	post-traumatic stress disorder
PUO	pyrexia of unknown origin
PVD	peripheral vascular disease
QID	four times/day
RA	rheumatoid arthritis
RDT	rapid diagnostic test
RLQ	right lower quadrant
RPR	rapid plasma reagent

ACRONYMS AND ABBREVIATIONS

RR	respiratory rate
RSV	respiratory syncytial virus
RUQ	right upper quadrant
STG	standard treatment guideline
STI	sexually transmitted infection
TB	tuberculosis
TIA	transient ischaemic attack
TID	three times/day
TSH	thyroid stimulating hormone
tsp	teaspoon
TST	tuberculin skin test
URI	upper respiratory infection
URT	upper respiratory tract
URTI	upper respiratory tract infection
VDRL	Venereal Disease Research Laboratory
VIA	visual inspection (of cervix) with acetic acid
WBC	white blood cell
WCC	white cell count
WHO	World Health Organisation
XDR	extensively drug resistant

How to Use the Standard Treatment Guidelines

Background

Over the years, the Ministry of Health has developed and implemented various guidelines relating to patient care and management of a number of priority diseases in Guyana. These guidelines have all been published individually, but no single documents provided a standardized approach to the management of a number of frequently seen diseases at the primary care level, until 2010, when the first edition of the *Standard Treatment Guidelines* was published.

Since then, a review of the use of the STGs has been undertaken and the format changed to provide a more systematic approach to the understanding of the disease entities. Additional chapters have been added to include other diseases commonly seen at the primary health care level including emergencies, trauma, and neuropsychiatric disorders.

The medicines used in the management of the diseases are evidence based and linked to the medicines available in the Guyana Essential MedicinesList. The use of clinical practice guidelines is, therefore, a means ofproviding standardized and quality care, and making more effective use of scarce resources. (See appendix A, “The Essential Medicine Concept.”)

Treatment guidelines serve to—

- Guide the procurement of medicines
- Guide the availability of medicines at the different levels of health facility
- Prevent unnecessary stocking of medicines and, hence, wastage
- Provide a standardized approach to the management of diseases

Furthermore, STGs and EMLs provide inputs for the compilation of national formularies.

It is envisioned that these guidelines will be applied systematically and, thus, lead to improved care and outcomes of the diseases in the Guyana context. These guidelines are meant for the use of medical and health professionals, (e.g., doctors, medexes, and community health workers), involved in curative care at the primary health care level.

How to Use the Manual

To use the STGs effectively, users of the manual must become familiar with its content and layout. Diseases are discussed according to systems, disease category, or signs and symptoms. Some diseases that already have existing guidelines (e.g., AIDS) are, in general, not included in this manual, but where such diseases are included, the disease-specific guidelines can be consulted for greater details about prevention, community action, and follow-up. Where relevant, the guidelines are consistent with the case management guidelines of the Integrated Management of Childhood Illness (IMCI) Strategy and other national treatment guidelines.

The table of contents at the beginning of the manual provides the number and title of each chapter along with its subsections and page numbers. The alphabetical index lists the names of the diseases and page numbers for ease of reference. Each disease is discussed according to the following format, where applicable:

- Description of the medical condition
- Classification
- Causes and risk factors
- Signs and symptoms
- Diagnosis (and, in some cases, differential diagnosis)
- Investigations
- Management objective(s)
- Nonpharmacological management
- Pharmacological management—medicine, dose, duration
 - First line
 - Second line
 - Third line (if necessary)
- Referral
- References

When the disease entity is problem based (e.g., a sign or symptom), a flowchart is provided to aid diagnosis. These charts are to be read from top to bottom and from left to right. The boxes on the extreme left ask questions that can be answered with a **YES** or **NO**. Depending on the answer, an arrow leads downward with further questions or across to the next column of

boxes, which provides the possible diagnosis. The next box to the right provides treatment guidelines.

All the medicines cited in the guidelines are included in the Guyana Essential Medicines List. The essential medicine concept and instructions on how to use that manual are outlined in appendixes A and B.

Not all patients or conditions need prescriptions for medicines. In certain conditions, simple advice and nonpharmacological management may be more suitable. Medicines should be prescribed only when they are necessary for treatment following a clear diagnosis. In all cases, the practitioner must carefully weigh the expected benefit of a prescribed medication against potential risks. This balance is especially important when treating pregnant patients since the risk to both mother and foetus must be considered.

Some of the material in this STG came from outside sources. To minimize space and confusion, all references have been numbered by the order they have appeared in this document, and the appropriate reference numbers for a section are noted at the end of the section. The numbered list of references can be found on pg. 367 in this manual. for example, if a section is followed by the notation—references 22,24—please turn to the reference section on pg. 367 and look at reference numbers 22 and 24.

Prescription Writing

All prescriptions should—

- Be written legibly in ink by the prescriber
- Contain the current date
- Give the full name and address of the patient
- Specify the age of the patient
- Note the patient's weight on prescriptions for children
- Be signed by the prescriber

In all prescription writing, the following instructions should be followed:

- Write the name of the medicine or preparation in full using the generic name.

- Limit the use of abbreviations to those generally accepted and listed in the acronyms and abbreviations list (e.g., ASA, HCTZ, HRZE, and MSM) to avoid misinterpretation.
- Avoid unnecessary use of decimal points, and use them only when they are unavoidable. A zero should be written in front of the decimal point if there is no other numeral (e.g., 2 mg and not 2.0 mg; 0.5 mL and not .5 m).
- State the treatment regimen in full, including the following information:
 - Medicine name, strength, and form
 - Dose or dosage
 - Dose frequency
 - Duration of treatment, for example—
 - ◆ Amoxicillin (250 mg tablet) every 8 hours for 5 days
 - ◆ Amoxicillin (250 mg tablet) 2 tablets every 8 hours for 5 days
 - ◆ Amoxicillin (250 mg tablet) 500 mg every 8 hours for 5 days
- In the case of “as required” (PRN), specify a minimum dose interval (e.g., every 4 hours as required).

1. Emergencies

1.1 Acute Abdomen

Description

Acute abdomen is a clinical term used to describe a syndrome in which the major symptom is a sudden acute abdominal pain of unknown origin. Pain may occur in any quadrant of the abdomen. Acute abdomen is a medical emergency requiring urgent and specific diagnosis. Several causes need surgical intervention.

Management must be instituted before referral to hospital.

Causes

The pain may originate from the abdomen, or it maybe referred from an extra-abdominal source. It maybe metabolic or neurogenic, both of which need to be ruled out when making a diagnosis.

Pains originating in the abdomen may be a result of the following causes.

- Inflammatory
 - Acute peritonitis
 - Acute appendicitis
 - Acute pancreatitis
 - Ruptured liver abscess
 - Pelvic inflammatory disease
 - Ruptured tubo-ovarian abscess
 - Acute pyelonephritis
 - Acute diverticulitis
- Bowel obstruction
 - Strangulated hernia
 - Volvulus, adhesions
 - Intussusception
- Perforations of hollow organs (e.g., stomach, duodenum, intestines)
- Colic
 - Acute cholecystitis or gallstones
 - Ureteric stones

- Haemorrhagic
 - Ruptured ectopic pregnancy
 - Ruptured spleen
 - Twisted ovarian cyst

Signs and symptoms

- Colicky abdominal pain that is either sudden or gradual in onset and increase of severity suggests an obstruction.
- Continuous pain when the patient lies quite still suggests peritonitis.
- Fever is present in inflammatory conditions.
- Other signs and symptoms can be—
 - Anorexia, nausea, and vomiting
 - Abdominal distension
 - Signs of dehydration
 - Signs of shock (i.e., cold, clammy skin; profuse sweating; tachycardia; hypotension)
 - Anxiety or altered mental state

Diagnosis

- Diagnosis is based on history or clinical symptoms, physical examination, radiography, and laboratory tests. A detailed history is far more valuable than an x-ray or laboratory examination.
- Location of pain may indicate the following:
 - RLQ—appendicitis, salpingitis, ruptured ectopic pregnancy, tubo-ovarian abscess
 - RUQ—cholecystitis, duodenal ulcer, hepatitis, pyelonephritis, hepatic abscess
 - LLQ—sigmoid diverticulitis, salpingitis, tubo-ovarian abscess, ruptured ectopic pregnancy, perforated colon
 - LUQ—ruptured spleen, pyelonephritis, aortic aneurysm
- Other indicators include and point to the following:
 - Severe rebound tenderness and rigidity and guarding—peritonitis
 - Abdominal x-ray results may indicate the following:
 - ◆ Distended bowel—obstruction
 - ◆ Pneumoperitoneum—perforation
 - Full blood count and differential WCC—infection

Note: Intrathoracic disease must be considered in every patient especially if the pain is in the upper part of the abdominal cavity.

Management objectives

At the health centre—

- Determine the cause
- Start emergency treatment before referral (i.e., while waiting to transport the patient).

Nonpharmacological management

- Pass a nasogastric tube with drainage bag if vomiting or abdominal distension is severe.
- Give nothing by mouth.
- Give oxygen if the patient is in shock.
- Elevate the legs if the patient's BP is low.
- Pass a Foley catheter, and monitor urine output.
- Secure IV access.
- Obtain urine and blood samples for analysis.

Pharmacological management

- Start an IV infusion of normal saline using a 16 G or 18 G needle or cannula. Give 1 L every 1–2 hours if patient is in shock and every 4–6 hours if patient's BP is normal.
- If fever is present, start the patient on a broad-spectrum antibiotic:
 - Ceftriaxone injection (500 mg, 1 g) 1 g IV daily
OR
 - Gentamycin (10 mg, 40 mg/mL) 5 mg/kg IV daily
PLUS
 - Metronidazole injection (500 mg/mL) 500 mg IV every 8 hours

Referral

Refer the patient to the hospital.

References—1, 2, 3

1.2 Acute Airway Obstruction

Description

Foreign bodies in the throat (pharynx), voice box (larynx), trachea, or bronchi, which can cause acute upper airway obstruction leading to the onset of respiratory distress, constitute a medical emergency. Acute airway obstruction is more common in children, who typically ingest objects they pick up and place in their mouths.

Causes

- Foreign body aspiration such as—
 - Coins, buttons, beads, marbles, toys and crayons, and similar items. Children either swallow or aspirate these objects.
 - In contrast, adults are more likely to ingest food boluses, chicken or fish bones, fruit pits, dentures, or toothpicks.
- Infections such as—
 - Laryngotracheobronchitis (croup)
 - Acute epiglottitis
- Secondary to other causes
 - Laryngeal oedema from anaphylaxis or trauma
 - Tongue obstruction in an unconscious patient

Signs and symptoms

Symptoms vary depending on the cause and site of impaction, but some symptoms are common to all types of obstruction.

- Agitation or fidgeting
- Choking or inability to swallow
- Confusion
- Difficulty breathing
- Gasping for air
- Panic
- Stridor (i.e., wheezing, crowing, whistling, or other unusual breathing noises indicating breathing difficulty)

Caution: A total obstruction of the upper airway causes asphyxia and results in rapid death. Total obstruction should be suspected if the patient exhibits a bluish skin colour (cyanosis) or is unconscious.

Persons with an object stuck at the back of the throat will have that sensation and difficulty in swallowing. If the obstruction is in the oesophagus, the sensation is felt lower down, and the patient may be drooling because of inability to swallow.

Diagnosis

A diagnosis is made by a positive history, clinical signs, radiology, and diagnostic laryngoscopy.

Management objectives

- Ensure a clear patient airway
- Remove the obstruction

Nonpharmacological management

- Management depends on the cause of the blockage and is best carried out at the hospital level.
- Objects lodged in the airway may be removed with a laryngoscope or bronchoscope.
 - A tube may be inserted into the airway (e.g., endotracheal tube or nasotracheal tube).
 - As a last resort, an opening can be made directly into the airway (i.e., tracheotomy or cricothyrotomy using a large-bore needle).

Caution: Total obstruction of the upper airway is an *emergency* requiring use of the Heimlich manoeuvre. (See appendix B.)

- ***In a child <1 year:*** Removal of the obstruction should be carried out in an operating theatre. Management while waiting for transfer—
 - First check the mouth for any foreign body, even if none is immediately apparent.
 - Lay child face downwards, and give five blows on the interscapular region, with the heel of a cupped hand. Check in the mouth again for the foreign body.
 - If it is still not seen, lay the child face up and give five blows to the chest.
 - If the foreign body is still not seen or has not been dislodged, then give five lateral chest blows.
 - If the child is still not breathing, then continue to administer CPR until the ambulance arrives.

■ ***In a child >1 year and in adults:***

- Stand behind the patient and give jerks with a closed fist at the upper abdomen, below the sternum until the foreign body comes out. (See appendix B.)
- If the patient has a partial obstruction in breathing or dysphagia, do not try to check in mouth by blindly inserting your finger in the patient's mouth—this may cause trauma or push the obstruction down the oesophagus.

Caution: Pushing a brush or finger into mouth to check it or to induce vomiting, causes more trauma, and the foreign body may become more impacted. Keep calm and go to a specialist.

- Small bones or foreign bodies are removed from the oropharynx using forceps under proper illumination and may require 10% xylocaine spray.

Referral

Deeply impacted foreign bodies in the lower oropharynx, larynx, laryngopharynx, oesophagus, and bronchus need endoscopic removal under general anaesthesia.

References—4, 5, 6, 7, 8

1.2.1 Acute Laryngotracheobronchitis (Croup)

Description

Croup is an acute inflammation of the larynx, trachea, and bronchi, which can lead to life-threatening airway obstruction in early childhood.

Causes

Most common pathogens are viruses.

Signs and symptoms

- Very ill child—harsh barking cough
- Inspiratory stridor
 - Drooling saliva
 - Unable to swallow
- Intercostal and subcostal retraction of the chest wall—sitting upright with head held erect

Diagnosis

- Base the diagnosis on clinical signs and symptoms.
- Suspect croup if the child shows signs 1–2 days after the onset of an upper respiratory tract infection.

Management objective

- Maintain a clear airway. Use table 1.2.1A to assess the degree of airway obstruction and to manage croup.

Table 1.2.1A. Assessment and Management of Croup

Signs	Action
Grade 1—inspiratory stridor	Observe.
Grade 2—inspiratory and expiratory stridor	Administer— <ul style="list-style-type: none"> • Adrenaline, 1:1,000 diluted in saline, nebulised immediately • Dilute 1 mL of 1:1,000 adrenaline with 1 mL sodium chloride 0.9% • Prednisone, oral, 1–2 mg/kg, single dose • Refer
Grade 3—inspiratory and expiratory stridor with pulsus paradoxus	Treat as with grade 2.
Grade 4—apnoea	Intubate and provide respiratory support as above.

Nonpharmacological management

- Keep child comfortable, and reduce anxiety.
- Continue oral fluids.
- Encourage parent or caregiver to remain with the child.

Pharmacological management

- The infection is viral, so no antibiotic is required.
- Give paracetamol, oral, every 4–6 hours, when required, not to exceed 4 doses daily (see table 1.2.1B).

Table 1.2.1B. Paracetamol Dosages by Age and Weight for the Management of Croup

Weight (kg)	Dose (mg)	Syrup (120 mg/5 mL)	Tablet (500 mg)	Approximate Age
6–10	60	2.5 mL	—	3–12 months
10–18	120	5.0 mL	—	1–6 years
18–15	240	10.0 mL	½ tablet	5–8 years
25–50	500	—	1 tablet	8–14 years

- If the child requires referral (i.e., grade 2 or higher), contact an ambulance and doctor immediately.
 - Management while awaiting transfer—
 - ◆ Administer adrenaline, 1:1,000, nebulised, immediately using a nebuliser. If there is no improvement, repeat every 15 minutes, until the child is transferred.
 - Dilute 1 mL of 1:1,000 adrenaline with 1 mL sodium chloride 0.9%.
 - Nebulise the entire volume with oxygen at a flow rate of 6–8 L/minute.
 - ◆ Give prednisone, oral, 2 mg/kg, single dose.
 - OR**
 - ◆ Give a single dose of hydrocortisone (powder 100 mg/mL) mg/kg IV.
 - ◆ Start on oxygen.
- Management during transfer—
 - ◆ Maintain oxygenation.
 - ◆ Continue as above.
 - ◆ Provide IV access.

Referral

The following require *urgent* referral:

- All children with—
 - Stridor on breathing in and out while at rest
 - Chest indrawing
 - Nasal flaring
 - Rapid breathing
 - Altered consciousness
 - Inability to drink or feed

- Suspected foreign body
- Suspected epiglottitis

References—3, 8

1.2.2 Acute Epiglottitis

Description

Acute epiglottitis is a rapidly progressive cellulitis of the epiglottis and adjacent structures that can result in complete airway obstruction in both children and adults.

Caution: Acute epiglottitis constitutes a medical emergency particularly in children and should be handled at the hospital level.

Cause

Bacterial: *H. influenza* type B

Signs and symptoms

- In young children—Acute epiglottitis is characterized by rapid onset of the following:
 - High fever (i.e., >39°C)
 - Severe sore throat and difficulty in swallowing
 - Excessive saliva due to inability to swallow
 - Rapid heartbeat (tachycardia)
 - Signs of respiratory obstruction—difficulty breathing (dyspnoea). Chest indrawing may also be present and may progress rapidly.
 - Inspiratory stridor
 - Swelling of the lymph nodes under the jaw
- In adolescents and adults—the illness is milder and often follows 1–2 days of severe sore throat.

Diagnosis

Diagnosis is often made on clinical grounds.

- Examination of the oropharynx using a tongue depressor and a light source
- Swollen erythematous epiglottis

Management objective

Maintain a clear airway

Nonpharmacological management

- Do not lay the child down; keep him or her in a sitting position.
- Avoid examining the larynx because of the risk of respiratory arrest.
- Have the child breathe in a humid environment (e.g., next to a bowl of water or a wet towel).
- Have the child gargle with glycerine.
- Give the child oxygen if indicated.

Note: Health posts and health centres should refer the patient immediately to hospital where a physician is available. Start on first-line antibiotics in areas where transfer to hospital may be delayed.

Pharmacological management

- At the hospital level, start antibiotic treatment:
 - Administer first-line treatment: ampicillin IV (powder for injection 500 mg and 1 g) 200 mg/kg/day (divided into 3 doses) every 8 hours for 1 day then continue with 100 mg/kg/day every 8 hours for 6–9 days.

OR

- Administer second-line treatment: ceftriaxone IM: (125 mg, 500 mg, and 1 g) 100 mg/kg/day (in 2 divided doses) every 12 hours for 7–10 days.

OR

- For patients allergic to penicillins and cephalosporins, administer chloramphenicol (powder for injection 250 mg, 500 mg). Give 25 mg/kg every 6 hours. Change to PO when appropriate.
- Give paracetamol (500 mg tablets; 120 mg/5 mL suspension). See table 1.2.2.

Table 1.2.2. Paracetamol Dosages by Age and Weight for the Management of Acute Epiglottitis

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3–12 months	6–10 kg	60	2.5 mL (½ tsp)	3 times/day	5–7 days
1–5 years	10–18 kg	120	5 mL (1 tsp)	3 times/day	5–7 days
5–8 years	18–25 kg	240	10 mL (2 tsp) or ½ tablet	3 times/day	5–7 days
8–14 years	25–50 kg	500	1 tablet	3–4 times/day	5–7 days
>14 years	>50 kg and adults	1,000	2 tablets	3–4 times/day	5–7 days

Management of the acute stage of epiglottitis

For significant swelling:

- Give hydrocortisone, IV, 100 mg immediately as a single dose.

 - Caution:** Setting up IV access may cause irritability, leading to respiratory distress.

 - Follow with prednisone, oral, 40 mg daily. Prednisone can be stopped abruptly after 3 days, once the swelling has subsided. If it is used for longer than 3 days, taper by 10 mg/day until dosage reaches 5 mg, then stop.
- PLUS**
- Give adrenaline 1:1,000, nebulized. Dilute to 5 mL with sodium chloride 0.9%, and administer every 4–6 hours.
 - Prepare for intubation, tracheostomy, or both.

Referral

- If the ability to perform an intubation is not available, start on treatment, and refer immediately.
- Children exhibiting the following, require immediate referral:
 - Stridor or laboured breathing in and out while at rest
 - Chest indrawing
 - Rapid breathing, defined as—
 - ◆ <2 months, RR >60 breaths/minute
 - ◆ 2–11 months, RR >50 breaths/minute
 - ◆ 12–59 months, RR >40 breaths/minute
 - Altered level of consciousness
 - Inability to drink or feed

References—1, 8, 9, 10, 11

1.3 Acute Asthma (Severe)/Status Asthmaticus

Description

A sudden intensification in the symptoms during an attack of asthma, not responding to standard treatment of bronchodilators and steroids is called *status asthmaticus*. (See also section 3.2 “Asthma.”)

1.3.1 Status Asthmaticus in Adults

Signs and symptoms

- Long duration of present attack
- Rapid, progressive dyspnoea
- Excessive use of accessory muscles of respiration
- Excessive wheezing
- RR >30/minute
- Decreased breath sounds
- Cyanosis

Management objectives

- Reverse the obstruction
- Relieve hypoxia as soon as possible

Nonpharmacological management

In the health centre or hospital—

- Start treatment, and hospitalize immediately.
- Start oxygen if available.

Caution: Do not give sedatives.

Pharmacological management (in adults)

In the health centre or health post—

- Administer a high dose of salbutamol: 5 puffs every 10 minutes.
- Refer urgently to the district hospital.

In the hospital—

- Provide immediate treatment.
 - Give oxygen 40–60%.
 - Administer inhaled salbutamol: 5 puffs every 10 minutes until improvement; then every 2–4 hours.

- If symptoms are severe, consider using inhaled ipratropium bromide (0.25%).
- Set up an IV line (normal saline), and monitor fluid intake.
- Administer hydrocortisone 100 mg IV; repeat in 2 hours PRN.
 - ◆ Continue to monitor the patient's level of hydration.
 - ◆ Change to prednisolone PO as soon as possible: 0.5–1 mg/kg daily for 5 days.
 - ◆ Reduce dose over 10-day period, and follow up in 10 days.
- If the patient has shown no improvement 20–30 minutes after starting the immediate treatment, take the following steps.
 - Administer aminophylline IV infusion: loading dose of 5 mg/kg diluted in isotonic solution over 30 minutes and then 0.5–1 mg/kg/hr.
 - Change to oral aminophylline after 24 hours.

Caution: Never administer aminophylline by direct IV.

Caution: If the patient has already been given oral aminophylline, do not give the loading dose.

- If the patient's condition is severe and persistent, follow this procedure:
 - Provide *continuous* treatment with high-dose inhaled beclometasone and inhaled salbutamol (1 puff 4–6 times/day)

PLUS, if needed

 - Give prednisolone tablets: 2 mg/kg/day, but not to exceed 60 mg/day. Try to wean the patient off this medicine as soon as feasible.
 - If the patient still shows no improvement, intubation and ventilator support will be required.

1.3.2 Status Asthmaticus in Children

Signs and symptoms

- General signs and symptoms
 - RR >50 breaths per minute (>40 in children >5 years)
 - Pulse >140 beats per minute (>120 in children >5 years)
 - In younger children, use of accessory muscles of breathing
- Life-threatening signs and symptoms
 - Cyanosis
 - Decreased breath sounds or poor respiratory effort

- Fatigue or exhaustion
- Agitation or reduced level of exhaustion
- Collapse

Management objectives

- Reverse the obstruction
- Relieve hypoxia as soon as possible

Nonpharmacological and pharmacological management

- Start oxygen via face mask: 1–2 L per minute (if available).
- Administer inhaled salbutamol: 10 puffs initially then 1 puff every 15–20 seconds until the child shows response to treatment.
- Set up an IV line (normal saline).
- Give hydrocortisone: 100 mg every 6 hours PRN.
- Change to prednisolone as soon as possible: 1–2 mg/kg as a single dose in the morning for 5 days; do not exceed 20 mg/day in children <5 years and 40 mg/day in children >5 years. Reduce dose gradually over a 10-day period.
- If the child shows no improvement, intubation and ventilator support will be required.

Referral

Presence of life-threatening signs or symptoms

References—1, 3, 10, 12

1.4 Acute Diarrhoea with Dehydration

Description

Acute diarrhoea is the passing of loose (i.e., liquid or unformed) stools >3 times/day. If more fluid is being lost than is being replaced, the result can be dehydration (i.e., inadequate body fluids).

Signs and symptoms

Signs of dehydration

- Floppy, weak
- Drinks poorly or not able to drink
- Eyes deeply sunken
- Mucosa very dry
- Skin retracts very slowly when pinched

- Skin turgor very diminished
- Lethargic, comatose
- Shock

Signs of shock

- Tachycardia
- Cold, pale extremities
- Rapid deep breathing
- Floppy, lethargic or comatose

Referral

Refer to hospital for treatment with IV fluids.

While waiting for transfer, take the following steps, if possible.

- If you know how to set up an IV, start immediately.
 - Give Ringer's lactate in the following amounts:
 - ◆ Child <12 months: 30 mL/kg for the first hour, then 70 mL/kg per hour over next 5 hours
 - ◆ Child 1–5 years: 20–30 mL/kg for the first 30 minutes, then 70 mL/kg over next 2.5 hours.
 - ◆ Older children and adults: 30 mL/kg for first 30 minutes, then 100 mL/kg over next 2.5 hours.
 - Reassess frequently, every 1–2 hours. If the patient has shown no improvement after the first hour, increase infusion rate.
 - Feeding
 - ◆ For infants, continue breastfeeding throughout the process.
 - ◆ For bottle or cup-fed children, do not give food during the initial 4-hour rehydration period, *but do not stop nourishment for more than 4 hours.*
 - Start ORS as soon as possible.
- If you were not trained to set up an IV but were trained to use a nasogastric tube, proceed as follows:
 - Start rehydration by tube using ORS solution, giving 20 mL/kg/hr for 6 hours (total 120 mL/kg)
 - Reassess every 1–2 hours.
- If you were not trained to use a nasogastric tube, start ORS 20 mL/kg/hr for 6 hours. Reassess every 1–2 hours.

1.5 Acute Urinary Retention

Description

Acute urinary retention is defined as a sudden onset of the inability to pass urine even though the bladder is full. It constitutes a medical emergency requiring prompt action. Chronic obstruction may result in permanent loss of renal function. It occurs most often in men over 60 years of age.

Causes

Obstruction can occur from an intrinsic or extrinsic mechanical blockage or from functional defects.

- Obstruction in the urinary tract
 - Intrinsic
 - ◆ Urethral stone
 - ◆ Enlarged prostate—benign or cancerous
 - ◆ Infection (prostatitis)
 - ◆ Urethral stricture from previous gonorrhoeal infection or injury
 - Extrinsic
 - ◆ Pregnant uterus
 - ◆ Cancer of uterus, prostate, colon, cervix, rectum
- Nerve disease or spinal cord injury

Signs and symptoms

- Severe suprapubic or lower abdominal pain
- Bladder distension, abdominal distension
- No passing of urine or passing just a dribble

Diagnosis

Diagnosis is based on the patient's history and a physical examination. A distended bladder can be identified by percussion.

Investigations

Look for a cause using the following techniques:

- Perform a rectal digital examination for an enlarged prostate.
- Try passing a F16 or F18 catheter to identify strictures.
- Take a urine specimen for evidence of infection or haematuria.

Management objective

Re-establish a normal urine flow

Nonpharmacological and pharmacological management

At the health centre level—

- Catheterize.
 - Use a sterile small (16 G) Foley catheter and sterile technique.
 - Lubricate catheter tip and urethra with KY jelly.
-
- Caution:** Make sure the catheter balloon is in the bladder and not the urethra before inflating, usually with 7–10 mL sterile water.
- If catheterization unsuccessful or not possible, use large bore needle 2 cm above pubic symphysis to drain the bladder.
 - After decompression, reattempt Foley catheterization.
 - If infection is present, start on an antibiotic: ciprofloxacin 500 mg tablet every 8 hours.
 - Refer to district hospital for further investigation and treatment.

At the hospital level—

- Perform suprapubic cystostomy.
- Investigate cause of retention.

References—1, 3

1.6 Allergic Reaction (Severe)/Anaphylactic Shock

Description

Anaphylactic shock is a reaction, starting within seconds to minutes, following exposure to a substance to which the patient had been sensitized. It causes a life-threatening response involving the whole body. This response occurs when the body's immune system overreacts to a foreign substance (antigen). People with asthma, eczema, and hay fever are slightly more likely to have an anaphylactic reaction than people who do not have these conditions.

Causes

- Venom of stinging insects such as bumblebees, honey bees, or wasps
- Foods, especially high-protein foods—most commonly, shellfish, fish, nuts, fruit, wheat, milk, eggs, or soy products

- Food additives, such as sulfites
- Medicines (both prescription and overthe counter) especially penicillins and erythromycin
- Transfusion of blood or blood products
- Dyes and contrast materials used during radiologic procedures or tests

Signs and symptoms

- The most severe and life-threatening symptoms are difficulty breathing and loss of consciousness.
- Most anaphylactic reactions involve the skin producing—
 - Hives (can cause severe itching)
 - Welts
 - Wheals (i.e., raised bumps).
- Generalized erythema (i.e., redness) Cardiovascular symptoms include—
 - Dangerously low BP
 - Rapid or irregular heartbeat
 - Other symptoms include—
 - Wheezing
 - Dizziness, sweating, nausea, and vomiting
 - Swelling in the face, eyelids, lips, tongue, throat, hands, and feet
 - Difficulty swallowing
 - Fear, feeling of dying

Management objectives

- Maintain adequate airway
- Maintain adequate BP

Nonpharmacological management

- Ensure that the airway is clear. Intubate if necessary.
- If the patient is hypotensive or in shock, lay him or her in a recumbent position with head and upper body lower than legs.
- Give oxygen 100%, at least 1–2 L/minute.
- Start an IV infusion to keep vein open using normal saline or Ringer's lactate, and give 20 mL/kg.
- Monitor the BP.

Pharmacological management

- Give adrenaline (injection, 1 mg/mL) stat.
 - Dosages—
 - ◆ <2 years: 0.1 mL IM
 - ◆ 2–5 years: 0.2 mL
 - ◆ 6–12 years: 0.3 mL
 - ◆ >12 years: 0.5 mL (maximum dose)
- If the patient shows no improvement, repeat every 5–15 minutes.
- Do not administer IV unless the patient fails to respond to several doses of IM.

PLUS

- Give chlorpheniramine maleate (injection, 10 mg/mL) at 0.2 mg/kg.
 - 2–5 years: 2.5–5 mg
 - 6–12 years: 5–10 mg
 - >12 years: 10–20 mg

PLUS

- Give hydrocortisone.
 - 2–5 years: 50 mg IM or slow IV
 - 6–12 years: 100 mg IM or slow IV
 - >12 years: 200 mg IM or slow IV

OR

- Give prednisone (tablets, 5 mg, 25 mg; syrup, 5 mg/mL).
 - Adults: 20–80 mg PO daily for 2–5 days
 - Children: 0.5–1 mg/kg PO daily for 2–5 days

References—3, 8, 13, 14

1.7 Bites and Stings—Insects, Snakes, Animals, and Humans

Bites or stings may be single or multiple and are often painful. Multiple stings and stings in the mouth or throat are dangerous because they can cause airway obstruction.

1.7.1 Insect Stings

1.7.1.1 Bees, Wasps, and Marabunta

Signs and symptoms

Injection of venom in the skin causes—

- Localised pain and swelling
- Severe allergic reaction may occur. (See section 1.6, “Allergic Reaction (Severe)/Anaphylactic Shock.”)

Nonpharmacological management

- Remove the stinger by scraping with a needle or a scalpel.
- Do *not* squeeze or use tweezers to remove stinger.
- Apply a cold compress or ice. For a sting in the mouth give patient ice to suck.

Pharmacological management

- Give chlorpheniramine (4 mg tablet) at the following dosages:
 - Adults and children ≥ 12 years: 4 mg PO
 - Children:
 - ◆ 2–5 years: 1 mg PO
 - ◆ 6–11 years: 2 mg PO
- For anaphylactic shock, see section 1.6, “Allergic Reaction (Severe)/Anaphylactic Shock.”

References—3, 15

1.7.1.2 Scorpions

Elderly people with medical conditions as well as young children are more susceptible to the venom of scorpions.

Signs and symptoms

Immediate, intense, localised burning pain. Pain can be intensified by tapping on the affected area.

- Nausea and vomiting
- Paraesthesia (numbness), which may spread to the whole body
- Muscular pains and cramps
- Weakness and drowsiness
- In severe cases, blurred vision, convulsions, respiratory failure, and swallowing difficulties.

Caution: These severe case symptoms constitute a medical emergency.

Nonpharmacological management

In most cases, management of scorpion bites is supportive.

- Monitor airway, breathing, and circulation.
- Immobilize the affected part.
- Remove any jewellery (e.g., rings).
- Wash area with soap and water.
- Apply cool compresses, usually 10 minutes on and 10 minutes off of the site of the sting.
- Do not cut into the wound or apply suction.

Pharmacological management

- For pain, give adults paracetamol (500 mg tablet): 1–2 tablets every 6 hours as required.
- For severe pain apply a local anaesthetic: lidocaine (injection 2%) 2 mL injected around the bite.

References—3, 8, 16

1.7.1.3 Centipedes

Centipede bites are not dangerous for humans.

Signs and symptoms

- Severe pain
- Localised swelling
- Erythema
- Mild necrosis

Pharmacological and nonpharmacological management

- Apply ice packs.
- Give paracetamol (500 mg tablet): 1–2 tablets every 4 hours.
- Treat with lidocaine (1%, 2% injection) if indicated.

Reference—3

1.7.2 Snake Bites

Guyana has many species of both nonpoisonous and poisonous snakes. The four most common and highly venomous are the labaria/carpet labaria (*Bothrops atrox*), the bushmaster (*Lachesis muta*), and the rupununi rattler (*Crotalus durissus trigonicus*).

Signs and symptoms

Signs and symptoms of snake bites vary according to the species of snake responsible for the bite and the amount of venom injected at the time of bite. Identification of the snake should be attempted as far as possible. Some patients may bring the dead snake or its head along for identification.

- Nonpoisonous snake bite signs and symptoms
 - Pain
 - Redness and swelling
 - Laceration at site
- Poisonous snake bite signs and symptoms
 - These bites produce a wide range of effects, from a simple puncture wound to life-threatening illness and death.
 - A victim may have no initial significant symptoms and then suddenly develop breathing difficulty and go into shock.

Nonpharmacological management

- Determine the type of snake (if available).
- Calm the patient, and keep him or her perfectly still, in a supine position (i.e., face up).
- Monitor vital signs.
- Clean the wound site, and apply cold compresses to the wound site.

Caution: Do not totally occlude arterial flow by applying a tourniquet.

- If venom gets into the eye, wash thoroughly with a saline solution while the patient rotates his or her eyeballs.
- Do not rub the eyes.
- Elevate the affected limb.
- Establish an IV line using normal saline or Ringer's lactate.
- Intubate if patient has difficulty breathing.

Pharmacological management

- Give paracetamol (500 mg tablet): 1–2 tablets every 4 hours for pain.
- Administer antivenom, according to the manufacturer's instructions. The following antivenoms have been found to be effective against bleeding and neurotoxicity:
 - Soro Antibotropico (Instituto Butantan, San Paulo, Brazil)
 - Antiveneno Polivalente (Instituto Nacional de Salud, Bogota, Colombia)
 - Antiveneno Polivalente (Higiene y Medicina Tropical “Leopoldo Izquieta Perez”)

Referral

- All children and pregnant women
- Patients with respiratory distress and signs of shock (i.e., cold, clammy skin; profuse sweating; tachycardia; hypotension)
- Criteria for referral from the health centre and the district hospital (levels 2 and 3) to regional hospital and directly to Georgetown Public Hospital Corp., from regions 1, 7, 8, and 9 are as follows:
 - Any signs of cardiopulmonary changes
 - ◆ Increase or decrease in BP of more than 15 systolic and 9 diastolic
 - ◆ Increase in pulse (above 90 beats/min) with changes in respiration
 - Any sign of bleeding (e.g., gums, wound site, under skin, bruising), vomiting blood, or blood in urine or stool

- Signs of a worsening of the wound condition
- Neurological changes

Note: Once the need for transfer is indicated, inform receiving the facility immediately, relaying all pertinent clinical and other information. Arrange transportation.

References—1, 3, 17, 18

1.7.3 Cat, Dog, and Wild Animal Bites

Cat and dog bites carry many serious infections. About 85% of cat and dog bites harbour bacteria that can potentially cause disease. It is important to know whether the animal is rabid or not. Consider any stray dog or animal and any known dog that acts aggressively or strangely to be rabid. In Guyana, however, such bites are not considered to be a problem.

Management objective

Lower the concentration of bacteria in contaminated wounds (and decrease the chance of infection)

Nonpharmacological management

- Clean the wound with soap and water, followed by an iodine solution.
- Apply a dressing and advise the patient to have it changed every other day.
- Do not suture wound if it is small and not actively bleeding.
- Debride wound if it is deep and contaminated.
- If wound is a large laceration or is bleeding profusely, apply a pressure bandage, and refer to hospital for suturing.

Pharmacological management

- Administer tetanus toxoid if patient had never been immunized or had his or her last dose more than 10 years ago.
- For pain, give paracetamol (500 mg tablets; 120 mg/5 mL suspension). See table 1.7.3A for dosages.

Table 1.7.3A. Paracetamol Dosages by Age and Weight for the Management of Pain from Animal Bites

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3-12 months	6-10 kg	60	2.5 mL (½ tsp)	3-4 times/day	5-7 days
1-5 years	10-18 kg	120	5 mL (1 tsp)	3-4 times/day	5-7 days
5-8 years	18-25 kg	240	10 mL (2 tsp) or ½ tablet	3-4 times/day	5-7 days
8-14 years	25-50 kg	500	1 tablet	3-4 times/day	5-7 days
>14 years	>50 kg and adults	1,000	2 tablets	3-4 times/day	5-7 days

Prescribe a prophylactic antibiotic.

- Amoxicillin (250 mg, 500 mg tablets; 125 mg/5 mL suspension)
 - ◆ Adults: 1 g 3 times/day for 5 days
 - ◆ Children: 100 mg/kg/day in 3 divided doses for 5 days

OR

- In penicillin-allergic patients, erythromycin (250 mg, 500 mg tablets; 125 mg/5 mL suspension). See table 1.7.3B for dosages.

Table 1.7.3B.Erythromycin Dosages by Age for Prophylactic Antibiotic Treatment of Penicillin-Allergic Patients for Management of Animal Bites

Age	Dose (mg)	Quantity	Frequency
<1 year	125	5 mL (1 tsp)	Every 6 hours
1-5 years	250	10 mL (2 tsp)	Every 6 hours
5-12 years	500	1-2 tablets	Every 6 hours
Adults	1,000	2-4 tablets	Every 6 hours

References—3, 19

1.7.4 Human Bites

Human bites can range from harmless to quite serious. They are more prone to become septic or to develop complications such as cellulitis and gangrene than animal bites because infection with anaerobic and aerobic bacteria is common.

Signs of infection

- Increasing pain and tenderness of the affected area (1–2 days after the bite)
- Increased or new redness
- Fever
- Pus drainage
- Swollen lymph glands

Nonpharmacological management

- Clean the wound thoroughly with soap and water followed by an iodine solution.
- Apply a dressing (if indicated), and change every other day.

Pharmacological management

- Administer tetanus toxoid if patient had never been immunized or had last dose >10 years ago.
- Give paracetamol for pain. See table 1.7.3A for dosages.
- Prescribe antibiotics.
 - Amoxicillin (250 mg, 500 mg tablets; 125 mg/5 mL suspension)
 - ◆ Adults: 1 g 3 times/day for 5 days
 - ◆ Children: 100 mg/kg/day in 3 divided doses for 5 days

PLUS

- Metronidazole (tablet 250 mg, suspension 125 mg/5 mL)
 - ◆ Adults: 500 mg PO 3 times/day for 5 days
 - ◆ Children: 7.5 mg/kg PO 3 times/day for 5 days

OR

- In penicillin-allergic patients, erythromycin (250 mg, 500 mg tablets; 125 mg/5 mL suspension). See table 1.7.3B for dosages.

References—3, 20

1.8 Cardiopulmonary Arrest

Description

Cardiopulmonary arrest is the cessation of breathing and circulation, which signifies clinical death. In children, it is usually the end result of a period of circulatory or respiratory insufficiency and is seldom due to a sudden precipitous event.

Causes

- Cardiac conditions (e.g., myocardial infarction)
- Airway obstruction
- Severe haemorrhage and fluid loss
- Head injuries
- Anaphylactic shock

Signs and symptoms

- Unconsciousness
- Absence of pulse—check carotid and femoral
- Absence of heart sounds
- Absence of respiration
- Fixed dilated pupils
- Cyanosis

Management objectives

- Get the patient breathing again
- Restart the heart beating

Nonpharmacological management

- Ensure an open airway.
- Clear all foreign materials from mouth.
- Start artificial breathing either mouth to mouth or using a face mask or intubation.
- Perform chest compressions at a rate of 80–100 compressions/minute
 - In children <8 years: 5 compressions to 1 breath
 - In children >8 years: 15 compressions to 2 breaths
 - In adults: 30 compressions to 2 breaths

References—3, 8

1.9 Diabetic Emergencies

A diabetic emergency can be the result of either low blood glucose (hypoglycaemia) as a result of too much insulin, or high blood glucose (hyperglycaemia) as a result of not enough insulin.

1.9.1 Hypoglycaemia (Low Blood Sugar)

Description

Hypoglycaemia is a clinical situation characterized by a reduction in plasma glucose concentration to a level that may induce symptoms or signs related to altered mental status, sympathetic nervous system stimulation, or both. The glucose level at which an individual becomes symptomatic is highly variable, although a plasma glucose level less than 50 mg/dL is generally considered the threshold. Hypoglycaemia typically arises from abnormalities in the mechanisms involved in glucose homeostasis.

Causes

The causes of hypoglycaemia are numerous, but are seen most often in diabetic patients. The following are the most common causes:

- Excessive or inappropriate treatment with insulin or oral hypoglycaemic agents
- Starvation (i.e., irregular meals)
- Impaired food absorption
- Lack of carbohydrate intake
- Metabolic problems
- Alcohol
- Prolonged vomiting or nausea (unable to eat)
- Medicines (e.g., quinine, salicylates, and sulphonamides)
- Overexertion

Signs and symptoms

- Early
 - Hunger
 - Tremors
 - Sweating
 - Palpitations

- Headache
- Dizziness, faintness
- Anxiety
- Later features
 - Double vision
 - Slurred speech
- Neuroglycopenic symptoms
 - Drowsiness
 - Inability to concentrate
 - Confusion
 - Inappropriate behaviour
 - Restlessness with sweating
 - Convulsions (in children)
 - Unconsciousness

Determining the time of onset of symptoms relative to the time of meal ingestion is crucial in the evaluation of a patient with hypoglycaemia.

Fasting hypoglycaemia typically occurs in the morning before eating, but can also occur during the day, particularly in the afternoon, if meals are missed or delayed.

Diagnosis

- Based on history, signs, and symptoms
- Blood glucose level of <50 mg/dL

Management objectives

- Reverse the hypoglycaemic episode
- Determine the cause and treat appropriately

Pharmacological and nonpharmacological management

- In the health centre or hospital, for mild or moderate hypoglycaemia—
 - Adults: Administer glucose water PO (50–100 g glucose in 100–200 mL water).
 - Children: Give 50 mL of 10% glucose or 10% sucrose solution (1 rounded teaspoon of sugar in 3.5 tablespoons of water) PO or by NGT. Start milk feedings every 30 minutes for 2 hours. Use $\frac{1}{4}$ of the amount of the regular 2-hour feeding each time.

- In the hospital, for severe symptoms or coma—
 - Administer glucose.
 - ◆ In young children (<12 years)—
 - Start IV of 10% dextrose (5 mL/kg).
 - OR**
 - Give 50 mL of 10% glucose or sucrose by NGT.
 - Continue milk feedings.
 - ◆ In children >12 years and adults—
 - Start IV therapy, keeping line open with 5–10% dextrose water.
 - Give an immediate rapid IV injection of 40 mL of 50% dextrose.
- Caution:** Flush the lines with saline because dextrose can sclerose veins.
- If blood glucose level remains less than 50 mg/dL, give a second IV injection of 40 mL 50% dextrose.
- Continue IV therapy of 10% dextrose water.
- Once the patient is conscious, ensure feeding or intake of carbohydrates.
- Provide follow-up.
 - Educate the patient.
 - ◆ Re-enforce the need to check glucose levels at home.
 - ◆ Teach the patient the early signs of hypoglycaemia.
 - ◆ Clarify what the patient should do in case of hypoglycaemia.
 - ◆ Emphasise the need to carry sugar—sweets or small packets of sugar—at all times.
 - Determine the cause of the hypoglycaemia, if it was unrelated to lack of food or overexertion.
 - ◆ For patients on oral hypoglycaemic agents, reduce the oral hypoglycaemic dose by 1 or 2 steps, depending on the severity of the hypoglycaemia.
 - ◆ For patients on insulin therapy, reduce the appropriate insulin dose by 4 units (e.g., if the patient is on a biphasic insulin 2 times per day, and the hypoglycaemia occurs in the day, reduce the morning dose).

1.9.2 Hyperglycaemia (High Blood Sugar)

Description

Hyperglycaemia is a condition in which an excessive amount of glucose circulates in the blood plasma. It is generally a glucose level higher than 200 mg/dL.

Symptoms may not start to become noticeable until even higher values such as 250–300 mg/dL. A subject with a consistent range above 126 mg/dL is generally held to have hyperglycaemia. Chronic levels exceeding 125 mg/dL can produce organ damage (e.g., to the eyes, kidneys, heart, and nerves). It can also lead to conditions requiring emergency intervention (e.g., ketoacidosis and coma).

Causes

- Undiagnosed DM
- Uncontrolled DM
- Interruption of treatment or not following treatment plan
- Infections
- Stress
- Not adhering to eating plan or diet

Signs and symptoms

- Drowsiness
- Varying degrees of loss of consciousness, mental confusion, stupor
- Abdominal pain
- Nausea and vomiting
- Severe dehydration leading to increased thirst
- Shock
- Ketotic breath
- Acidotic breathing (deep, laboured breathing)
- Hyperventilation
- Sometimes subnormal temperature

Diagnosis

Blood glucose 600–1,200 mg/dL

Pharmacological and nonpharmacological management

In the health centre—

- Refer immediately.

- While awaiting transfer, start IV normal saline.
 - For severe hyperglycaemia with pre-coma, run first litre in 1–2 hours.
 - For hyperglycaemic coma and ketoacidosis 1 L in 30 minutes.
- Over the subsequent hour, continue with 1 L normal saline.
- If the transfer to hospital is delayed, continue with normal saline hourly depending on clinical response.
- Do not give any insulin unless the transfer to the hospital is delayed for more than 2 hours.
- Ensure that the airway and breathing are adequate.
- Insert nasogastric or urinary catheter or both as required.

References—1, 2, 21, 22

1.10 Febrile Convulsions

Description

A febrile convolution is a convolution associated with a significant rise in body temperature. It is age related and tends to occur in children 6 months to 5 years of age. It presents with high temperature, but without signs of intracranial disease. Males are at a slightly higher risk than females.

Classification

- Simple febrile seizure
 - The setting is fever in a child 6 months to 5 years of age.
 - The single seizure is generalized and lasts <15 minutes.
 - The child is otherwise neurologically healthy and without neurological abnormality by examination or by developmental history.
 - Fever (and seizure) are not caused by meningitis, encephalitis, or other illness affecting the brain.
- Complex febrile seizure
 - Age, neurological status before the illness, and fever are the same as for simple febrile seizure.
 - This seizure is either focal or prolonged (i.e., >15 minutes), or multiple seizures occur in close succession.
- Symptomatic febrile seizure
 - Age and fever are the same as for simple febrile seizure.
 - The child has a pre-existing neurological abnormality or acute illness.

Signs and symptoms

- In the very young child—
 - Fever
 - Subtle signs of convulsion
 - ◆ Horizontal eye deviation
 - ◆ Repetitive blinking or fluttering of the eyes
 - ◆ Drooling or sucking
 - ◆ Rowing or swimming movements of the limbs
 - ◆ Apnoea
 - ◆ Abnormal cry
 - ◆ No bulging of the fontanel
- In the older child—
 - Tonic-clonic convulsions affecting the whole body but usually not lasting longer than 1 minute
 - No neck stiffness

Differential diagnosis

- These three causes account for 85–90% of cases:
 - Viral infection (e.g., URTI, chickenpox, or nonspecific viral illnesses)
 - Otitis media
 - Tonsillitis
- Other causes:
 - Urinary tract infection
 - Gastroenteritis
 - Lower respiratory tract infection
 - Meningitis
 - Post-immunization
 - Post-epileptic fever (likely only in seizures lasting >10 minutes)

Management objectives

- Control the seizures
- Determine the cause of the underlying illness and treat appropriately

Nonpharmacological management

If the child is still convulsing or not fully alert—

- Place the patient in the recovery position. (See figure 1.10.) Lay the child on his or her side, on a soft surface, with the face turned to one side to prevent

the child from swallowing any vomit, to keep the airway open, and to help prevent injury. Follow these steps:

- Kneel on the floor to one side of the child.
- Place the child's arm nearest you at a right angle to the child's body with the hand upwards toward the head.
- Tuck the other hand under the side of the head, so that the back of the hand is touching the cheek.
- Bend the knee farthest from you to a right angle.
- Roll the child onto his or her side carefully by pulling on the bent knee.
- The top arm should be supporting the head, and the bottom arm will keep you from rolling the child too far.
- Open the airway by gently tilting the head back and lifting the chin. Check to be sure that nothing is blocking the airway.
- Stay with the child and monitor breathing and pulse continuously until help arrives.
- If the injuries allow, turn the child onto his or her other side after 30 minutes.
- Check and maintain airway, breathing, and circulation.
- Check blood glucose.

Note: The use of cold sponges or fans is not recommended for treating a high temperature. Little evidence suggests that they are effective.

Figure 1.10. The recovery position



Pharmacological management

- Give an antipyretic (paracetamol) if feasible (although no clear evidence indicates that it prevents seizures) PO (500 mg tablets; 120 mg/5 mL oral suspension). See table 1.10 for dosages.

Table 1.10 Paracetamol Dosages by Age for Management of Febrile Convulsions

Age	Dosage (mg)	Quantity	Frequency	Duration
2-12 months	60	2.5 mL (½ tsp)	3 times/day	5 days
1-<5 years	120	5 mL (1 tsp)	3 times/day	5 days
5-8 years	240	10mL (2 tsp)	3 times/day	5 days

- If the patient is seizing >5 minutes—
 - Give a rectal diazepam injection.
 - Adults: 5 mg/mL
 - Children: 500 mcg/kg per rectum stat
 - Diazepam injection may be repeated after 5 minutes if the seizure has not stopped.

References—3, 23, 24

1.11 Hypertensive Crisis

Description

Malignant hypertensive crisis is defined as elevated BP, a diastolic pressure of >130 mmHg, or both. It can lead to progressive end-organ dysfunction such as the following:

- Unstable angina
- Papilloedema and retinal haemorrhages and exudates
- Hypertensive encephalopathy—severe headache, vomiting, and visual disturbances
- Cerebrovascular accident or cerebral infarction
- Subarachnoid haemorrhage, intracranial haemorrhage, or both
- Myocardial ischemia or infarction
- Acute left ventricular dysfunction
- Acute pulmonary oedema
- Acute renal failure or insufficiency
- Eclampsia in pregnant women

Causes

- Primary (essential) hypertension accounts for about 90–95% of adult cases
- Pregnancy induced (eclampsia)
- Head injury
- Intracranial haemorrhage
- Secondary hypertension (renal, endocrine)
- Failure to comply with established anti-hypertensive treatment
- Drugs, medicines, and toxins (e.g., alcohol, cocaine, NSAIDs)
- Adrenergic medications
- Decongestants containing ephedrine

Signs and symptoms

- Confusion, altered level of consciousness, or seizures; stroke, papilloedema, or both
- Pulmonary oedema
- Severe chest pain with sudden shock (acute aortic dissection)
- Acute chest pain with (angina) dyspnoea and orthopnoea, cyanosis cough, fatigue (acute myocardial infarction)
- High BP with seizures (during pregnancy)

Caution: A hypertensive crisis is a medical emergency.

Management objectives

- Correct medical complications
- Reduce the diastolic pressure rapidly and thus reduce end-organ damage such as hypertensive encephalopathy, acute ischemic stroke, acute intracerebral haemorrhage, and subarachnoid haemorrhage. Reduce diastolic pressure by one third, but not to exceed <95 mmHg.
- Reduce the BP slowly (i.e., over 24–48 hours) in patients who have no end-organ damage
- Aim for a BP reading of 160/100 after the first day of therapy.

Nonpharmacological management

In the health centre—

- Institute bed rest.
- Start oxygen.
- Refer to hospital urgently.
- If transport is delayed for >4 hours, begin pharmaceutical treatment.

Pharmacological management

- Administer methyldopa (250 mg tablet), 1 tablet PO every 12 hours, and restart the hypertensive treatment that the patient had been receiving.
- Administer furosemide (injection 10 mg/mL), 40 mg IV 2 times/day until transfer.

References—1, 3, 25

1.12 Poisoning

Description

A poison is any substance, including medications, that is harmful to the body if too much is eaten, inhaled, injected, or absorbed through the skin. Poisonings are either intentional or unintentional (i.e., accidental). The most common poisons encountered in Guyana are malathion, household cleaners, and kerosene.

Causes

- **Accidental.** Accidental poisonings usually occur in small children (<5 years) and are due to ingestion of every-day items located in all areas of the home (e.g., kitchen, closets, bathrooms, dining room, laundry room, or storage areas). Ingested substances may include medications, cleaning materials, disinfectants, toilet bowl cleaners, kerosene, insecticides, and rat poison—anything that is not safely stored. In adults, insecticide poisoning is common among farm workers when proper precautions are not observed.
- **Intentional.** Intentional poisonings can be self-induced (i.e., attempted suicide) using medications or industrial or agricultural chemicals, or deliberately caused by someone else (i.e., attempted homicide).

Signs and symptoms

Wide and varied; dependent on the type of poison—

- Sudden onset of illness, usually diarrhoea and vomiting
- Increased or slowed pulse rate
- Dilatation or constriction of pupils
- Increased or lowered respiratory rate
- Change in muscle tone, skin colour, and body temperature
- Seizures, shock, drowsiness, unconsciousness or coma

Diagnosis

Based on the history and the findings—

- From patient, family, friends, and witnesses, obtain information about the nature and amount of the substance ingested.
- Determine the names of all prescription and over-the-counter medications the person is taking, and in the case of a child, all those available in the house.
- Determine whether the patient has exposure to chemicals at home or at work.

- Determine whether others in the family or at work have been similarly ill or exposed.
- Check clinical signs—
 - Pulse rate and regularity
 - Blood pressure
 - Temperature
 - Papillary size
 - Respiratory rate
 - Skin—dry, sweaty, jaundiced
 - Urine output

Management objective

Counteract the effects of the poisoning

Nonpharmacological and pharmacological management

If the patient is unconscious—

- Maintain a clear airway.
- Set up an IV line with dextrose saline.

For all patients—

- Pass a nasogastric tube.
- If poison is on the skin, wash with plenty of water for 10 minutes.
- Use activated charcoal through the NGT at the dosages below. It will absorb most poisons and prevent the poison from passing from the bowels into the rest of the body. Repeat after 4 hours.
 - Adults: 50–100 g in 1 cup water.
 - Children: 25–50 g in $\frac{1}{2}$ cup water
- Do a stomach wash-out *only* if it can be done within 1 hour of poisoning.

Note: Stomach wash-out is contraindicated in paraffin, acid, or corrosives poisoning. See section 1.12.1 “Acid and Other Corrosive Poisoning.”

Caution: Never make the patient vomit if he or she is unconscious, has convulsions, or has ingested paraffin, acid, corrosives, or organophosphates.

Refer all cases of known or suspected poisoning to the hospital. If this is a case of attempted suicide, refer the patient for psychological or psychiatric counselling.

Provide patient and family education that includes the following:

- Keep dangerous substances out of the reach of children.
- Do not store medicines or poisons in areas used for storing food.
- Clearly mark containers that hold poisonous material.
- Never use soft drink containers for storing poisons.
- Lock medicines and poisons in a cupboard.
- Avoid contamination of food or drink when using insecticides or pest control and agricultural chemicals.

1.12.1 Acid and Other Corrosive Poisoning

Many household cleaning agents contain acid or corrosive poisons (e.g., caustic soda and drain and toilet bowl cleaners).

Signs and symptoms

- Burning pain in mouth, throat, oesophagus, and stomach
- Severe abdominal pain
- Vomiting blood
- Rapid shallow breathing, stridor
- Rapid weak pulse

Nonpharmacological management

- Do not induce vomiting.
- Give milk to neutralize acid.
- If the patient is in shock and hypotensive, set up IV to replace fluid loss.
- Transfer the patient to the hospital.

1.12.2 Aspirin or Salicylate Poisoning

Salicylates are found in a number of over-the-counter medications and in numerous prescription medicines, making salicylate toxicity an important cause of morbidity and mortality. Tablets can contain 300–500 mg aspirin per tablet, so 5–10 tablets can cause severe toxic effects in children.

Signs and symptoms

Early signs and symptoms include—

- Nausea and vomiting
- Excessive sweating
- Tinnitus (ringing in the ear)

- Vertigo
- Hyperventilation (rapid breathing)
- Tachycardia
- Hyperactivity

Later signs include—

- Agitation
- Delirium
- Hallucinations
- Convulsions
- Lethargy
- Stupor
- Hyperthermia—an indication of severe toxicity, especially in young children

Nonpharmacological and pharmacological management

- Perform a gastric lavage with water (if aspirin had been ingested within the past hour).
- Give activated charcoal as soon as possible—100 g followed by 50 g every 4 hours.
- If the patient is conscious, give 5% sodium bicarbonate solution PO together with a high fluid intake.
- If the patient is severely ill and unconscious, set up an IV of Ringer's lactate or isotonic sodium chloride 10–20 mL/kg/hr until a 1–1.5 mL/kg/hr urine flow is established.
- Give an initial IV bolus of 1 mEq/kg of sodium bicarbonate, and then start a sodium bicarbonate intravenous infusion. Aim at making urine pH = 7.5–8.5.

References—1, 3, 8, 10

1.13 Seizures and Convulsions

Description

Epilepsy is a condition characterized by recurrent seizures. A seizure is defined as an involuntary contraction or series of contractions caused by abnormal electrical activity within the brain and resulting in a temporary disturbance of motor, sensory, or mental function. There are many types of seizures, depending primarily on what part of the brain is involved.

Since epilepsy has many forms and causes, it is a clinical phenomenon rather than a single single-disease entity. In some cases, there is no known underlying cause (i.e., it is idiopathic).

Table 1.13 provides the classifications of seizures. One seizure type may evolve into another during the course of the seizure. For example, a seizure may start as a partial, or focal, seizure, involving the face or arm, but then the muscular activity spreads to other areas of the body. In this way, the seizure becomes generalized.

Table 1.13. Nomenclature of the International Classification of Epileptic Seizures

I. Partial seizures (i.e., seizures beginning locally)	A. Simple partial seizures (without impaired consciousness)	1. With motor symptoms 2. With somatosensory or special sensory symptoms 3. With autonomic symptoms 4. With psychic signs
	B. Complex partial seizures (with impaired consciousness)	1. With impaired consciousness only 2. With automatisms
	C. Partial seizures	1. Secondarily generalized
II. Generalized seizures	A. Absence seizures B. Generalized tonic-clonic seizures C. Myoclonic seizures D. Akinetic seizures E. Atonic seizures F. Tonic seizures G. Clonic Seizure	
III. Unclassified seizures ^a		

^a Unclassified seizures may include neonatal seizures and infantile spasms.

Causes

Age is one of the most important factors determining both the incidence and likely cause of a seizure or epilepsy.

- During the neonatal period (<1 month), likely causes are—
 - Hypoxic ischaemic encephalopathy or birth asphyxia
 - Head trauma (intracranial haemorrhage) from birth injury
 - Congenital CNS abnormalities
 - CNS infection
 - Metabolic disorders
- In infancy and early childhood (>1 month and <12 years), likely causes are—
 - Febrile convulsions (without evidence of CNS infection or other defined cause)
 - Trauma
 - CNS infection (e.g., encephalitis, meningitis)
 - Developmental disorders
 - More often—idiopathic
- In adolescence (12–18 years), likely causes are—
 - Head trauma
 - Cerebral infection
 - Brain tumour
 - Illicit drug use
 - Idiopathic
- In young adults (18–35 years), likely causes are—
 - Tumour
 - Head injuries
 - Certain toxic chemicals or drug abuse
 - ◆ Alcohol withdrawal
 - ◆ Idiopathic
- In older adults (>35 years), likely causes are—
 - ◆ Chemical imbalance such as—
 - Hypoglycaemia
 - Hypo- or hypernatraemia
 - Hypocalcaemia
 - ◆ Alcohol abuse, intoxication, or withdrawal
 - ◆ Malignant hypertension

- ◆ Stroke including cerebral haemorrhage
- ◆ Brain tumour
- ◆ Eclampsia during pregnancy
- ◆ Electrolyte imbalance
- ◆ Degenerative CNS diseases

Signs and symptoms

- In epilepsy—an aura (i.e., foreboding of an attack) combined with a peculiar taste in the mouth and dizziness
- Loss of consciousness
- Muscular contractions
- Chewing movements of mouth
- Urinary or faecal incontinence or both

Management objectives

- Maintain an open airway
- Support circulation
- Stop the seizures
- Determine and treat the underlying cause

Nonpharmacological management

During an acute episode—

- Place the patient on his or her side. Oropharynx may need gentle suction to clear secretions or vomitus.
- Ensure that the patient is breathing. Give oxygen if necessary.
- Support circulation with IV fluids. If signs of shock are present (i.e., cold, clammy skin; profuse sweating; tachycardia; hypotension), give 20 mL/kg of normal saline over 1 hour (both children and adults).
- If fever is present, control with tepid sponging.

Pharmacological management

- Begin first-line treatment.
 - Administer a diazepam injection (5 mg/mL).
 - ◆ Adults: 10 mg IV or IM
 - ◆ Children: 300 mcg/kg IV or 500 mcg/kg per rectum
 - Repeat after 2–3 minutes, if needed.

- If convulsions persist for 30 minutes or more or there are frequent episodes of convulsions without regaining consciousness between episodes, treat as status epilepticus and proceed to second-line treatment.
- Begin second-line treatment.
 - Administer a phenytoin injection (200 mg/mL) 20 mg/kg IV, in a dextrose-free solution, infused over a period of 30 minutes.
 - Monitor for bradycardia, arrhythmias, hypotension. If any are present, stop infusion until stable then restart at $\frac{2}{3}$ the starting rate.
- Refer all types of convulsions to hospital.

In the hospital—

- Take a complete history including possible precipitating factors.
- Rule out underlying causes.
- Start anticonvulsive therapy.
- Determine the underlying cause by performing the following tests:
 - Blood glucose
 - Urea and electrolytes
 - EEG
 - CT

References—1, 3, 8, 10

2. Trauma

2.1 Abdominal Injuries

Description

Injuries to the abdomen are common. These injuries may be blunt or penetrating. The abdominal cavity contains many important organs, vessels, and membranes that can be damaged. These injuries may be life threatening.

Classification

- Blunt, nonpenetrating injuries
- Penetrating injuries

Causes

- Blunt abdominal trauma may be due to—
 - Motor vehicle collisions
 - Blows to the abdomen (e.g., from fighting, punching, kicking)
 - Bicycle mishaps (e.g., being struck by the handlebar)
 - Sports injuries
 - Child abuse
- Penetrating injuries are commonly the result of—
 - Gunshot wounds
 - Stab wounds

Signs and symptoms

- Signs and symptoms of abdominal injuries may be general signs of shock including low BP, tachycardia, or laboured breathing, or they may be abdomen specific, such as—
 - Marked tenderness (localised or all over)
 - Rigidity or guarding of abdominal muscles
 - Rebound tenderness
 - Absent bowel sounds
- Blunt trauma can affect any of the abdominal organs plus the intestines and the diaphragm. Most frequently injured are the liver and spleen followed by small and large intestines.
- Penetrating trauma is more localised to the point of injury.

Diagnosis

Based on history and physical findings

Investigations

- Full blood count, urea, and electrolytes
- Abdominal x-ray

Management objectives

- Determine the extent of the injuries
- Control resulting damage
- Prevent further damage

Nonpharmacological and pharmacological management

At the health centre—

- Take a clear history.
- Examine vital signs: pulse, BP, respiratory rate, and level of consciousness.
- Carry out a complete physical including head, chest, and cardiovascular examinations. Check for hypovolaemia, fractures, and other injuries.
- Examine the abdomen for abrasions or ecchymosis, distension, and bowel sounds.
- Check for local or generalized tenderness, guarding, rigidity, or rebound tenderness, which suggests peritoneal injury.
- If the patient is in shock—
 - Ensure a clear airway.
 - Start an IV line with 5% dextrose or Ringer's lactate. IV fluids should be titrated to a systolic BP of 90–100 mmHg.
- If the patient has an open wound, cover and keep the bowel inside the abdomen.
- If the patient has vomiting or abdominal distension, insert a nasogastric tube.

Referral

Refer the patient to the hospital urgently. Notify the destination hospital so that the facility can prepare for the patient.

References—3, 28

2.2 Chest Injuries

Description

Injury to the chest may be the result of blunt or penetrating trauma that may affect the bony rib cage (i.e., ribs, clavicles, scapulae, or sternum), heart, pleurae, lungs diaphragm, and mediastinal contents.

Classification

- **Blunt, nonpenetrating injuries.** The most common cause of blunt force trauma is motor vehicle accidents, when the chest comes into contact with the steering wheel. These injuries result in damage to the structures inside the chest cavity.
- **Penetrating injuries.** Penetrating injuries disrupt chest wall integrity and result in alterations in pressure inside the thoracic cavity. They usually result from stab wounds and gunshot wounds.

Differential Diagnosis

- Fractured ribs or flail chest (i.e., 3 or more consecutive ribs) or sternum fractured in 2 or more places and a portion of the chest wall separated from the chest cage
- Pneumothorax, haemothorax, or pneumo-haemothorax
- Diaphragmatic rupture
- Heart injury, pericardial tamponade
- Aorta and oesophageal rupture
- Vascular injury

Signs and symptoms

Signs and symptoms vary widely, and the presentation depends on the mechanism of injury and the organ systems injured. Obtaining as detailed a clinical history as possible is therefore extremely important in the assessment of a patient.

2.2.1 Rib Fractures

Signs and symptoms

- Patient reports pain at the site of injury, increasing on inspiration or coughing.
- Patient indicates localised tenderness and crepitus on palpation.

- Patient exhibits shallow breathing plus impaired movement.
- Antero-posterior compression of the chest produces pain.
- Ribs 3 through 10 are most frequently affected.
- Pneumothorax or pneumo-haemothorax may be present. If a pneumothorax is present, breath sounds may be decreased and resonance to percussion may be increased.

Management objectives

- Relieve pain
- Establish adequate ventilation

Pharmacological and nonpharmacological management

- Look for signs and symptoms of a pneumothorax.
- Provide pain relief.
 - Give paracetamol (500 mg tablet; 120 mg/5 mL suspension). See table 2.2.1 for dosages.

Table 2.2.1. Paracetamol Dosages by Age for the Management of Pain Associated with Rib Fractures

Age	Dosage (mg)	Quantity	Frequency	Duration
2-12 months	60	2.5 mL ($\frac{1}{2}$ tsp)	3 times/day	5 days
1-<5 years	120	5 mL (1 tsp)	3 times/day	5 days
5-8 years	240	10mL (2 tsp)	3 times/day	5 days
8-14 years	500	1 tablet	3 times/day	5 days
>14 years	1,000	2 tablets	3-4 times/day	5 days

OR

- Give ibuprofen (200, 400, and 600 mg tablets).
 - ◆ Adults: 200–400 mg every 4–6 hours depending on severity of pain not to exceed 3,200 mg/day.
 - ◆ Children: 4–10 mg/kg orally every 6–8 hours as needed not to exceed 40 mg/kg/day.

OR

- Give diclofenac (25 mg/mL injection).

Caution: Do not strap chest.

2.2.2 Flail Chest

Signs and symptoms

- Severe chest pain over the injured area
- Paradoxical chest movements
- Severe dyspnoea
- Tachypnoea with shallow breathing
- Use of abdominal and other accessory muscles to breath
- Decreased or absent breath sounds on auscultation of the affected area
- Increased anxiety

Management

Management of flail chest depends on the state of the patient.

- If the patient has no respiratory problems, observe closely.
- If the patient has respiratory problems, intubate or ventilate as needed.
Suction if mucous is present.

Referral

Refer to hospital.

2.2.3 Fractured Clavicle

In 75–80% of cases, the clavicle fracture occurs in the middle third of the bone.

Signs and symptoms

- Tenderness over the fracture site
- Pain with movement of the shoulder or arm on the affected side
- Anteroinferior positioning of the arm on the affected side as compared to the other arm
- The proximal segment of the clavicle is displaced upwards because of the action of the sternocleidomastoid muscle

Management objectives

- Realign the clavicular bone
- Relieve pain
- Nonpharmacological and pharmacological management
- Immobilise the clavicle using a simple arm sling supporting the elbow.
- Give oral analgesics to control pain—paracetamol (500 mg tablets; 120 mg/5 mL suspension). See table 2.2.1 for dosages.
- Surgery is rarely indicated.

2.2.4 Pneumothorax

Description

Pneumothorax is an abnormal collection of air or gas in the pleural cavity between the chest wall and the lung, which may interfere with normal breathing.

Classification

- Primary pneumothorax occurs without an apparent cause and in the absence of significant lung disease.
- Secondary pneumothorax occurs in the presence of existing lung pathology.
- Traumatic pneumothorax may present as a—
 - Tension pneumothorax, when air leaks into the pleural cavity and cannot escape during expiration
 - Haemothorax, when blood is in the pleural cavity
 - Pneumo-haemothorax, when blood and air are present together in the pleural cavity

Signs and symptoms

Table 2.2.4 presents the signs and symptoms for the different classifications of pneumothorax.

Nonpharmacological and pharmacological management

At health centre—

- If the patient has a wound, dress it but do not suture.
- Start an IV infusion with Ringer's lactate or normal saline.
- If the patient is in respiratory arrest or shock, resuscitate.
- For tension pneumothorax, insert an intercostal drain. If no doctor is available, the health care worker should drain the chest as follows:
 - Carefully insert a large needle through the chest wall into the pleural cavity.
 - Insert the IV needle through the second and third rib space in the midclavicular line just above the upper border of the third rib avoiding the lower border of the second rib, which covers the neurovascular bundle.
 - Connect the needle to an IV line, and prevent air from getting into the pleural cavity by placing the end of the IV line into a bottle filled with antiseptic fluid or sterile water.

Table 2.2.4. Signs and Symptoms of Pneumothorax

Classification	Signs and Symptoms
Pneumothorax— may be closed or open, the latter being more commonly caused by a penetrating injury	<ul style="list-style-type: none"> ▪ Closed pneumothorax <ul style="list-style-type: none"> • Inspiratory pain or dyspnoea • Pain at the sites of the rib fractures ▪ Open pneumothorax <ul style="list-style-type: none"> • Respiratory distress due to collapse of the lung on the affected side • A chest wall defect that is larger than the cross-sectional area of the larynx • Significant to complete loss of breath sounds on affected side • Mediastinal shift to the opposite side, decreasing the return of blood to the heart leading to cardiac insufficiency
Tension pneumothorax	<ul style="list-style-type: none"> ▪ Lung collapsed on the affected side ▪ Mediastinal shift towards the unaffected side (i.e., heart is shifted to the unaffected side) ▪ Compression of the heart and large blood vessels resulting in acute shock and cardio-respiratory arrest
Haemothorax	<ul style="list-style-type: none"> ▪ Pain and dyspnoea ▪ Decrease in breath sounds ▪ Dullness to percussion over the affected area
Pneumo- haemothorax	<ul style="list-style-type: none"> ▪ Tachycardia ▪ Low BP ▪ Cyanosis ▪ Respiratory distress ▪ Fast, shallow breathing ▪ Rib retraction ▪ Use of accessory muscles of respiration ▪ Less movement on wounded side ▪ Laboured breathing ▪ Shift in the trachea and the apex of the heart ▪ Decreased or no breath sounds on affected side

Referral

- Refer the patient to the hospital.
- Inform the hospital of the transfer so that preparations can be made to receive the patient.

References—3

2.3 Eye Injuries

Description

Eye injuries can range from the very minor, such as getting soap in the eye, to the catastrophic, resulting in permanent loss of vision or loss of the eye. They can be caused by blunt trauma (e.g., a fist) or by a sharp and penetrating object. All parts of the eye can be affected and must be treated independently. Eye injuries often occur in the workplace, at home, during other accidents, or while participating in sports.

Causes

- A foreign body (usually a small piece of wood, metal or plastic) in the eye—can lead to corneal abrasions
- Chemical exposures and burns can occur in a number of ways but are most often the result of a liquid splashing into the eye. Acids and alkalis are highly caustic and may cause severe and permanent damage to the ocular surface.
- Blunt object
- Sharp object

Signs and symptoms

See table 2.3A.

Table 2.3A. Signs and Symptoms of Various Types of Eye Injury

Indications	Blunt Trauma	Penetrating Trauma	Chemicals and Burns
Symptoms	<ul style="list-style-type: none"> ▪ Pain ▪ Swelling of the eyelid ▪ Decrease in vision (rarely) 	<ul style="list-style-type: none"> ▪ Pain ▪ Decrease in vision 	<ul style="list-style-type: none"> ▪ Pain ▪ Decrease in vision
Signs	<ul style="list-style-type: none"> ▪ Haematoma of the eyelid ▪ Subconjunctival haemorrhage ▪ Bleeding behind the cornea (hypaemia) ▪ Decreased eye movement ▪ Post-traumatic infection ▪ Contusion cataract 	<ul style="list-style-type: none"> ▪ Laceration of the cornea or conjunctiva ▪ Pupil size abnormal or irregular ▪ Iris protruding out of the wound 	<ul style="list-style-type: none"> ▪ Burn wound on the eyelid ▪ Laceration of the cornea

Nonpharmacological and pharmacological management

- Do not exert pressure on the eyeball.
- Cover with an eye pad.
- For pain relief, give paracetamol (500 mg tablets; 120 mg/5 mL suspension). See table 2.3B for dosages.

Table 2.3B. Paracetamol Dosages by Age for the Management of Pain Associated with Eye Injuries

Age	Dosage (mg)	Quantity	Frequency	Duration
2-12 months	60	2.5 mL (½ tsp)	3 times/day	5 days
1-5 years	120	5 mL (1 tsp)	3 times/day	5 days
5-8 years	240	10 mL (2 tsp)	3 times/day	5 days
8-14 years	500	1 tablet	3 times/day	5 days
>14 years	1,000	2 tablets	3-4 times/day	5 days

Referral

- Refer the patient urgently to the hospital if—
 - The cornea is unclear.
 - The vision is bad.
 - The eye is leaking blood or clear fluid.
- Possible conditions include—
 - Corneal abrasions
 - Injury to the iris
 - Injury to the lens
 - Injury to the retina

References—3, 30

2.4 Head Injuries

Description

Even though it is protected by the bone covering of the skull, the brain is more sensitive to trauma than most organs. The surface of the brain can tear or bruise if it bumps against the inside of the skull. This bruising can damage blood vessels and nerves and cause severe swelling of the brain tissue (i.e., cerebral oedema). If the brain is severely damaged, it is unable to heal completely. Traumatic brain injury that results from head injuries is a major cause of death and disability. Brain injuries can have emotional, behavioural, and physical effects.

Causes

- Motor vehicle and bicycle accidents
- Gunshot wounds
- Falls from heights
- Blows to the head

Classification

The Glasgow coma scale (GCS) measures the level of consciousness. The scale comprises three tests: eye (4 grades), verbal (5 grades), and motor (6 grades) responses. (See table 2.4.) The three values separately as well as their sum are considered. The lowest possible GCS (the sum of the first column in table 2.4) is 3 (deep coma or death), and the highest is 15 (fully awake person). Generally, brain injury is classified as follows:

- Severe, GCS ≤ 8
- Moderate, GCS 9–12
- Minor, GCS ≥ 13

Signs and symptoms

The signs and symptoms depend on the severity of the injury and can include the following:

- Impaired level of consciousness that is not induced by drugs, medications, alcohol, or an underlying disease process
- Low GCS rating
- Headache, drowsiness
- Restlessness
- Intolerance to light

Table 2.4. The GCS Tests and Grades

Tests	Grades					
	1	2	3	4	5	6
Eyes	Does not open eyes	Opens eyes in response to painful stimuli	Opens eyes in response to voice	Opens eyes spontaneously	N/A	N/A
Verbal	Makes no sounds	Makes incomprehensible sounds	Utters inappropriate words	Is confused, disoriented	Is oriented and converses normally	N/A
Motor	Makes no movements	Exhibits extension to painful stimuli (i.e., decerebrate response)	Exhibits abnormal flexion to painful stimuli (i.e., decorticate response)	Exhibits flexion or withdrawal from painful stimuli	Localizes painful stimuli	Obeys commands

- Papillary dilatation; unequal pupils
- Signs of elevated intracranial pressure (i.e., intracranial bleeding or oedema)
 - Change in consciousness
 - Elevated BP
 - Slow pulse and respiration
 - Vomiting
- Signs of fracture of the base of the skull
 - Otorrhoea (i.e., blood draining from one or both ears)
 - Rhinorrhoea (i.e., cerebrospinal fluid draining from the nose)
 - Peri-orbital bruising (i.e., raccoon eyes)
 - Subcutaneous bleed over the mastoid (i.e., behind the ears)
 - Deep scalp injuries with underlying fractures of the skull
 - Haemotympanum (i.e., blood behind the eardrum)
 - Open skull fractures and exposed cerebral tissue

Management objective

Ensure that the patient is fully conscious and coherent

Nonpharmacological and pharmacological management

Most head injuries are of a benign nature and require no treatment beyond analgesics and close monitoring for potential complications such as intracranial bleeding.

- Treating the conscious patient—
 - Examine the skull carefully for abrasions, contusions, and lacerations.
 - Search for other injuries.
 - If the patient had been unconscious, is confused, or is suffering from amnesia, observe for 24 hours.
 - If the patient has improved, discharge.
 - ◆ Instruct family members to observe the patient closely for a few days.
 - ◆ Advise the patient to rest, drink enough fluids, and eat normally.
 - ◆ Indicate to the patient and family what neurological signs to watch for.
- Treating the unconscious patient—
 - Check and monitor vital signs.
 - Perform emergency resuscitation (airway, breathing, circulation), and stabilize the patient.
 - Start oxygen.
 - Start IV infusion with normal saline or Ringer's lactate.
 - Stabilise the cervical spine (i.e., affix a neck collar).
 - Insert a urinary catheter.
 - Place the patient with his or her head slightly elevated to reduce cerebral oedema.
 - Lay the patient on his or her side to prevent aspiration of vomitus.

Referral

- Refer any conscious patient who does not improve to the hospital.
- Refer all unconscious patients to the hospital.

References—3, 31

2.5 Wounds

Description

A wound occurs when the skin is broken or damaged because of injury. The skin can be damaged in a variety of ways depending upon the mechanism of injury. It may be superficial or deep and may be associated with broken bones, bleeding, or both. It may be clean or contaminated by dirt or foreign bodies that can cause infection.

Causes

- Motor vehicle accidents
- Occupational accidents
- Fights
- Stab wounds
- Human and animal bites
- Prolonged or chronic pressure on an area of the skin
- Rubbing against an abrasive surface

Classification

- ***Superficial (i.e., on the surface) wounds and abrasions*** leave the deeper skin layers intact. They are usually caused by friction (rubbing against an abrasive surface).
- ***Deep abrasions*** (cuts or lacerations) go through all the layers of the skin and into underlying tissue like muscle or bone.
- ***Puncture wounds*** are usually caused by a sharp pointed object entering the skin, (e.g., needle stick, stepping on a nail, or a stab wound with a knife). Human and animal bites can be classified as puncture wounds, abrasions, or a combination of both. (See section 1.7.3 “Cat, Dog, and Wild Animal Bites” and section 1.7.4 “Human Bites.”)
- ***Pressure sores*** (e.g., bed sores) can develop because of lack of blood supply to the skin due to chronic pressure on an area of the skin (e.g., a person who is bedridden, sits for long hours in a wheelchair, or has a cast pressing on the skin). Individuals with diabetes, poor circulation (peripheral vascular disease), or malnutrition are at an increased risk of pressure sores.

Signs and symptoms

The most common symptoms of a wound are—

- Pain, swelling, and bleeding. The extent depends upon the location of the injury and the mechanism of injury.
- Inflammation, which is the skin's initial response to injury

Management objectives

- Stop the bleeding
- Prevent infection
- Promote healing
- Provide pain relief
- Suture if indicated
- Ensure a good cosmetic result after the wound has completely healed

Nonpharmacological management

Proper wound care is necessary to prevent infection and to promote healing of the skin.

- Stop the bleeding.
 - Apply manual pressure.
 - Raise the bleeding site above the level of the heart.
 - Suture larger and deeper wounds. Use lidocaine 2% to anaesthetise the wound.
- Prevent infection.
 - Remove all dirt and foreign bodies from the wound.
 - Clean the wound thoroughly with soap and water and diluted iodine.
- Promote healing.
 - Leave small wounds open.
 - Dress larger wounds.
 - Elevate the wound.

Pharmacological management

If a wound is cleaned and cared for properly, there is often little need to prescribe antibiotics. If the wound is considered to be contaminated—

- Prescribe a broad-spectrum antibiotic if indicated.
 - Amoxicillin (250 mg, 500 mg tablets; 125 mg/5 mL suspension)
 - ◆ Adults: 1 g 3 times/day for 5 days
 - ◆ Children: 100 mg/kg/day in 3 divided doses for 5 days

OR

- In penicillin-allergic patients, erythromycin (250 mg, 500 mg tablets; 125 mg/5 mL suspension). See table 2.5A for dosages.

Table 2.5A. Erythromycin Dosages by Age for the Management of Wounds

Age	Dose (mg)	Quantity	Frequency
<1 year	125	5 mL (1 tsp)	Every 6 hours
1-5 years	250	10 mL (2 tsp)	Every 6 hours
5-12 years	500	1-2 tablets	Every 6 hours
Adults	1,000	2-4 tablets	Every 6 hours

- Give tetanus toxoid if patient has never been immunized or if last dose was >5 years ago.
- Provide pain relief. Give paracetamol (500 mg tablets; 120 mg/5 mL suspension). See table 2.5B for dosages.
- Suture larger deeper wounds.
- Ligate or clamp arteries or veins with mosquito forceps.

Table 2.5B. Paracetamol Dosages by Age for the Management of Wounds

Age	Dosage (mg)	Quantity	Frequency	Duration
2-12 months	60	2.5 mL (½ tsp)	3 times/day	5 days
1-<5years	120	5 mL (1 tsp)	3 times/day	5 days
5-8 years	240	10 mL (2 tsp)	3 times/day	5 days
8-14 yrs	500	1 tablet	3 times/day	5 days
>14 years	1,000	2 tablets	3-4 times/day	

Referral

If the wound does not show signs of healing after 5 days, refer the patient to the hospital.

References—3, 32

3. Respiratory System

3.1 Acute Bronchitis

Description

Acute bronchitis is defined as an acute inflammation of the lining of the bronchi, most commonly caused by a virus, but sometimes caused by irritation from inhaling gases, smoke, dust particles, or some types of pollution. Mycoplasma pneumonia may be the cause in older children.

Signs and symptoms

- Symptoms of acute bronchitis usually begin 3–4 days after an upper respiratory infection, such as a cold or influenza. This infection is usually characterized by—
 - A dry cough at the beginning, which later produces clear, white, or yellow-green mucus. Sometimes nasal congestion and sore throat appear before the dry cough. After nasal congestion and sore throat improve, the cough continues and worsens, becoming wet and loose.
 - Shortness of breath with wheezing
 - Fatigue
 - Fever, usually low grade. If the fever is high, prolonged, or both, rule out the presence of pneumonia or influenza.
 - Chest discomfort
- Even after acute bronchitis has cleared, a dry, nagging cough may linger for several weeks.
- Even though symptoms may last up to 90 days, it can still be classified as acute bronchitis; symptoms lasting longer, sometimes for months or years, are usually classified as chronic bronchitis.

Diagnosis

The diagnosis is essentially a clinical one based primarily on signs and symptoms.

- A wheezing may be heard during the physical examination. If focal chest signs are present, it could be pneumonia.

- A chest x-ray is sometimes done to exclude pneumonia, mainly if wheezing is heard, the lungs are congested, or the patient is short of breath.
- In children >2 years who have frequent episodes of acute bronchitis or wheezing bronchitis, consider asthma. (See section 3.2 “Asthma.”) In children <2 years, consider bronchiolitis. (See section 3.3 “Bronchiolitis.”)

Management objectives

- Rule out serious illness
- Alleviate symptoms, particularly cough

Nonpharmacological management

- Promote hand washing to limit the spread.
- Advise drinking lots of fluids and humidifying the air; suggest steam inhalation.
- Advise sunning pillows at least twice weekly.
- Let the patient know that the cough might last a long time.

Pharmacological management

- Treat the fever (if present).
 - First-line treatment: Give paracetamol PO (500 mg tablets; 120 mg/5 mL oral suspension). See table 3.2 for dosages.

Table 3.2. Paracetamol Dosages by Age for Management of Acute Bronchitis

Age	Dosage (mg)	Quantity	Frequency	Duration
2-12 months	60	2.5 mL (½ tsp)	3 times/day	5 days
1-<5years	120	5 mL (1 tsp)	3 times/day	5 days
5-8 years	240	10 mL (2 tsp)	3 times/day	5 days
8-14 years	500	1 tablet	3 times/day	5 days
>14 years	1,000	2 tablets	3-4 times/day	

OR

- Second-line treatment: Give acetylsalicylic acid PO (300 mg and 500 mg tablets). Give 1-2 (300 mg) tablets or 1 (500 mg) tablet 3-4 times/day, not to exceed 2 g/day.

Caution: Acetylsalicylic acid (aspirin) is not recommended for children <12 years old because of the risk of Reye’s syndrome.

- Treat wheezing (if present) with antihistamines: chlorpheniramine maleate (4 mg tablets; 2 mg/5 mL syrup).
 - Children 2–5 years: 2.5 mL (½ tsp) as needed but not to exceed 4 times/day
 - Children 6–12 years: 5 mL (1 tsp) as needed but not to exceed 4 times/day
- Consider antibiotics. Antibiotics are not indicated for otherwise healthy patients suffering from acute bronchitis. Antibiotics may be considered if—
 - Patient is elderly or in poor general health with other conditions such as malnutrition, measles, rickets, severe anaemia, or cardiac disease.
 - Patient has difficulty breathing, fever >38.5°C, and purulent expectorations. These symptoms indicate a possible bacterial infection.
- If warranted, prescribe antibiotics.
 - First-line treatment: amoxicillin PO (250 mg and 500 mg tablets; suspension 125 mg/5 mL)
 - Adults: 3 g/day in 3 divided doses for 7 days.
 - ◆ Children: 100 mg/kg/day in 2 divided doses for 7 days

Note: Reassess the patient after 5 days. If no improvement, refer the patient but advise continuation of medication until seen.

OR

- Second-line treatment for penicillin-allergic patients: azithromycin (250 mg tablet; 200 mg/5 mL suspension)
 - ◆ Adults: 2 tablets once daily for 7 days
 - ◆ Children: 10 mg/kg, once daily for 3 days

Referral

Health posts should give the first dose of first-line treatment and refer the patient to health centre or district hospital if the patient has the following, which may indicate a bacterial infection—

- Difficulty breathing
- Fever >38.5°C
- Coughing up mucous containing pus

References—3, 8, 10, 34, 35

3.2 Asthma

Description

Asthma is a chronic inflammatory disorder of the airways with reversible narrowing or obstruction of the bronchi. The chronically inflamed airways are hyper-responsive to a number of endogenous or exogenous stimuli resulting in widespread narrowing of the airways. Airflow is limited, not only by bronchoconstriction but also by mucus plugs and increased inflammation.

Classification

Asthma varies in intensity, and may be—

- ***Intermittent.*** <2 episodes per week or 1 episode per night per month
- ***Mild persistent.*** 2–4 episodes per week or 2–4 night episodes per month.
On examination: RR normal or increased, shortness of breath, few wheezes, no chest indrawing, pulse <100 beats/minute; patient is able to walk or lie down.
- ***Moderate persistent.*** >4 episodes per week or 4 night episodes per month.
On examination: RR is increased, shortness of breath interferes with speech, marked wheezes, chest indrawing, pulse 100–120 beats/minute; patient is most comfortable in the sitting position.
- ***Severe persistent.*** Continuous wheezing or frequent night episodes.
On examination: RR increased (>30 breaths/minute in adults and >40 breaths/minute in children 12 months to 5 years), difficulty speaking, chest indrawing, high-pitched wheeze, pulse >120 beats/minute in adults; patient is anxious. The attack can be life threatening if patient has no sounds on auscultation, cyanosis, altered level of consciousness and reduced pulse rate, or shock.

Causes and risk factors

The cause of asthma is unknown, but the following factors are associated with the development of asthma—

- Exposure to various allergens (e.g., house dust, mites, animals with fur, perfumes, cockroaches, pollens, and moulds)
- Occupational and chemical irritants
- Smoke—tobacco, wood
- Nonspecific irritating substances

- Infections (viral or bacterial)
- Strong emotional expressions (laughing or crying hard)
- Medicines (such as aspirin and beta blockers)
- Exercise
- Change in temperature
- Family history

See also appendix C, “Common Asthma Triggers and Avoidance Strategies.”

Signs and symptoms

Typically most attacks are short lived, and the patient seems to recover completely after an attack. Look for the following:

- Common signs:
 - Recurring episodes of wheezing, breathlessness, chest tightness, and coughing, (particularly at night or in the early morning)
 - Auscultation—expiratory rales in both lung fields
- Danger signs: Consider admission to the hospital ICU if the patient presents with any of these signs—
 - Inability to speak
 - Cyanosis
 - Severe distress
 - Confusion and exhaustion; drowsiness
 - Pulsus paradoxus
 - Decreased breath sounds
 - High pulse rate (children >140 beats/minute; adults >110 beats/minute)
 - High RR (children >60 breaths/minute; adults >30 breaths/minute)
 - Repeat attacks despite good compliance or oral steroids

Diagnosis

The diagnosis is based on the characteristics, pattern of symptoms, and signs of asthma in the absence of another explanation. The patient usually has a history of periodic attacks.

Note: Diagnosis of asthma in children ≤ 6 years presents a particularly difficult problem. The younger the child, the greater the likelihood that an alternative diagnosis may explain recurrent wheeze. Always consider bronchiolitis, congestive cardiac failure, bronchopneumonia, or airway obstruction by a foreign body.

Management objectives

- Relieve the symptoms of the acute attack and maintain control of the clinical manifestations of the disease for prolonged periods
- Prevent acute attacks and hospitalization with maintenance therapy because when asthma is controlled, patients can prevent most attacks, avoid troublesome symptoms day and night, and keep physically active
- Achieve and maintain normal or best possible long-term lung function
- Identify and avoid precipitating factors
- Develop a good relationship with the patient, the patient's family, and health care workers
- Educate the patient

Management

Treatment depends on the severity of the attack. Good asthma care has three interrelated components:

- Assess the severity of attack. (See discussion of danger signs above.)
- Identify and reduce exposure to risk factors. (See appendix C, "Common Asthma Triggers and Avoidance Strategies.")
- Calm the patient.

Nonpharmacological management

- Advise the patient—
 - Not to smoke and to avoid areas where others are smoking
 - To avoid contact with household pets and with bat, rat, and other droppings
 - To avoid exposure to known allergens and stimulants or irritants
- Educate the patient about early recognition and management of acute attacks.
- Reassure the patient, and place him or her in a semi-recumbent position.

Pharmacological management

- If the attack is mild—
 - Give inhaled salbutamol (0.1 mg/puff)
 - ◆ Adults: 2–4 puffs at 20-minute intervals for the first hour, and then if the patient shows mild exacerbation, 2–4 puffs every 3–4 hours
 - ◆ Children: 2–4 puffs at 20-minute intervals. If responding, continue every 1–4 hours.

- If the attack is resolved, observe the patient for an hour.
 - If the attack is only partially resolved, proceed to treat as a moderate attack (see below).
 - If the attack is mild but persistent—
 - Give continuous inhaled steroids (e.g., beclometasone dipropionate 0.25%).
 - Give inhaled salbutamol when symptomatic.
 - If the attack is moderate—
 - Give a high dose of salbutamol (0.1 mg/puff) (e.g., 4–5 puffs every 10 minutes) until improvement or via oxygen-driven nebuliser (if available).
 - Continue with inhaled salbutamol: 2 puffs every 6 hours for 24–48 hours following an attack.
 - Add prednisolone (5 mg tablets) PO
 - Adults: 0.5–1 mg/kg once daily in the morning
 - ◆ Children: 1–2 mg/kg once daily in the morning
 - ◆ Observe for 4 hours after symptoms stop.
 - Continue prednisolone for 10 days at tapered doses.
 - Follow up in 10 days.
 - Consider long-term treatment.
 - If the attack is moderate persistent—
 - Give continuous treatment with low- to medium-dose inhaled beclometasone.
- PLUS**
- Give inhaled salbutamol (1 puff 4 times/day).
- If the attack is severe—
 - At the health centre or health post—
 - ◆ Give a high dose of salbutamol: 5 puffs every 10 minutes.
 - ◆ Refer urgently to the district hospital.
 - At the hospital—
 - ◆ Give oxygen 40–60%.
 - ◆ Give inhaled salbutamol 5 puffs every 10 minutes until improvement.
 - ◆ If symptoms are severe, consider inhaled ipratropium bromide (0.25%)
- PLUS**

- ◆ Hydrocortisone 100 mg IV.
 - Adults: 200 mg repeat in 2 hours PRN
 - Children: 100 mg every 6 hours PRN
- ◆ Change to prednisolone PO as soon as possible.
 - Adults: 0.5–1 mg/kg for 5 days
 - Children: 1–2 mg/kg in the morning for 5 days not to exceed 20 mg/day in children <5 years and 40 mg/day in children >5 years
 - Reduce dose over a 10-day period and follow up in 10 days
- ◆ If the patient shows no improvement after 20–30 minutes, give aminophylline IV infusion.
 - Administer with caution to children <30 months.
 - Give a loading dose 5 mg/kg diluted in isotonic solution over 30 minutes and then 0.5 to 1 mg/kg/hr.

Caution: Never administer aminophylline by direct IV.

Caution: If the patient has already been given oral aminophylline, do not give the loading dose.

- Change to oral aminophylline after 24 hours.
- If the attack is severe persistent—
 - Provide continuous treatment with high-dose inhaled beclometasone.
PLUS
 - Give inhaled salbutamol (1 puff 4–6 times/day).
PLUS
 - If needed, give prednisolone tablets 2 mg/kg/day but not to exceed 60 mg/day. Try repeatedly to wean off.
- For long-term management—
 - The goal is to achieve a stable, asymptomatic state with the best pulmonary function using the least amount of medication. An important step is to educate patients to participate fully in the management of their disease.
 - Things that trigger attacks should be avoided or controlled.
 - Long-term treatment is not required for mild intermittent asthma.

Referral

Refer patients with any of the following:

- Unstable asthma
- Inadequate response to treatment
- A life-threatening episode (refer during or after)
- Pregnant women with aggravated asthma
- All children <6 years with recurrent wheeze on first presentation for assessment and confirmation of diagnosis

References—3, 8, 10, 33, 34, 35

3.3 Bronchiolitis

Description

Bronchiolitis is caused by an acute viral infection of the lower respiratory tract that occurs primarily in young infants. It may lead to fatal respiratory distress resulting from lower airway obstruction. Bronchiolitis is seasonal and, in tropical countries, tends to occur during the rainy season. All patients recover once they are past the acute phase, as long as they are managed properly. Recurrence is common.

Causes and risk factors

Bronchiolitis is usually caused by a respiratory syncytial virus (RSV), but could also be caused by the viruses that cause the flu or coryza. Children <2 years of age and those who have never been breastfed are more prone to infection as are those who are exposed to tobacco smoke. A child with a compromised immune system is also susceptible.

Signs and symptoms

- General signs and symptoms—
 - Early symptoms are those of a viral upper respiratory tract infection (URTI), including mild nasal discharge, and low-grade fever (38.5–39°C) often accompanied by cough and wheezing. Adults, older children, and many infants do not progress beyond this stage of URTI.
 - For those infants and young children who progress to lower respiratory tract involvement, fits of coughing and difficulty in breathing develop within 1–2 days.

- On listening to the chest, you will hear laboured expiration with diffuse wheeze and, occasionally, fine, scattered crepitations during inspiration in both lungs.
- Signs of serious illness—
 - The most common physical sign: rapid breathing, often RR >50–60 breaths/minute
 - Cyanosis evident in the lips, buccal membranes, and fingernails
 - Nasal flaring
 - Periods of cessation of breathing, especially in infants <6 weeks
 - Poor feeding or refusal of feedings; difficulty drinking or breastfeeding
 - Altered level of consciousness
 - Chest indrawing
 - Silence on auscultation corresponding to an intense constriction of the bronchi

Diagnosis

History and physical examination form the primary basis for the diagnosis of bronchiolitis.

Management objectives

- Recognize the severity of the illness
- Alleviate symptoms
- Refer appropriately

Nonpharmacological management

- Position child in a half-sitting position to make breathing easier.
- Do not sedate the child.
- Keep the air humidified using a bowl of water or a wet towel.
- Assist the child's breathing by applying frequent subcostal pressure.
- Advise oral fluids, 80–100 mL/kg/day in small amounts throughout the day.
- Minimize the patient's contact with other children.

Pharmacological management

At the health centre or health post—

Caution: Avoid the use of bronchodilators, antibiotics, and corticosteroids.

- Salbutamol 2.5%, solution, 1–2 mL diluted to 2–4 mL with sodium chloride 0.9%, nebulised over 3 minutes

- Evaluate the response to salbutamol.
- Send patient home on a salbutamol metered-dose inhaler if he or she has exhibited a good response.

Caution: If the patient's condition does not improve in $\frac{1}{2}$ hour, it is a medical emergency. Refer immediately.

- Antibiotics are indicated only if bacterial infection is suspected (e.g., the patient has a toxic appearance, fever $>39^{\circ}\text{C}$, sputum containing pus, or aggravation of respiratory symptoms).
 - According to the severity, give antibiotics orally or by injection for 5 days.
 - Amoxicillin PO or ampicillin IM: 100 mg/kg/day in divided doses or injections
- OR**
- For penicillin-allergic patients, erythromycin (125 mg/5 mL suspension), 30–50 mg/kg/day in 4 divided doses for 5 days
- Re-evaluate every day.
 - If the child is improving, continue with the same antibiotic to complete treatment.
 - If there is no change or if the child's condition is deteriorating, refer to a hospital.
 - In children <2 months, treat as acute pneumonia. (See section 3.6, "Pneumonia.")
 - If the child has signs of serious illness, give oxygen at a rate of 1–3 L/minute, and refer to the regional hospital.

Referral

- Children at risk (i.e., <2 months of age, malnourished, or HIV infected)
- Children with at least one sign of serious illness (e.g., toxic appearance, fever $>39^{\circ}\text{C}$, sputum containing pus, or aggravation of respiratory symptoms)
- Previous admission for the same problem

References

Desenclos, J.C., P. Biberon, and J. Rigal. 2007. *Clinical Guidelines. Diagnosis and Treatment Manual* (7th ed.). Paris: Médecins Sans Frontières.

3.4 Coryza (Common Cold)

Description

The common cold is an acute inflammation of the upper respiratory tract and is usually afebrile and self-limited.

Causes and risk factors

Although often caused by the rhinovirus, a viral infection may also be caused by parainfluenza and respiratory syncytial viruses. Transmission is person to person and usually airborne. The viral infection can be complicated by secondary bacterial infection (e.g., *streptococcus*, *staphylococcus*, *Haemophilus influenza*).

Signs and symptoms

The signs and symptoms are similar to other URIs but not localised to one particular anatomical location. Onset is usually sudden, mild, and self-limited, lasting about 1 week. The common cold is characterized by—

- Nasal stuffiness, tickling sensation in nose, and sneezing
 - Dry, “scratchy” throat, sore throat, or both
 - Profuse nasal watery discharge, often with fever and cough
- Note:** A thick purulent discharge suggests secondary infection.
- For some patients, mild headache

Diagnosis

Diagnosis is generally clinical and presumptive. Allergic rhinitis is the most important consideration in differential diagnosis. Resolution is usually in 5–10 days. If symptoms recur often or last >2 weeks, suspect an allergy.

Management objectives

- Relieve symptoms
- Prevent complications

Nonpharmacological management

Advise the patient to do the following:

- Get bed rest.
- Increase the humidity in his or her home.
- Increase fluid intake, preferably warm liquids.
- Use steam inhalation to clear the nose and ease breathing.

- Sooth irritated nasal tissue using commercial nasal saline solutions or a homemade solution (i.e., 5 mL of salt in 250 mL of warm water).
- Include adequate intake of fresh fruits and vegetables in the diet.
- Practice frequent hand washing to prevent transmission.

Pharmacological management

- The common cold is a viral disease and does *not* require use of antibiotics.
- Give antipyretics and analgesics until fever stops.
 - Paracetamol PO (100 mg, 500 mg tablets; suspension 120 mg/5 mL)
 - ◆ Adults: 1 g (two 500 mg tablets) 3–4 times/day
 - ◆ Children<1 year: 60 mg(½ tsp) 3 times/day
 - ◆ Children 1–5 years: 100–150 mg (1–1½ tablets or 5 mL) 3 times/day

OR

- Acetylsalicylic acid PO (300 mg and 500 mg tablets)

Caution: Acetylsalicylic acid (aspirin) is not recommended for children <12 years old because of the risk of Reye's syndrome.

-
- Adults: 1–3 g/day in 3–4 divided doses
 - Children>12 years old: 60 mg/kg/day in 3–4 divided doses
 - Give vitamin C tablets (500 mg tablets) 1 daily for 2 weeks. In patients with nasal allergy, give chlorpheniramine maleate PO (4 mg tablet; 2 mg/5 mL syrup) for no more than 5 days.
 - Adults: 4 mg tablet 3–4 times/day but not to exceed 24mg/day
 - Children:
 - ◆ <1 year: Do not administer
 - ◆ 1–2 years: 1 mg (¼ tablet or 2.5 mL) two times/day
 - ◆ 2–5 years: 1 mg (¼ tablet or 2.5 mL) 3–4 times/day, not to exceed 6 mg/day
 - ◆ 6–12 years: 2 mg (½ tablet or 5 mL) 3–4 times/day, not to exceed 12 mg/day
 - Advise the patient to return to the clinic if earache, tenderness, or pain over sinuses develops or if cough or fever persists for longer than a week.

Referral

Level 1 facilities should refer patients in the following situations:

- If more severe symptoms develop, such as shaking chills, high fever ($>38.5^{\circ}\text{C}$), severe headache or neck stiffness, nausea, vomiting, difficulty breathing, or chest pain
- If the patient has a sore throat and a fever with no other cold symptoms (possible strep throat)
- If the patient experiences facial pain or yellowish-green drainage from the nose accompanied by a fever (possible sinusitis)

References

3.5 Influenza

Description

Influenza (commonly called *the flu*) is a contagious respiratory illness caused by respiratory viruses. It affects mainly the nose, throat, bronchi, and occasionally the lungs. It can cause mild to severe illness and at times can lead to death. Symptoms start 1–4 days after the virus enters the body, so persons with the flu can infect others as early as 1 day before developing symptoms and up to 5–7 days after becoming sick.

Causes and risk factors

The flu is caused by the influenza virus. People at risk include the following:

- Children <5 , but especially children <2 years old
- Adults ≥ 65 years of age
- People who have certain medical conditions, including—
 - Asthma
 - Neurological and neurodevelopmental conditions including disorders of the brain, spinal cord, peripheral nerve, and muscle such as cerebral palsy and epilepsy
 - Chronic lung disease such as chronic obstructive pulmonary disease (COPD) and cystic fibrosis
 - Heart disease such as congenital heart disease, congestive heart failure, and coronary artery disease
 - Blood disorders such as sickle cell disease
 - Endocrine disorders such as diabetes mellitus

- Kidney disorders
- Liver disorders
- Weakened immune systems due to disease or medication—including people with HIV and AIDS, or cancer, individuals on chronic steroids
- People who are morbidly obese (i.e., have a body mass index of >40)

Signs and symptoms

- Fever
- Tiredness
- Muscle aches (myalgia)
- Headache
- Runny or stuffy nose
- Nonproductive cough
- Sore throat
- Children may have difficulty feeding

Diagnosis

Based on clinical signs and symptoms

Management objectives

- Relieve symptoms
- Prevent complications

Nonpharmacological management

- Urge bed rest.
- Instruct the patient to drink plenty of water and other fluids.
- Encourage the patient to eat foods rich in vitamin C such as fruits and vegetables.
- Advise using salt water drops in the nostrils to clear mucus.
- Encourage the patient to maintain good hygiene practices by washing hands frequently with soap and water.
- Urge the patient to cover his or her mouth and nose when sneezing and coughing to reduce transmission.

Pharmacological management

- For pain and fever, give paracetamol PO (500 mg tablet; 120 mg/5 mL oral suspension). See table 3.5 for dosages.

Table 3.5. Paracetamol Dosages by Age for Management of Influenza

Age	Dosage (mg)	Quantity	Frequency	Duration
2-12 months	60	2.5 mL (½ tsp)	3 times/day	5 days
1-<5 years	120	5 mL (1 tsp)	3 times/day	5 days
5-8 years	240	10mL (2 tsp)	3 times/day	5 days
8-14 years	500	1 tablet	3 times/day	5 days
>14 years	1,000	2 tablets	3-4 times/day	5 days

OR

- Give second-line treatment: acetylsalicylic acid PO (300 mg and 500 mg tablets) 1-2 (300 mg tablets) or 1 (500 mg tablet) 3-4 times/day not to exceed 2 g/day.

Caution: Acetylsalicylic acid (aspirin) is not recommended for children <12 years old because of the risk of Reye's syndrome.

- Prescribe antibiotics only for patients who have a secondary bacterial infection or for patients with underlying heart or renal conditions.
 - Start with first-line antibiotic treatment: amoxicillin PO (250 mg and 500 mg tablets; 125 mg/5 mL suspension)
 - Adults: 3 g/day in 2-3 divided doses for 7 days.
 - Children: 100 mg/kg/day in 2 divided doses for 7 days
 - Reassess the patient after 5 days. If no improvement, refer the patient but advise continuation of medication until seen.

OR

- For penicillin-allergic patients, prescribe erythromycin, (125 mg/5 mL; 250 mg and 500 mg tablets) oral, 4 times/day for 10 days
 - Adults: 1 g (2-4 tablets) 2 times/day
 - Children
 - <1 year: 125 mg (5 mL or 1 tsp) 2 times/day
 - 1-5 years: 250 mg (10 mL or 2 tsp) 2 times/day
 - 6-12 years: 500 mg (2 tablets) 2 times/day
- Follow up. Advise the patient to return to the clinic if he or she has no improvement in 1 week.

Note: Patients who are at high risk of serious complications and who are likely to be exposed to others infected with influenza or who are themselves within the first 2 days of illness onset should be treated with antiviral medications. Refer.

Referral

- Patients with serious complications
- Patients needing antiviral medicines

Reference—48

3.6 Pneumonia

Description

Pneumonia is an inflammation of the pulmonary alveoli. It can be caused by a virus, bacteria, fungus, or parasite.

Causes and risk factors

- Typical causes of pneumonia
 - Viruses
 - Bacteria (*pneumococcus*, *Haemophilus influenzae*, *Mycoplasma pneumoniae*)
 - Fungus (*Cryptococcus*, histoplasmosis)
 - Parasite (*Pneumocystitis carinii* in HIV infected persons).
 - Chemical (gases, fumes, dust, aspiration)
- Persons at risk
 - Elderly
 - Immunocompromised persons (e.g., those with severe malnutrition, HIV infection with CD4<200 cells/mm³)
 - Persons having—
 - ◆ Heart failure
 - ◆ Sickle cell disease
 - ◆ Severe chronic bronchitis

Signs and symptoms

- Pneumonia in children <5 years
 - Difficulty with feeding
 - Chest indrawing

- Nasal flaring
 - Wheezing
 - Stridor in calm child
 - Fast RR
 - Fever
 - Tachycardia
- Pneumonia in children >5 years and adults
 - The patient often gives a history of having had a respiratory condition (nonproductive cough and low-grade fever) that got worse.
 - Cough, production of sputum (yellow, green, or bloody)
 - Fever
 - Chest pain during deep breathing and coughing
 - Rapid breathing may also be present
 - Anorexia
 - Sudden onset with high fever ($>39^{\circ}\text{C}$) pain in the chest and oral herpes are suggestive of pneumococcal infection. Symptoms may be confusing, particularly in children with abdominal pain, meningeal syndrome, or other conditions
 - In the elderly, the onset may be very gradual and may not suggest pneumonia at all. They may have very little cough, produce no sputum, and have no fever.
 - Signs of serious illness
 - Cyanosis
 - Nasal flaring
 - Intercostal or subclavial indrawing
 - Respiratory rate
 - ◆ Children <2 months: RR >60 breaths/minute
 - ◆ Children 2–11 months: RR >50 breaths/minute
 - ◆ Children 12–59 months: RR >40 breaths/minute
 - ◆ Adults: RR >30 breaths/minute
 - Heart rate more than 125 beats/minute
 - Altered level of consciousness (drowsiness, confusion)

Diagnosis

- On examination:
 - Decreased vesicular breath sound, localised crepitations, sometimes bronchial wheeze
 - Dullness on percussion
- Chest x-ray
- Sputum smear to exclude TB

Management objectives

Management is guided by the age of the patient, his or her health status, and the severity of the disease. In general, the objectives are to—

- Treat the fever
- Maintain an adequate level of oxygenation and hydration
- Treat the infection

Nonpharmacological management

- Encourage high oral fluid intake and nutrition. Use a nasogastric tube if necessary
- Provide oxygen at a rate of 1 L/minute
- In the elderly, encourage postural drainage

Pharmacological management

In the health centre or health post, follow these procedures.

- For all patients—
 - Clear nostrils if blocked with normal saline drops or Ringer's lactate.
 - For fever, give paracetamol (120 mg/5 mL and 500 mg tablets). See table 3.6 for dosages.
- In mild cases, give—
 - Benzylpenicillin procaine IM
 - ◆ Adults: 2 MIU 1–2 times/day for 5 days
 - ◆ Children: 100,000 IU/kg once daily for 5 days

OR

- Amoxicillin PO
 - ◆ Adults: 1 g 3 times/day for 5 days
 - ◆ Children: 100 mg/kg/day in 3 divided doses for 5 days

OR

Table 3.6. Paracetamol Dosages by Age and Weight for the Management of Pneumonia

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3-12	6-10 kg	60	2.5 mL (½ tsp)	3 times/day	5 days
1-5 years	10-18 kg	120	5 mL (1 tsp)	3 times/day	5 days
5-8 years	18-25 kg	240	10 mL (2 tsp) or ½ tablet	3-4 times/day	5 days
8-14 years	25-50 kg	500	1 tablet	4 times/day	5 days
>14 years	>50 kg and adults	1,000	2 tablets	4 times/day	5 days

- In penicillin-allergic patients, give erythromycin, PO (125 mg/5 mL; 250 mg and 500 mg tablets) 500 mg every 6 hours for 7 days
 - ◆ Adults: 500 mg every 6 hours for 7 days
 - ◆ Children
 - <1 year: 125 mg (5 mL or 1 tsp) 2 times/day for 7 days
 - 1-5 years: 250 mg (10 mL or 2 tsp) 2 times/day for 7 days
 - 6-12 years: 500 mg (2 tablets) 2 times/day for 7 days
- In mild cases if the patient has HIV and AIDS, give—
 - Co-trimoxazole tablet (800/160 mg) 2 tablets PO every 8 hours for 21 days.

OR

 - For sulfa-allergic patients, give clindamycin (50 mg, 300 mg tablets) 600 mg PO every 8 hours for 21 days

PLUS

 - Primaquine (7.5 mg, 15 mg tablets) 30 mg once daily for 21 days.

Note: In cases where the clinical presentation could be consistent with TB or PCP, start the patient on PCP treatment while 3 samples for AFB are obtained. If the samples are negative, continue with PCP treatment and monitor progress. If TB diagnosis is confirmed, change co-trimoxazole to 1 tablet daily and begin TB treatment. (See section 14.8, “Tuberculosis.”)

- In severe cases—
 - Hospitalize or refer to hospital
 - At the health centre level, give stat dose before transferring patient.

In the hospital, follow these procedures.

- Give benzylpenicillin procaine, benzylpencillin, and amoxicillin.
 - Adults
 - ◆ Benzylpenicillin procaine + benzylpencillin IM
 - 2 MIU 2 times/day for 2–3 days
 - Once fever or signs of severe illness disappeared switch to oral treatment
 - ◆ Amoxcillin PO 1 g, 3 times/day to complete 7 days of treatment
 - Children
 - ◆ Benzylpenicillin procaine + benzylpencillin IM
 - 100,000 IU/kg once daily for 2–3 days
 - Once fever or signs of severe illness disappears, switch to oral treatment
 - ◆ Amoxcillin PO 100 mg/kg/day in 3 divided doses to complete 7 days of treatment

OR

- Give ampicillin IV/IM (powder for injection 500 mg and 1 g)
 - Dosages—
 - ◆ Adults: 1 g 3 times/day by injection
 - ◆ Children: 100 mg/kg/day in 3 injections
 - Change to oral treatment once fever or signs of severe illness disappear.

OR

- For pencillin-allergic patients, give—
 - Erythromycin, PO (125 mg/5 mL; 250 mg and 500 mg tablets) 500 mg every 6 hours for 7 days
 - ◆ Adults: 500 mg every 6 hours for 7 days
 - ◆ Children
 - <1 year: 125 mg (5 mL or 1 tsp) 2 times/day for 7 days
 - 1–5 years: 250 mg (10 mL or 2 tsp) 2 times/day for 7 days
 - 6–12 years: 500 mg (2 tablets) 2 times/day for 7 days

OR

- Doxycycline (100 mg tablets). Adults and children >9 years (and >45 kg): 1 (100 mg) tablet 2 times/day for 7 days.

- If no response after 48 hours, administer chloramphenicol IM/IV
 - Dosages—
 - ◆ Adults: 1 g 3 times/day by injection for 2 to 3 days
 - ◆ Children: 100 mg/kg/day in 3 injections for 2 to 3 days
 - If the chloramphenicol fails to produce a favourable response then administer a ceftriaxone injection (125 mg, 500 mg, and 1 g) 1 g IM or slow IV (over 3 minutes) for 3 days followed by amoxicillin to complete 7 days of treatment.

Referral

- Elderly
- Signs of serious illness
- Presence of other underlying disease(s)
- Development of complications
- Nonresponsive to treatment after 48 hours
- No access to immediate transportation in case of sudden worsening of condition

References—1, 3, 8, 10

3.7 Sinusitis

Description

Acute sinusitis is a transient inflammation of the mucosal lining of one or more paranasal sinuses lasting <4 weeks. Although most cases of sinusitis involve more than one sinus, the maxillary sinus is most commonly involved. If unresolved, the condition can become chronic.

Note: Sinusitis is uncommon in children <5 years because the sinuses are not fully developed.

Causes

- Common infections: *pneumococcus*, *streptococcus*, *staphylococcus*, *E. coli*, and *H. influenza*. The most common causes are *H. influenza* in children <5 years and *pneumococci* in patients >5 years.
- Viral, bacterial, and sometimes fungal infection. The latter may be associated with immune deficiency.
- Allergy

- Rhinitis and nasal obstruction due to a foreign body
- Dental focal infections
- Swimming and diving

Signs and symptoms

- Facial pain above the eyes and in the brow or forehead area in frontal sinusitis; behind the cheekbones in maxillary; behind the bridge of the nose in ethmoidal sinusitis
- May also be accompanied by a discharge from the nostrils and into the throat. The discharge is yellow (contains pus) if the infection is bacterial and is clear if it is viral.
- Nasal blockage sometimes present
- Sneezing
- Reduced sense of smell
- Moderate fever
- Malaise
- On examination—
 - Pain on pressure over the forehead, under the border of the orbit or cheek
 - Purulent secretions in the nostrils and back of the throat and inflammation of the mucosa

Diagnosis

- Based on clinical signs and symptoms
- X-ray of the sinuses at the hospital level (not routinely recommended for the primary care level)

Management objectives

- Relieve congestion and improve sinus drainage
- Relieve pain and fever
- Treat bacterial or fungal infection, if present

Nonpharmacological management

- Inform the patient that the symptoms will resolve slowly but may persist for 2–3 weeks whether antibiotics are used or not. Complications are rare.
- Advise the use steam inhalations 2–3 times/day to help clear blocked nose.
- In case of allergies, remind the patient to avoid situations that trigger an attack.

Pharmacological management

- For mild sinusitis—
 - Advise 2 drops warm, 0.9% sodium chloride, or Ringer's lactate in each nostril 4 times/day to clear airway.
 - For relief of symptoms—
 - ◆ Give paracetamol (500 mg tablet) PO to relieve pain and fever. See table 3.7 for dosages.

Table 3.7. Paracetamol Dosages by Age and Weight for the Management of Sinusitis

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3-12 months	6-10 kg	60	2.5 mL (½ tsp)	3 times/day	5-7 days
1-5 years	10-18 kg	120	5 mL (1 tsp)	3 times/day	5-7 days
5-8 years	18-25 kg	240	10 mL (2 tsp) or ½ tablet	3 times/day	5-7 days
8-14 years	25-50 kg	500	1 tablet	3-4 times/day	5-7 days
>14 years	>50 kg and adults	1,000	2 tablets	3-4 times/day	5-7 days

- ◆ Give chlorpheniramine (4 mg tablet; syrup 2 mg/5 mL) PO if the sinusitis is associated with allergy.
 - Adults: 4 mg tablet 3-4 times/day but not to exceed 24 mg/day
 - Children: 2 mg/5 mL
 - <1 year: Do *not* administer.
 - 1-2 years: 1 mg (¼ tablet) or 2.5 mL (½ tsp) two times/day
 - 2-5 years: 1 mg (¼ tablet) or 2.5 mL (½ tsp) 3-4 times/day, not to exceed 6 mg/day
 - 6-12 years: 2 mg (½ tablet) or 5 mL (1 tsp) 3-4 times/day, not to exceed 12 mg/day
- For severe infections (i.e., patients with systemic illness or patients whose signs and symptoms worsen after 5-7 days), prescribe antibiotics—
 - First-line treatment: phenoxyethyl penicillin (250 mg tablet) or amoxicillin (250 mg, 500 mg tablets; 125 mg/5 mL suspension)
 - ◆ Adults: 1 tablet (500 mg) PO 3-4 times/day for 5-7 days

- ◆ Children: oral suspension 125 mg/5 mL
- ◆ <1 year: 2.5 mL (½ tsp; 62.5 mg) 3–4 times/day for 5–7 days
- ◆ 1–5 years: 5 mL (1 tsp) 3–4 times/day for 5–7 days
- ◆ >5 years: 1 tablet (500 mg) PO 3–4 times/day for 5–7 days

OR

- For penicillin-allergic patients, give—
 - ◆ Doxycycline (100 mg tablets)
 - Adults: 1 tablet twice/day for 7 days
 - Children >9 years (>45 kg): 1 (100 mg) tablet 2 times/day for 7 days

Note: Doxycycline is not recommended in children <9 yrs and 45 kg.

OR

- ◆ Erythromycin (250 mg and 500 mg tablets)
 - Adults: 500 mg 4 times/day for 7 days
 - Children: 250 mg 4 times/day for 7 days
 - <1 year: 125 mg (5 mL or 1 tsp) 2 times/day for 7 days
 - 1–5 years: 250 mg (10 mL or 2 tsp) 2 times/day for 7 days
 - 6–12 years: 500 mg (2 tablets) 2 times/day for 7 days

Referral

- Fever lasting >48 hours
- Unilateral signs (e.g., unilateral polyp or mass)
- Bleeding
- Diplopia or proptosis (i.e., double vision)
- Maxillary paraesthesia
- Orbital swelling or erythema
- Suspicion of intracranial or intraorbital complication
- Immunocompromised patient
- Dental focus of infection
- Recurrent sinusitis
- Severe signs and symptoms for >7–10 days

References—8, 10, 49, 50, 51

4. Ears, Nose, and Throat

4.1 Ear Disorders

4.1.1 Foreign Body in the Ear

Description

A foreign body in the ear can be any small object that is inserted in the ear canal, usually by the patient. It is relatively common and is seen most often, but not exclusively, in children. The foreign object may also be a small insect that has crawled into and irritated the external auditory canal.

Causes and risk factors

- In small children, common objects include—
 - Beads, toy pieces, and ornament pieces
 - Small seeds, peas, peanuts, raisins
- In adults, the foreign object is usually a cotton swab.
- Infected ears encourage flies to lay eggs (maggots) on the pus that comes out of the ear canal.

Signs and symptoms

- Children, depending on age, may be able to indicate that they have a foreign body in the ear.
- Patients may present with complaints of ear pain or discharge from the ear.
- Patients may complain of nausea or vomiting if a live insect is in the ear canal.
- Patients may complain of hearing loss.

Diagnosis

Diagnosis is made mainly on physical examination, and physical findings vary according to the object and length of time it has been in the ear

- When an object has been in the ear a very short time, there is usually no abnormal finding other than the object itself seen on direct visualization or otoscopic examination.
- Pain or bleeding may be present with sharp objects that bruise the ear

canal or rupture the tympanic membrane or from the patient's attempts to remove the object.

- Redness and swelling of the canal and a foul-smelling discharge may be present.

Management objective

Safe removal of the object without causing any harm

Nonpharmacological management

- Foreign body removal is made easier if the external auditory canal is made straight. This can be done in children by pulling the pinna from its lobe in the direction down, out, and laterally, and in adults by pulling the pinna from its top in the direction up, out, and laterally. Shake the head with the affected ear turned downwards.
- In adults—
 - Small aural forceps can remove most foreign bodies.
 - Small pieces or objects can be taken out by aural syringing. Syringing should be done only when you can see that the eardrum is intact.
- In children—

Note: Never attempt foreign object removal on an uncooperative child.

 - Hold the child firmly, in a sitting position, in the lap of an attendant.
 - For a small round foreign body, syringing is the safest, easiest, and least traumatic procedure.
 - For other objects, either use fine aural forceps or the ring of a Jobson probe to hook it out by going beyond it and then pulling it out. This should be done by someone who has experience or in the operating theatre.
- Methods of removal—
 - Irrigation with water is the simplest method of foreign body removal, provided it is not tightly wedged or the tympanic membrane is not perforated. Tap water or normal saline at body temperature can be used.
 - Note:** Irrigation with water is contraindicated for vegetable objects, organic matter, or seeds, which may swell if exposed to water.
 - Removal of live insects
 - ◆ Patients in extreme distress secondary to an insect in the ear require prompt attention.

- ◆ The insect should be killed prior to removal, using mineral oil, lidocaine hydrochloride (2%), or cooled boiled tap water.
- Note:** Do *not* use hydrogen peroxide.
- ◆ Remove the insect carefully with crocodile forceps under direct vision and *only* when the patient cooperates fully.
- ◆ If removal was successful, check whether eardrum is intact, and check for infection.
- Removal of the foreign body in a theatre under general anaesthetic is sometimes required.

Referral

In these situations, general anaesthesia may be required:

- The patient is uncooperative, making removal of the object difficult.
- The foreign body is deep in the ear canal.
- Eardrum perforation is evident or suspected.
- The patient has severe pain due to associated inflammation and oedema.

References—3, 52, 53, 54, 55

4.1.2 Impacted Wax in the Ear

Description

Wax is a natural product of the sebaceous and sweat glands of the skin lining the external auditory canal mixed with the epithelial desquamated layer of the skin. It protects the skin of the human ear canal, assists in cleaning and lubrication, and also provides some protection from bacteria, fungi, insects, and water. The ear canals are self-cleaning. In some persons, wax is secreted more and gets collected, which requires cleaning. Impaction is, therefore, a collection of ear wax to an extent of causing ear canal blockage.

Causes and risk factors

- Enthusiastic, unnecessary cleaning of the ear
- Pushing wax deeper into the ear with swabs, cotton wool, sticks, or other items

Signs and symptoms

- Having increasing difficulty hearing
- Pain in the ear(s)

- Hearing a noise or ringing in the ear(s) (i.e., tinnitus)
- An awareness of something blocking the ear(s)
- Temporary deafness after swimming or having a shower
- Pain or itchiness due to infection from bacteria trapped in the ear; infection can lead to otitis externa. (See section 4.1.3, “Otitis Externa.”)

Diagnosis

Direct vision using a torchlight or an otoscope

Management objectives

- Soften the wax making it easier to remove
- Remove wax from the ear

Nonpharmacological management

For soft wax (coloured light to deep brown), syringing is the easiest and least painful method.

- Use a 10 or 20 mL syringe if an ear syringe is not available.
- Use water or normal saline, a sodium bicarbonate solution, or a solution of water and vinegar. Warm these to body temperature before use.
- Use a kidney dish for collecting the water that will be coming out of the ear after syringing.
- Do not insert the syringe too far into the ear canal causing obstruction. Leave space so that injected water can run out.
- Inject water upwards and backwards slowly.
- Re-examine frequently.

Caution: Do not syringe the ear if—

- The patient has severe pain (usually due to otitis media, otitis externa, or impaction of the wax onto the eardrum).
 - Eardrum is perforated.
-

For hard, dry wax, use a wax softener such as olive oil, almond oil, mineral oil, baby oil, or various other organic liquids (glycerine solution) 2–3 times/day for 3–5 days.

- Advise the patient to—
 - Tilt his or her head or lie with the affected ear up while the drops are instilled.
 - Stay in that position for 2–3 minutes.

- Lie with the ear down to drain out the oil.
- The action of chewing gum helps move the wax.
- Try syringing again next day.
- If the wax is very impacted, instil softener every 2 hours for 7–10 days.

Note: Do not use hydrogen peroxide or swab to remove wax. Ear cleaning swabs are useful only if wax is at the external meatus.

Pharmacological management

Medications are necessary only in the presence of associated infection. If otitis externa is present, treat before attempting wax removal. (See section 4.1.3, “Otitis Externa.”) An associated URTI causing otitis media should also be treated first before wax removal. (See chapter 3, “Respiratory System” and section 4.1.4, “Otitis Media.”)

Referral

- Treatment failure
- Persistent or severe earache

References—3, 54, 56, 57

4.1.3 Otitis Externa

Description

Otitis externa is an inflammation of the external auditory meatus (i.e., the skin lining the outer ear), and it can become chronic. It is caused by infection, usually bacterial, although sometimes fungal, but it may also be associated with various noninfectious systemic or local skin conditions. It is occasionally due to a foreign body in the ear canal.

Causes and risk factors

- Trauma (i.e., scratching, cleaning with sticks, cotton ear buds)
- Bacterial infection secondary to scratching
- Virus infections such as herpes simplex
- Foreign substances (e.g., cottonwool, stones, insects, seeds)
- Moisture in the ear (e.g., shampoo, soap, contaminated swimming pool water)
- Fungal infections, especially in diabetes mellitus
- Inappropriate use of antibiotic ear drops
- Allergic conditions such as dermatitis, eczema

Signs and symptoms

- Ear discomfort that can range from itching to severe pain especially when chewing
- A scant white discharge in or flowing from the ear canal
- Tenderness when touching or pulling the pinna
- Hearing loss (i.e., ear feels blocked)
- Examination with an otoscope generally reveals—
 - Inflammation and swelling of the canal
 - The tympanic membrane may be normal or slightly inflamed, if visible. If not visible, use a cotton swab to gently clean secretions from the external auditory canal. **Note:** Stop if it is very painful.
- Examine for the presence of a foreign body.

Diagnosis

The diagnosis is based on the clinical signs and symptoms. There is no diagnostic test to confirm diagnosis.

Management objectives

- Relieve symptoms
- Prevent complications such as mastoiditis

Nonpharmacological management

- Clean the canal to remove debris to make topical treatment easier.
- For inflammation, use 2% acetic acid or Ringer's lactate: 3 drops QID for 5–7 days or 3 days after cessation of symptoms; more severe infections may require 10–14 days.
- Patient should not participate in water sports for at least 2–3 weeks.
- If foreign body is present, remove it.

Pharmacological management

- Give neomycin otic suspension with hydrocortisone: 2 drops QID for 5–7 days or for 3 days after cessation of symptoms; more severe infections may require 10–14 days.
- For pain—
 - Give ibuprofen (200, 400, and 600 mg tablets; 100 mg/5 mL suspension)
 - ◆ Adults: 200–400 mg 4–6 times/day depending on severity of pain

OR

- Give paracetamol PO (500 mg tablets; 120 mg/5 mL oral suspension).
See table 4.1.3 for dosages.

Table 4.1.3. Paracetamol Dosages by Age and Weight for the Management of Otitis Externa

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3-12 months	6-10 kg	60	2.5 mL (½ tsp)	3 times/day	5-7 days
1-5 years	10-18 kg	120	5 mL (1 tsp)	3 times/day	5-7 days
5-8 years	18-25 kg	240	10 mL (2 tsp) or ½ tablet	3 times/day	5-7 days
8-14 years	25-50 kg	500	1 tablet	3-4 times/day	5-7 days
>14 years	>50 kg and adults	1,000	2 tablets	3-4 times/day	5-7 days

OR

- Give acetylsalicylic acid PO (300 mg and 500 mg tablets). Adults: 300–500 mg every 4–6 hours PRN.

Caution: Acetylsalicylic acid (aspirin) is not recommended for children <12 years old because of the risk of Reye's syndrome.

- Antimicrobial therapy should not be used unless there is extension outside the ear canal or the presence of specific host factors such as diabetes or immune deficiency that would indicate a need for systemic therapy. When the ear canal is obstructed, delivery of topical preparations should be enhanced by aural toilet, placement of a wick (only if swelling is severe), or both.
 - If symptoms persist for 3 days, ask patient to return to be re-evaluated. The patient may need to be placed on systemic antibiotic:
 - Give cloxacillin (250 mg and 500 mg tablets)
 - Adults: 500 mg 4 times/day for 7 days
 - Children >20 kg: 250 mg 4 times/day for 7 days

OR

- Give amoxicillin-clavulanate (125 mg + 31 mg/5 mL) or amoxicillin-clavulanate(amoxicillin 500 mg/clavulanate 125 mg tablet)
 - ◆ Adults: (500 mg +125 mg tablet) 1 tablet 2 times/day for 10 days
 - ◆ Children: 90 mg + 6.4 mg/kg/day in 2 divided doses for 10 days

Referral

- If there is no response to treatment within 4 days or if getting worse
 - Extension of disease outside the ear canal

References—1, 3, 10, 58, 59, 60

4.1.4 Otitis Media

Description

Otitis media is an infection of the middle ear that can result from dysfunction of the eustachian tube in association with a number of illnesses including URIs and chronic rhinosinusitis. There are two types, acute and chronic. If left untreated, acute otitis media can lead to mastoiditis or become chronic. (See section 4.1.5, “Chronic Otitis Media.”)

Causes

- Viral infection of upper respiratory tract (e.g., rhinitis, common cold)
- Bacterial infections (e.g., *streptococcus*, *H. influenza*)
- Chronic allergy
- Chronic enlargement of tonsils or adenoids

Signs and symptoms

Commonly, the patient presents with signs of an upper respiratory illness a few days before presenting with an ear infection. Other signs and symptoms are the following:

- In adults—
 - Fever
 - Pain in ear
 - Headache
 - Malaise, weakness
- In children<3 years—
 - Irritability
 - Waking at night

- High fever
- Poor feeding
- Runny nose
- Problems with balance
- Hearing loss
- Acutely painful ear
- In children ≥ 3 years and older—
 - Acutely painful ear
 - Drainage from ear
 - Hearing loss
 - Ear popping
 - Ear fullness
 - Dizziness

Diagnosis

Examination with otoscope reveals middle ear effusion. In a bacterial infection, the tympanic membrane can also be inflamed with symptoms as stated above.

Management objectives

- Prevent complications
- Control pain and inflammation

Nonpharmacological management

Clear the nose as for rhinitis with 0.9% sodium chloride or Ringer's lactate.

Pharmacological management

- Treat fever with paracetamol or aspirin.
 - Give paracetamol (500 mg tablets; 120 mg/5 mL suspension). See table 4.1.4 for dosages.

OR

- Give acetylsalicylic acid PO (300 mg and 500 mg tablets). Adults: 1–3 g/day in 3 or 4 divided doses.

Caution: Acetylsalicylic acid (aspirin) is not recommended for children <12 years old because of the risk of Reye's syndrome.

Table 4.1.4. Paracetamol Dosages by Age and Weight for Management for Otitis Media

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3–12 months	6–10 kg	60	2.5 mL (½ tsp)	3 times/day	5–7 days
1–5 years	10–18 kg	120	5 mL (1 tsp)	3 times/day	5–7 days
5–8 years	18–25 kg	240	10 mL (2 tsp) or ½ tablet	3 times/day	5–7 days
8–14 years	25–50 kg	500	1 tablet	3–4 times/day	5–7 days
>14 years	>50 kg and adults	1,000	2 tablets	3–4 times/day	5–7 days

- Provide antibiotic treatment.
 - For all children <6 months of age—
 - ◆ First-line: give amoxicillin orally at 80–90 mg/kg/day in 2–3 divided doses for 5–7 days, extending to 10 days in case of complications.
 - OR**
 - ◆ In penicillin-allergic children, use erythromycin PO (125/5 mL) 30–50 mg/kg in 2–3 divided doses for 10 days.
 - ◆ If there is no response in 48 hours, health care workers at level 2 should refer the patient to the district hospital. At the hospital, give ceftriaxone IM (125 mg, 500 mg, and 1 g) 50 mg/kg daily for 3 days.
 - In children >6 months of age, the cause is usually viral. Prescribe an analgesic only. If possible, re-examine 3 days after the initial visit.
 - ◆ If it is not possible to re-examine in 3 days or if the fever and pain continue despite the analgesic, provide antibiotics as above.
 - ◆ If child has fever >39°C, moderate or severe pain, or both, prescribe antibiotics as above.
 - ◆ If there is treatment failure at 48–72 hours with first-line antibacterial agents, prescribe amoxicillin-clavulanate (125 mg + 31 mg/5 mL) 90 mg/kg of amoxicillin component and 6.4 mg/kg/day of clavulanate in 2 divided doses for 10 days.
 - OR**
 - ◆ In penicillin-allergic patients, give ceftriaxone 50 mg/kg/day IM or IV once a day for 3 days.

- In adults—
 - First line: give amoxicillin PO (250 mg, 500 mg tablets) 500 mg orally 3 times day for 10 days.
 - ◆ For treatment failure, give amoxicillin-clavulanate (amoxicillin 500 mg/clavulanate 125 mg tablet) 2 times/day for 10 days.
- OR**
- ◆ For penicillin-allergic adults, give—
 - Doxycycline (100 mg tablets) 1 tablet twice/day for 7 days
- OR**
- Erythromycin (250 mg and 500 mg tablets): 500 mg 4 times/day for 7 days
- Watch for the following complications:
 - Acute mastoiditis
 - Meningitis (see section 16.4.2, “Meningitis”)
 - Subdural or extradural abscess
 - Brain or neck abscess

Referral

- Failure to respond to treatment after 2 weeks
- Severe fever, vomiting, and drowsiness in children
- Swelling over mastoid area
- Facial palsy or neurological signs
- Stiffness of the neck
- Perforated tympanic membrane
- Suppurative otitis media

References—1, 3, 10, 61

4.1.5 Chronic Otitis Media

Description

Chronic otitis media is characterized by persistent or recurrent serous or purulent discharge from the ear due to chronic infection to the middle ear. A purulent discharge is associated with perforation of the tympanic membrane. It may lead to hearing loss due to secondary infections.

Causes

- Failed treatment for otitis media
- Perforated eardrum

Signs and symptoms

- Chronically draining ear (>2 weeks)
- History of recurrent acute otitis media
- Traumatic perforation of eardrum
- Usually pain or discomfort
- Hearing loss in the affected ear (common)

Diagnosis

Diagnosis is made from the signs and symptoms.

- The external auditory canal may possibly be oedematous and usually is not tender.
- The discharge varies from fetid and purulent to clear and serous.
- Granulation tissue is often seen in the medial canal or middle ear space.
- The middle ear mucosa seen through the perforation may be oedematous or even polypoid, pale, or erythematous.

Management objectives

- Relieve the symptoms—pain, if present, and persistent discharge
- Keep the ear dry
- Eradicate infection and close the tympanic perforation to prevent complications such as deafness or mastoiditis

Nonpharmacological management

- Use a syringe to aspirate the pus to restore drainage.
- Insert a small amount cotton wool or a cotton wick into the ear to absorb the discharge. Change cotton 3–4 times/day until the discharge has stopped.

Pharmacological management

- Treat pain. Give paracetamol PO (100 mg and 500 mg tablets; 120 mg/5 mL oral suspension). See table 4.1.5 for dosages.
- Instil chloramphenicol ear drops 2 drops twice/day until pus dries up (approximately 5–7 days).

Table 4.1.5 Paracetamol Dosages by Age and Weight for Management of Chronic Otitis Media

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3-12 months	6-10 kg	60	2.5 mL (½ tsp)	3 times/day	5-7 days
1-5 years	10-18 kg	120	5 mL (1 tsp)	3 times/day	5-7 days
5-8 years	18-25 kg	240	10 mL (2 tsp) or ½ tablet	3 times/day	5-7 days
8-14 years	25-50 kg	500	1 tablet	3-4 times/day	5-7 days
>14 years	>50 kg and adults	1,000	2 tablets	3-4 times/day	5-7 days

Referral

- If pain and fever persist despite local treatment, the level 1 health care worker should refer the patient to the next level facility, and treat as acute otitis media.(See section 4.1.4, “Otitis Media.”)
- Refer the following:
 - All sick children (i.e., those who are vomiting, drowsy, and showing symptoms of more serious illness)
 - Patients who have painful swelling behind the ear
 - Patients who have a large central perforation
 - Patients who show no improvement after 1 week

References—8, 10, 62, 63

4.1.6 Hearing Loss

Description

Hearing loss is a symptom of an underlying disease or condition. It can result from disorders of the auricle, external auditory canal, middle ear, inner ear, or central auditory canal. It can occur gradually with age (i.e., presbycusis). Heredity and exposure to loud noises are the main factors that contribute to hearing loss over time. It may also be secondary to the causes listed below.

Causes

- Conductive hearing loss (i.e., obstruction of external auditory canal)—
 - Impacted wax in the ear (see section 4.1.2, “Impacted Ear Wax in the Ear”)
 - Foreign body in ear canal (see section 4.1.1, “Foreign Body in the Ear”)
 - Perforation of tympanic membrane
 - Otitis externa (see sections 4.1.4, “Otitis Media” and 4.1.5, “Chronic Otitis Media”)
- Sensorineural hearing loss—
 - Aging (most common)
 - Intense noise
 - Meningitis (see section 16.4.2, “Meningitis”)
 - Otitis media with perforation
 - Trauma (head injury)
 - Congenital—genetics, maternal diabetes
 - Pre- and postnatal infections (e.g., rubella)

Signs and symptoms

- Muffling of speech and other sounds
- Difficulty understanding words, especially against background noise or in a crowd of people
- Frequently asking others to speak more slowly, clearly, and loudly
- Needing to turn up the volume of the television or radio
- Tinnitus—the perception of a sound (buzzing, roaring, or ringing) when none is there

Diagnosis

- Diagnosis can be made from the history (i.e., duration, uni- or bilateral, nature of onset, rate of progression, and signs and symptoms)
- Tuning fork test—
 - Ability to hear by air conduction and by bone conduction
 - Identifying hearing in ears with stem of vibration tuning fork in mid-forehead

Management objective

Improve hearing

Nonpharmacological management

- Advise patients to—
 - Protect their ears in workplaces that have high noise levels.
 - Avoid listening to extremely loud music for long periods of time.
- If the hearing loss is due to a blockage, treat the underlying cause.
- Encourage yearly monitoring of hearing.

Pharmacological management

- Only necessary if the hearing loss is due to an underlying infection
- See appropriate disease section.

Referral

- If underlying disease is suspected
- If hearing loss is considered to be irreversible
- For screening of hearing

References—1, 3

4.2 Nose and Paranasal Sinus

4.2.1 Nasal Obstruction

Description

Nasal obstruction is the blockage of air flow through the nostrils.

Causes

- Mechanical
 - Septal abnormality (e.g., deviation, haematoma, abscess)
 - Intranasal mass (e.g., foreign body, tumour)
- Mucosal
 - Infection
 - Allergic

4.2.1.1 Foreign Body in the Nose

Occasionally, an object is put into the nose, where it may become stuck. This occurs most often among children. Common objects include beads, seeds, small toy batteries or toy pieces, and sponge pieces. This may occur in one or both nostrils.

Signs and symptoms

- Signs and symptoms may include the following:
 - Difficulty breathing through the clogged nostril
 - Feeling pain or irritation with the sensation of something in the nostril
 - Discharge from one nostril, which may become foul-smelling and mucopurulent and sometimes blood stained if the object has been left in the nostril a long time
 - Sneezing
 - Tears
- Usually noticed by parents (in infants)

Diagnosis

- Diagnosis is normally made from medical history and physical examination.
- Examine the nostrils using a lighted instrument.

Management objective

Removal of the foreign body without making the situation worse

Nonpharmacological management

In a cooperative patient—

- Gently press the unaffected nostril closed, and encourage or instruct the child (if older) to blow the nose forcibly. Avoid blowing the nose too hard or repeatedly.
- Sponge or paper pieces can be pulled out by a small artery or tooth dissecting forceps.
- A round body or deeper situated foreign body, only if it is clearly visible, should be hooked out by putting a blunt hook or a curved artery forceps behind and beyond the foreign body and then pulling it out along the floor of the nostril.
- Avoid the following when trying to remove a foreign body from the nose:
 - Grasping the object with tweezers or other tools, which can harm the nose
 - Squeezing or manipulating the nostrils

Caution: Do not attempt to remove an object that is not easy to see and grasp. Doing so can push the object farther up the nose.

Caution: Do not try to push a foreign object back in nasopharynx. If the child is uncooperative or is bleeding, the foreign body is not seen, or the area is very infected, then it is better for the obstruction to be removed under general anaesthetic.

- Post-extraction bleeding is controlled by giving decongestant nasal drops or putting adrenaline cotton pack in the nose for 10 minutes.

Pharmacological management

- Antibiotics should be used only if there is evidence of an infection.
- Give amoxicillin (250 mg, 500 mg tablets). Adults: 500 mg 3 times/day for 5 days.
- Children: 100 mg/kg/day in 3 divided doses for 5 days
- In penicillin-allergic patients, erythromycin (250 mg, 500 mg tablets; 125 mg/5 mL suspension).

Table 4.2.1.1 Erythromycin Dosages by Age and Weight for Management of Infection caused by Foreign Body in Nose

Age	Dose (mg)	Quantity	Frequency
<1 year	125	5 mL (1 tsp)	Every 6 hours
1–5 years	250	10 mL (2 tsp)	Every 6 hours
6–12 years	500	1–2 tablets	Every 6 hours
Adults	1,000	2–4 tablets	Every 6 hours

Referral

Foreign body difficult to see or too far back to remove without making situation worse

References—64, 65, 66, 67

4.2.1.2 Nasal and Sinus Infections

4.2.1.2.1 Rhinitis and Rhinopharyngitis

Description

Rhinitis and rhinopharyngitis are infections of the nasal or pharyngeal mucosa, which occur with seasonal variation and are more frequent in cold and rainy seasons. They can be complicated by a secondary bacterial infection.

Causes and risk factors

- Most frequently due to viral infections
- May be bacterial, which may be secondary (e.g., *streptococcus*, *staphylococcus*, *H. influenza*)

Signs and symptoms

They are characterized by recurrent episodes of—

- Blocked stuffy nose
- Watery nasal discharge, which may be accompanied by a sore throat, cough, fever, and diarrhoea in infants
- Frequent sneezing, often accompanied by nasal itching and irritation
- Conjunctival itching and watering
- Mouth breathing
- Snoring at night

Note: Nasal obstruction may make breathing and breastfeeding difficult and may be the early symptoms of measles, influenza, or another disease. The condition may become secondarily infected or complicated by otitis media and acute sinusitis in children <5 years.

Diagnosis

- Made on history and signs and symptoms
- In recurrent infections, consider allergies, iron deficiency, and exposure to tobacco smoke.

Management objectives

- Achieve and maintain maximum relief
- Prevent recurrent attacks
- Provide symptomatic relief

Nonpharmacological management

- Advise the patient to—
 - Clear nasal cavities twice daily to remove crusts.
 - Syringe nose with warm 0.9% sodium chloride or Ringer's lactate 4 times/day to clear airway. (A homemade saltwater solution can be prepared by mixing 5 mL of salt in 250 mL of warm water.)
 - Avoid allergens and irritants.
 - Use steam inhalations when necessary.
 - Get bed rest if feverish.
 - Ensure plenty of oral fluids.
- Advise patient to return to the clinic if he or she develops an earache or tenderness or pain over the sinuses and if the cough or fever persists for longer than a week.

Pharmacological management

- To relieve pain and fever, give paracetamol PO (100 mg or 500 mg tablets; 120 mg/5 mL oral suspension). See table 4.2.1.2.1 for dosages.
- For allergic rhinitis only, see section 4.2.1.2.2, "Allergic Rhinitis."

References—8, 10

Table 4.2.1.2.1. Paracetamol Dosages by Weight and Age for the Management of Rhinitis and Rhinopharyngitis

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3–12 months	6–10 kg	0	2.5 mL (½ tsp)	3 times/day	5–7 days
1–5 years	10–18 kg	120	5 mL (1 tsp)	3 times/day	5–7 days
5–8 years	18–25 kg	240	10 mL (2 tsp) or ½ tablet	3 times/day	5–7 days
8–14 years	25–50 kg	500	1 tablet	3–4 times/day	5–7 days
>14 years	>50 kg and adults	1,000	2 tablets	3–4 times/day	5–7 days

4.2.1.2.2 Allergic Rhinitis

Description

Allergic rhinitis is an inflammation of the nasal passages, usually associated with watery nasal discharge and itching of the nose and eyes.

Classification

- Intermittent (seasonal), mild, moderate, or severe, and caused by inhalants such as tree pollen, grass, or moulds
- Persistent, mild, moderate, or severe and caused by house dust mites, animal dander, cockroaches or food

Causes and risk factors

- Allergic rhinitis usually occurs after exposure to dust or certain seasonal pollens in people who are allergic to these substances.
- Patient usually has a history of other allergic manifestations.

Signs and symptoms

- Sneezing, nasal discharge, and obstruction of the nasal passages
- Conjunctival, nasal, and pharyngeal itching
- Conjunctiva congested and oedematous

Diagnosis

Diagnosis depends largely on accurate history of occurrences and association with allergens

Management objectives

- Relieve the symptoms
- Avoid contact with the triggering antigen

Pharmacological management

- Identify and avoid allergen.
- If conjunctivitis is present, clean eyes 4–6 times/day with previously boiled water cooled to room temperature or sterile 0.9% sodium chloride solution. (See section 5.1.1, “Conjunctivitis.”)

Provide symptomatic treatment only—

- Give chlorpheniramine oral (4 mg tablets; 2 mg/5 mL syrup) every 4–6 hours for about 3–5 days
 - Adults: 4 mg tablet 4–6 times/day, not to exceed 24 mg/day
 - Children:
 - ◆ 2–5 years 1 mg (2.5 mL or $\frac{1}{2}$ tsp) syrup 4–6 times/day, not to exceed 6 mg/day
 - ◆ 6–12 years: 2 mg ($\frac{1}{2}$ tablet or 5 mL [1 tsp] syrup) 4–6 times/day, not to exceed 12 mg/day

OR

- Give loratadine tablet or syrup.
 - Children 2–5 years (syrup): 5 mg once daily
 - Children \geq 6 years and adults (tablet): 10 mg daily for 3–5 days

References—1, 3, 8, 10, 68

4.2.2 Epistaxis (Nose Bleed)

Description

Epistaxis is bleeding from the nose. The rupture may be spontaneous or as a result of trauma. There are two types: anterior (the most common), which is most often seen in children, and posterior (less common but more likely to require medical attention), which is more often seen in adults. Epistaxis is seen more often in children $<$ 10 years and adults $>$ 50 years of age. It appears to occur more often in males.

Causes and risk factors

- Idiopathic: commonest cause
- Rupture of a blood vessel within the nasal mucosa

- Nose picking over the septum (common in children)
- Severe bleeding is usually associated with trauma
- Benign or malignant tumours of the nose, sinuses, or nasopharynx,
- Systemic diseases such as—
 - Hypertension
 - Polyps
 - Cirrhosis
- Blood dyscrasias (e.g., bleeding disorders such as sickle cell, haemophilia, and coagulation factors; blood cancer [i.e., leukaemia])
- Use of blood-thinning medicines such as aspirin or warfarin; immunosuppressive medicines
- Vitamin C or vitamin K deficiency

Signs and symptoms

- The patient often has a history of bleeding from the nostrils.
- The physical examination may reveal a bleeding point on the nasal septum.
- If nothing is visible anteriorly, examine the pharyngeal area.
- Diffuse oozing of blood, recurrent episodes, or multiple bleeding points may indicate a systemic cause.
- Check the skin for signs of bruising.

Diagnosis

- A careful history and physical examination generally determine the cause of the bleeding.
- If a systemic cause suspected, carry out the following:
 - CBC, platelets, prothrombin time, partial thromboplastin time, bleeding time, clotting time, and peripheral smear cell morphology.
 - Radiology
 - Biopsy for tumours in a guarded condition. Note: This procedure must be done at the hospital level.

Management objectives

- Determine cause of bleeding
- Stop the bleeding

Nonpharmacological management

- Reassure the patient.
- Advise the patient to sit with head forward and slightly down to prevent bleeding into the pharynx.
- Nasal bleeding usually responds to first-aid measures such as compression. Apply direct pressure by squeezing the nostrils for 5–10 minutes. Do not let go to check in between. In some cases, pressure may need to be applied for up to 30 minutes.
- Instruct the patient not to blow his or her nose.
- In adults, placing an icepack on the forehead may be helpful.
- When epistaxis does not respond to simple measures, the source of the bleeding should be located and treated appropriately.

Pharmacological management

- In nonemergencies—
 - Reassure the patient.
 - If direct pressure is not sufficient, gauze moistened with epinephrine at a ratio of 1:10,000 or phenylephrine (Neo-Synephrine®) may be placed in the affected nostril to help vasoconstrict and stop bleeding.

OR

 - For a mild bleed, put an adrenaline swab in the affected nostril and apply continuous pressure to the nostril for at least 5 minutes. Have the patient tilt the head forward while this is being done.

Caution: Do not use an adrenaline swab in hypertensive patients. Use paraffin-soaked gauze instead.

 - After 10 minutes, remove the swab and look for any bleeding point.
 - ◆ If a bleeding point seen, cauterise it with a silver nitrate stick after applying a local anaesthetic (4% xylocaine) topically.
 - ◆ An oozing point may need diathermy coagulation.
 - ◆ If no bleeding point seen, then investigate.- In emergencies—
 - In severe or profuse bleeding, the patient may also be in shock, so treat simultaneously on principles of ABC (airway, breathing, circulation), and do nasal packing with antibiotic-soaked (e.g., Neosporin® triple antibiotic ointment) ribbon gauze for 48–72 hours.

- Give systemic antibiotics:
 - ◆ Amoxicillin PO (250 mg and 500 mg tablets; 125 mg/5 mL suspension)
 - Adults: 1 g twice/day for 6 days
 - Children: 50 mg/kg/day in 2 divided doses for 6 days

Note: Macrolides resistance develops fast and frequently, so use it only in penicillin-allergic patients.

OR

- ◆ For penicillin-allergic patients, erythromycin PO (250 mg and 500 mg tablets; 125 mg/5 mL)
 - Adults: 1 g (two 500 mg tablets) 2–3 times/day for 10 days
 - Children: 30–50 mg/kg in 2 to 3 divided doses for 10 days
- Any associated conditions (e.g., hypertension, bleeding disorder, or shock) should be treated simultaneously.

Referral

- Uncontrolled bleeding—the patient needs hospitalisation because postnasal packing or ligature of the bleeding vessel may be required
- Vital signs decompensate
- Bleeding recurs
- Suspected underlying systemic condition

References—3, 69, 70, 71

4.3 Throat Disorders

4.3.1 Tonsillitis

Description

Tonsillitis is a condition caused by the inflammation of the tonsils, secondary to viral or bacterial infection. It is common in children and young people but can occur at any age. It is spread by airborne droplets, hand-to-hand contact, and kissing. Untreated streptococcal infection can go on to cause an abscess, acute rheumatic fever, or acute glomerulonephritis.

Causes

- Streptococcal bacterial infection—major cause; must be treated to prevent complications
- Many different viral infections, often those associated with the common cold, influenza, and nasal infections
- Infectious mononucleosis
- Diphtheria

Signs and symptoms

- Sore throat with pain; pain may radiate to the ear
- Difficulty while swallowing (i.e., dysphagia)
- Loss of voice or hoarseness
- Swollen, inflamed tonsils with white patches (i.e., follicles)
- Tender, enlarged cervical lymph nodes
- Often associated with sudden onset of fever
- Breath may be foul smelling

Diagnosis

- Do a visual inspection of the throat using a torch and tongue depressor
- Suspect streptococcal tonsillitis if the patient has no hoarseness, watery nasal discharge, or conjunctivitis.

Management objectives

- Alleviate the symptoms
- Eradicate the infection completely
- Prevent cardiac and renal complications
- Prevent development of a peri-tonsillar abscess

Nonpharmacological management

- Keep the patient warm.
- Advise the patient to gargle or use throat lozenges to ease the pain on swallowing. Gargle with homemade salt mouthwash (2.5 mL [$\frac{1}{2}$ tsp] of table salt in a glass of lukewarm water) for 1 minute twice daily.
- Advise the patient to eat soft or liquid foods.

Pharmacological management

- Give paracetamol PO (100 mg or 500 mg tablets; 120 mg/5 mL oral suspension) for fever and pain. See table 4.3.1A for dosages.

Table 4.3.1A. Paracetamol Dosages by Age and Weight for the Management of Tonsillitis

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3–12 months	6–10 kg	60	2.5 mL ($\frac{1}{2}$ tsp)	3 times/day	5–7 days
1–5 years	10–18 kg	120	5 mL (1 tsp)	3 times/day	5–7 days
5–8 years	18–25 kg	240	10 mL (2 tsp) or $\frac{1}{2}$ tablet	3 times/day	5–7 days
8–14 years	25–50 kg	500	1 tablet	3–4 times/day	5–7 days
>14 years	>50 kg and adults	1,000	2 tablets	3–4 times/day	5–7 days

OR

- For pain only, have patient gargle with an aspirin solution.

Caution: Acetylsalicylic acid (aspirin) is not recommended for children <12 years old because of the risk of Reye's syndrome.
- Patients <15 years who have sore throat, dysphagia, fever, and red and inflamed tonsils with follicles or enlarged lymph glands need antibiotics.
 - Give benzathine benzylpenicillin (600 mg, 1 g injection) IM, immediately.
 - ◆ <15 kg: 300 000 IU
 - ◆ 15–30 kg: 600 000 IU
 - ◆ >30 kg and adults: 1.2 MU

OR

- Give phenoxycephalothin PO (250 mg tablet; 125 mg/5 mL suspension) 2 times/day for 10 days. See table 4.3.1B for dosages.

Table 4.3.1B. Phenoxycephalothin Dosages by Age for the Management of Tonsillitis

Age	Dose (mg)	Quantity	Frequency	Duration
<1 year	125	5 mL (1 tsp)	2 times/day	10 days
1–5 years	250	10 mL (2 tsp)	2 times/day	10 days
5–12 years	500	2 tablets	2 times/day	10 days
Adult	1,000	4 tablets	2 times/day	10 days

OR

- For penicillin-allergic patients, give erythromycin PO (250 mg, 500 mg tablets; 125 mg/5 mL suspension), every 6 hours before meals for 10 days in the same dosage as phenoxycephalothin.

Referral

- Any suppurative complications (e.g., retropharyngeal or peri-tonsillar abscess)
- Suspected acute rheumatic fever
- Suspected acute glomerulonephritis
- Recurrent tonsillitis or tonsillitis accompanied by severe swallowing problems
- History of previous rheumatic fever or rheumatic heart disease
- Heart murmurs not previously diagnosed

References—3, 8, 10, 12, 72

4.3.2 Pharyngitis

Description

Pharyngitis is an acute inflammation of the throat particularly the tonsils and the pharynx. It is a self-limited illness and spontaneous resolution usually occurs within a few days.

Causes

- The majority of cases are of viral origin.
- Sometimes infection with *Streptococcus pyogenes* can occur, and this infection can lead to rheumatic fever or glomerulonephritis.

Caution: Rheumatic fever may develop if a streptococcal infection is not treated promptly and properly.

Signs and symptoms

Pharyngitis is characterized by a painful red throat without pus, with difficulty in swallowing.

- In children from 3–14 years, look for—
 - Cough
 - Runny nose
 - At least one enlarged and tender posterior cervical lymph node
 - Conjunctivitis (may be present)
 - Hoarseness
- The following suggest a viral cause—
 - Fever $>38^{\circ}\text{C}$
 - The absence of cough
 - At least one enlarged and tender anterior lymph node in the neck
 - Presence of an exudate
- The following favour streptococcal pharyngitis, which is uncommon in children <3 years and patients >14 years—
 - Difficulty in swallowing
 - Red and inflamed tonsils, pharynx

Diagnosis

- Visual examination of the throat—tonsils may be red and swollen
- Presence of cervical lymph nodes.
- Throat swab if streptococcal infection is suspected

Management objectives

- Relief of symptoms
- Prevention of complications of streptococcal infection

Nonpharmacological management

- Keep the patient warm.
- Instruct the patient to gargle with homemade salt mouthwash (2.5 mL [$\frac{1}{2}$ tsp] of table salt in a glass of lukewarm water) for 1 minute 2 times/day.
- If white spots are present on mucous membrane, have the patient gargle with 3% hydrogen peroxide before gargling with salt water.

Pharmacological management

- Treat fever and pain with paracetamol PO (500 mg tablet; 120 mg/5 mL suspension). See table 4.3.2 for dosages.

Table 4.3.2. Paracetamol Dosages by Age and Weight for the Management of Pharyngitis

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3-12 months	6-10 kg	60	2.5 mL ($\frac{1}{2}$ tsp)	3 times/day	5-7 days
1-5 years	10-18 kg	120	5 mL (1 tsp)	3 times/day	5-7 days
5-8 years	18-25 kg	240	10 mL (2 tsp) or $\frac{1}{2}$ tablet	3 times/day	5-7 days
8-14 years	25-50 kg	500	1 tablet	3-4 times/day	5-7 days
>14 years	>50 kg and adults	1,000	2 tablets	3-4 times/day	5-7 days

- No antibiotic therapy is required in viral pharyngitis.
- For streptococcal pharyngitis, give benzathine benzylpenicillin IM immediately (1.2 MIU powder for injection).
 - >15 kg: 300,000 IU as a single dose
 - 15-30 kg: 600,000 IU as a single dose
 - >30 kg and adults: 1.2 MIU as a single dose

OR

- Give phenoxymethylpenicillin PO (250 mg tablet; 125 mg/5 mL suspension) for 10 days.
 - Adults: 1 g (4 tablets) 2 times/day
 - Children:
 - ◆ <1 year: 125 mg (5 mL or 1 tsp) 2 times/day
 - ◆ 1–5 years: 250 mg (10 mL or 2 tsp) 2 times/day
 - ◆ 6–12 years: 500 mg (2 tablets) 2 times/day for 2 days

OR

- For penicillin-allergic patients, give erythromycin, (250 mg and 500 mg tablets; 125 mg/5 mL suspension) oral, 4 times/day for 10 days in the same dosage as phenoxymethylpenicillin. (See table 4.3.1B.)

Referral

- Children who have suspected streptococcal infection
- Any patient who has a persistent fever

References—1, 10, 73

4.3.3 Laryngitis

Description

Acute laryngitis is an inflammation of the lining of the laryngeal caused by a variety of infectious and noninfectious processes. It is, however, caused predominantly by the same viruses that cause many other URIs. It may involve surrounding structures (e.g., the pharynx and trachea). The condition is usually brief and self-limited.

Signs and symptoms

Onset is similar to any URTI. It is characterized by—

- Hoarseness; stridor and chest indrawing may be present
- Nasal congestion, cough, and sore throat
- Inspiratory dyspnoea (difficulty taking a breath)
- Restlessness, anxiety, cyanosis in severe cases
- Mild fever

In spasmodic laryngitis in a child who has rhinitis or measles—

- The onset is nocturnal with coughing fits followed by periods of suffocation and difficulty taking a breath.

- The child may develop stridor and hoarseness after the attack.
- The child remains afebrile.

Diagnosis

Diagnosis is based on clinical signs and symptoms at primary level.

Management objectives

Relief of symptoms

Nonpharmacological management

- Use steam inhalations 2–3 times/day to help clear blocked nose.
- Rest the voice.
- For spasmodic laryngitis—
 - Monitor the child, and try to keep him or her calm.
 - Have the child breathe in a humid environment (e.g., next to a bowl of water or a wet towel).

Pharmacological management

- For uncomplicated laryngitis—
 - Instil two drops of 0.9% sodium chloride or Ringer's lactate in each nostril 4 times/day to clear airway.
 - Antibiotics are not recommended in uncomplicated laryngitis
- For spasmodic laryngitis in children—
 - Use antihistamine treatment: chlorpheniramine maleate PO (2 mg/5 mL)
 - ◆ Children 2–5 years: 2.5 mL ($\frac{1}{2}$ tsp) 4 times/day
 - ◆ Children 6–12 years: 5 mL (1 tsp) every 6 hours but not to exceed 4 times/day

PLUS

- Give prednisolone (5 mg, 25 mg tablets), depending on the severity.
 - ◆ Adults and children ≥ 12 years: 30 mg/day for 3 days then tapering off over a 1 week period
 - ◆ Children < 12 years: 10 mg daily for 7 days
- In children with severe dyspnoea, if a physician is available—
 - Give dexamethasone IM (4 mg/mL) 0.1–0.2 mg/kg in a single dose.

OR

- Give hydrocortisone (100 mg/mL) 1 mg/kg as a single dose.

- In adults, for relief of fever or pain—
 - Give paracetamol PO (500 mg tablets) 1 g (2 tablets) 3–4 times/day for 5–7 days.

OR

- Give acetylsalicylic acid PO (300 mg and 500 mg tablets—what is needed to relieve pain) 1 tablet 3–4 times/day for 5–7 days

Caution: Acetylsalicylic acid (aspirin) is not recommended for children <12 years old because of the risk of Reye's syndrome.

If definite signs of infection are present—

- Adults and children 12 years and over—
 - Give co-trimoxazole PO (400 mg + 80 mg and 800 mg + 160 mg tablets) 960 mg every 12 hours for 5–7 days.

OR

- Give amoxicillin PO (250 mg, 500 mg tablets) 3 g/day in 2–3 divided doses for 5–7 days.

- Children >12 years

- Give co-trimoxazole PO
 - ◆ 6 months–5 years: 240 mg twice daily
 - ◆ 6 years–11 years: 480 mg twice daily

OR

- Give amoxicillin
 - ◆ Children: 100 mg/kg/day in 3 divided doses for 5–7 days

OR

- For penicillin-allergic patients, give—
 - ◆ Doxycycline (100 mg tablets)
 - Adults: 1 tablet 2 times/day for 7 days
 - Children >9 years (and >45 kg): 1 (100 mg) tablet 2 times/day for 7 days

OR

- ◆ Erythromycin (250 mg and 500 mg tablets)
 - Adults: 500 mg 4 times/day for 7 days
 - Children: 250 mg 4 times/day for 7 days
 - <1 year: 125 mg (5 mL or 1 tsp) 2 times/day for 7 days
 - 1–5 years: 250 mg (10 mL or 2 tsp) 2 times/day for 7 days
 - 6–12 years: 500 mg (2 tablets) 2 times/day for 7 days

Referral

- Children with severe dyspnoea (immediately)
- If condition persists beyond 2 weeks, for laryngoscopy (at hospital level)

References—1, 10, 74

4.3.4 Hoarseness

Description

Hoarseness is a change in the normal voice to become breathy, raspy, or strained. Changes in volume or pitch (depending on how high or low the voice is) are also noticeable. Voice changes are related to disorders in the vocal cords of the larynx. Hoarseness can be of sudden onset or chronic. It can be a warning of impending airway obstruction.

Causes

- Infections
- Acute laryngitis (most common cause)
- Acute epiglottitis
- Diphtheria
- Croup
- Inflammation, oedema
- Inhalation of irritants, such as tobacco smoke or chemicals
- History of smoking, alcohol use, or both
- Gastroesophageal reflux
- Allergies or anaphylaxis
- Misuse of voice for prolonged periods (too much or too loud)
- Benign vocal cord nodules or polyps
- Carcinoma of larynx or vocal cords
- Thyroid problems, including thyroid cancer or hypothyroidism
- Trauma to the larynx or vocal cords
- Vocal cord paralysis

Signs and symptoms

- Underlying URTI
- General malaise or weakness
- Fever, if infection present

- Cough and constant clearing of throat
- Dyspnoea, stridor, wheezing

Management objective

Relieve the symptoms

Nonpharmacological management

- Advise patient to rest his or her voice.
- Look for signs of airway obstruction.
- Look for signs of an underlying cause, fever, or tenderness in the lymph nodes.
- Recommend steam inhalation 3 times/day.
- Counsel the patient to stop smoking (see appendix D, “Tobacco Cessation”) and drinking alcohol.

Pharmacological management

- Usually no antibiotics are necessary.
- Do not give decongestants or antihistamines
- If there is an underlying cause, treat it as appropriate.

Referral

If the hoarseness has lasted for >3 weeks, investigation is required to rule out malignancy.

References—3, 75

5. Eye Conditions

5.1 Red Inflamed Eye

5.1.1 Conjunctivitis

Description

Conjunctivitis is an inflammation of the conjunctiva and is the most common cause of red eyes. Conjunctivitis may also be associated with measles or rhinopharyngitis in children. It is a viral infection that can be highly contagious and easily spread by contact with hands, towels, or face cloths.

- Causes
- Allergies
- Infection
- Trauma—
 - Chemicals
 - Injury

5.1.1.1 Allergic Conjunctivitis

Signs and symptoms

- Usually bilateral
- Excessive tearing
- Eyelid oedema
- Intense itching
- Red conjunctivae

Diagnosis

- Base the diagnosis on history clinical signs and symptoms.
- Always check for foreign bodies.

Management objectives

- Identify and remove the cause
- Relieve itching and swelling
- Treat secondary infection if present

Nonpharmacological management

- Recommend cold compresses (i.e., ice packs) for oedema of the eyelid.
- Educate the patient about the correct method for eye cleansing.

Pharmacologic management

Adults and children—

- Recommend sodium chloride 0.9%, eye washes or irrigations.
- Give chlorpheniramine PO (4 mg tablet; 2 mg/mL syrup), 3 times/day. See table 5.1.1.1 for dosages.

Table 5.1.1.1. Chlorpheniramine Dosages by Weight and Approximate Age for the Management of Allergic Conjunctivitis

Weight (kg)	Dose (mg)	Syrup (2 mg/5 mL)	Tablet (4 mg)	Approximate Age
6–10 kg	0.8	2 mL	—	6–12 months
10–18 kg	1	2.5 mL	—	1–5 years
18–25 kg	2	—	½ tablet	5–8 years
25–50 kg	2–4	—	½–1 tablet	8–14 years
>50 kg	4	—	1 tablet	>14 years and adults

5.1.1.2 Infective Conjunctivitis

5.1.1.2.1 Bacterial Infective Conjunctivitis

Causes

- *Staphylococci*
- *Streptococci*
- *Gonococci*
- *Chlamydia*

Signs and symptoms

- Usually bilateral
- Itchy eyes and swollen lids
- Stickiness of eyelids on awakening in the morning
- Abundant and purulent discharge from one or both eyes

Diagnosis

Based on clinical signs and symptoms

Management objectives

- Identify the cause and treat
- Prevent spread of infection to the other eye if the infection is presently in one eye only
- Prevent complications

Nonpharmacological management

- Provide patient education on personal hygiene.
- Advise the patient to clean his or her eyes 4–6 times/day with cooled boiled water or 0.9% sodium chloride.
- Counsel the patient on correct method for application of ophthalmic ointment.
- Advise the patient—
 - To wash his or her hands thoroughly before applying ophthalmic ointment
 - Not to share ophthalmic ointments or drops
 - Not to rub the eyes

Pharmacological management

Adults and children—

- Give chloramphenicol 1% eye ointment, applied every 6 hours in both eyes for 7 days.

OR

- Give tetracycline 1% eye ointment 2 times/day, in both eyes for 7 days.
- Do *not* use corticosteroid drops or ointments.
- For pain relief, give paracetamol PO (500 mg tablet; 120 mg/5 mL suspension) every 4–6 hours, PRN, not to exceed 4 doses daily. See table 5.1.1.2.1 for dosages.

Referral

If the patient has no response to treatment after 3 days

Table 5.1.1.2.1. Paracetamol Dosages by Age and Weight for the Management of Pain Associated with Bacterial Infective Conjunctivitis

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3-12 months	6-10 kg	60	2.5 mL (½ tsp)	3 times/day	5-7 days
1-5 years	10-18 kg	120	5 mL (1 tsp)	3 times/day	5-7 days
5-8 years	18-25 kg	240	10 mL (2 tsp) or ½ tablet	3 times/day	5-7 days
8-14 years	25-50 kg	500	1 tablet	3-4 times/day	5-7 days
>14 years	>50 kg and adults	1,000	2 tablets	3-4 times/day	5-7 days

5.1.1.2.2 Viral Infective Conjunctivitis

Signs and symptoms

- Watery discharge
- Feeling of grittiness or burning, which can be painful
- Photophobia

Diagnosis

Based on clinical signs and symptoms

Management objectives

- Prevent the spread of infection
- Symptomatic relief

Nonpharmacological management

- Educate the patient on the correct method for cleansing or rinsing the eye.
- Advise the patient to clean his or her eyes 4–6 times/day with cooled boiled water or 0.9% sodium chloride.
- Suggest cold compresses for symptomatic relief.

Pharmacological management

Adults and children—

- Recommend sodium chloride 0.9% eye washes or irrigations. If sodium chloride 0.9% is not available, use cooled boiled water or sterile water.
- For pain relief, give paracetamol PO (500 mg tablet; 120 mg/5 mL

suspension) every 4–6 hours PRN, not to exceed 4 doses daily. (See table 5.1.1.2.1 for dosages.)

- If the conjunctivitis is associated with measles, treat systemically with vitamin A to prevent keratitis.

5.1.1.3 Chemical Conjunctivitis

Caution: Chemical burns to the eye constitute an emergency. Treat immediately. Alkaline chemicals are the most dangerous.

Management

- Instil a topical anaesthetic drop immediately (if available).
- Rinse the eye with cooled boiled water or sterile water for at least 30 minutes ensuring that all foreign matter has been removed. The length of time is very important.
- Give an antibiotic drop (chloramphenicol eye drops) 4 times/day.
- For pain relief, use paracetamol PO (500 mg tablet; 120 mg/5 mL suspension) every 4–6 hours PRN, not to exceed 4 doses daily. (See table 5.1.1.2.1 for dosages.)

Referral

- If severe, refer the patient immediately after initial treatment.
- If less severe but there is no improvement after 3 days, refer.
- If the patient was wearing contact lenses at the time of the injury, refer.

5.1.1.4 Neonatal Conjunctivitis

Description

Neonatal conjunctivitis is an acute purulent conjunctivitis of the newborn in the first 28 days of life.

Caution: Neonatal conjunctivitis is an ophthalmic emergency requiring urgent treatment to save the infant's eye(s).

Causes

- *Neisseria gonorrhoea*
- *Chlamydia trachomatis*
- *Streptococcus*
- *Enterobacteriaceae*

Signs and symptoms

- Purulent discharge from the eye
- Swollen eyelids
- Red conjunctivae
- Corneal ulcers or opacities in severe cases (especially gonococcal infection)

Diagnosis

- Base the diagnosis on clinical signs and symptoms.
- Send pus from eyes for culture.

Management objectives

- Prevent blindness
- Relieve symptoms

Nonpharmacological management

Clean eyes regularly (every 10–30 minutes initially).

Pharmacological management

- Give chloramphenicol eye drops 1% 4 times/day for 7 days.
- For gonorrhoea, give ceftriaxone 50 mg/kg stat, not to exceed 125 mg.
PLUS
- Give erythromycin syrup 10 mg/kg 4 times/day for 14 days.

Referral

No response to treatment after 3 days

References—1, 3, 8, 10, 76

5.1.2 Keratitis (Corneal Ulcer)

Description

Keratitis is an inflammation of the cornea. There are two types: superficial, which heals without permanent damage; and deep, which is a serious disease. Deep keratitis causes corneal scarring with permanent visual loss and can progress to cause perforation of the eyeball with loss of the eye.

Causes and risk factors

- Infective
 - Viral—especially herpes simplex (most common)
 - Bacterial—from injury or wearing contact lenses. The bacteria involved are *Staphylococcus aureus* and, for contact lens wearers, *Pseudomonas aeruginosa*.
 - *Chlamydia*
 - Fungal (especially after injuries due to plant material)
 - Amoeba—the most serious corneal infection, usually affecting contact lens wearers. Mainly due to acanthamoeba.
- Vitamin A deficiency
- Injury—foreign bodies from plant material, sand, and other substances
- Arc eye—injuries from welding without protective glasses—also called welder's eye (see section 5.1.4, “Arc Eye”)

Signs and symptoms

- Usually occurs in one eye only
- History of injury (in some patients)
- History of wearing contact lens
- Redness of the eye
- Excess tears or other discharge (pus) from the eye
- Eye pain
- Difficulty opening the eyelid because of pain or irritation
- Blurred or decreased vision
- Sensitivity to light (photophobia)
- An itchy, burning or gritty feeling in the eye
- Swelling around the eye
- Cornea unclear, dull, grey

Diagnosis

- Based on signs and symptoms
- Fluorescein test

Management objectives

Prevent blindness and injury to the eyeball

Management

Treatment is dependent on the cause.

Referral

All cases

References—3, 77

5.1.3 Foreign Body in the Eye

Management objective

Remove the object without doing damage to the eye

Nonpharmacological management

Caution: Don't try to remove a large object or one that is deeply stuck in the eye.

Refer.

For small particles (e.g., sand or gravel) or something under the upper eyelid, in the corner of the eye or under the lower lid—

- Rinse the eye with saline solution.
- Evert the eyelid, and remove the item with the corner of a damp cloth or moistened cotton swab.
- Do not attempt to remove an object that is stuck in cornea.

Pharmacological management

At the hospital level—

- Before attempting removal, instil topical anaesthetic (tetracaine eye drops 0.5%) in eye.
- After removal, instil 0.5% chloramphenicol ointment 3 times/day for 3 days.

5.1.4 Arc Eye

Arc eye, also known as welder's flash, occurs when the eyes are exposed to bright ultraviolet light during welding.

Nonpharmacological management

Educate patient about prevention by wearing protective glasses

Pharmacological management

- Use topical steroid anti-inflammatory eye drops (dexamethasone).
- For pain relief, give paracetamol PO (500 mg tablet; 120 mg/5 mL suspension) every 4–6 hours PRN, not to exceed 4 doses daily.

Table 5.1.4. Paracetamol Dosages by Age and Weight for the Management of Pain Associated with Arc Eye

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3–12 months	6–10 kg	60	2.5 mL (½ tsp)	3 times/day	5–7 days
1–5 years	10–18 kg	120	5 mL (1 tsp)	3 times/day	5–7 days
5–8 years	18–25 kg	240	10 mL (2 tsp) or ½ tablet	3 times/day	5–7 days
8–14 years	25–50 kg	500	1 tablet	3–4 times/day	5–7 days
>14 years	>50 kg and adults	1,000	2 tablets	3–4 times/day	5–7 days

Referral

- Severe infective keratitis
- Foreign body sticking through eyelid
- Severe vision loss (refer to specialist)
- Condition has not improved in 2 days

Reference—3

5.2 Eyelid Infection—Stye

Description

Stye is an acute infection of the secretory gland of the eyelid, which results from a blocked gland. It can form a lump that is red and painful. It is found on the edge of the eyelid with a hair follicle in the middle of the swelling. If infected, a stye can cause redness of the eye and surrounding eyelid. The most common cause of infection is staphylococcus.

Causes

- Improper or incomplete removal of eye makeup
- Use of outdated or infected cosmetics
- Poor eyelid hygiene

Signs and symptoms

- A lump on the top or bottom eyelid
- Localised swelling of the eyelid
- Pain
- Redness
- Tenderness to touch
- Crusting of the eyelid margins
- Burning in the eye
- Droopiness of the eyelid
- Scratchy sensation on the eyeball
- Blurred vision
- Mucous discharge in the eye

Management objectives

Prevent infection of the eye

Nonpharmacological management

- Remove the eyelash.
- Apply warm compresses to the eye 4–6 times/day for about 15 minutes at a time to help the drainage. Advise the patient to keep his or her eyes closed while using compresses.
- Gently scrub the eyelid with tap water or with a mild, nonirritating soap, or shampoo (such as baby shampoo).

- Instruct the patient to discontinue the use of eye makeup as well as eye lotions and creams until the stye heals.
- Do not squeeze or puncture the stye. A more serious infection may occur as a result.
- Advise the patient to discontinue use of contact lenses until the stye heals.

Pharmacological

- Use chloramphenicol eye ointment 3 times/day for 1 week.

Referral

If the patient has no improvement after 1 week

References—3, 78

5.3 Xerophthalmia

Description

A disease of the eye characterized by pathological dryness of the conjunctiva and cornea due to failure of the eye to produce tears. If untreated, it can lead to corneal ulceration and ultimately blindness.

Cause

- Severe vitamin A deficiency
- Affects mainly children (particularly those suffering from malnutrition or measles) and older people

Signs and symptoms

As the disease progresses—

- Irritation in the eyes that may feel like the presence of a foreign body
- Night blindness
- Sensitivity to light
- Conjunctiva dry and dull, thick and insensitive
- Bitot's spots: grayish foamy patches on the conjunctiva
- Corneal ulceration, which may develop secondary infection
- Softening of the cornea with perforation of the eyeball

Diagnosis

- Based on clinical history and physical findings
- Tests of dark adaptation

Management objective

Avoid the development of severe complications

Nonpharmacological management

- Inform patients and parents that—
 - Vitamin A deficient children cannot see in the dark and have dry eyes.
 - Xerophthalmia leads to blindness.
- Recommend a diet containing plenty of vitamin A rich foods—green leafy vegetables, orange and yellow fruits (mango and paw paw), and vegetables (pumpkin, carrots, sweet potato), fish, eggs, liver, and milk.

Pharmacological management

- Give retinol (vitamin A) tablets 200,000 IU regardless of the clinical stage.
 - Children 6–11 months (or <8 kg): 100,000 IU once daily (cut tablet in half) on days 1, 2, and 8 of treatment
 - Children >1 year (or >8 kg): 200,000 IU once daily on days 1, 2, and 8 of treatment
 - Adults (except pregnant women): 200,000 IU once daily on days 1, 2, and 8 of treatment.
- Repeat 4 weeks later.

Referral

No response after initial treatment

References—1, 3, 10

6. Cardiovascular System

6.1 Angina Pectoris

Description

Angina pectoris is defined as a severe crushing pain behind the sternum and is due to an insufficient supply of blood to the heart muscles. It can be intermittent and relieved by rest. The pain typically lasts 2–5 minutes, and may radiate to the left arm, base of the neck, jaw, epigastrium, or back. It tends to affect men >50 years of age and women >60 years.

Causes and risk factors

Angina pectoris is caused by any circumstance leading to the narrowing of the coronary arteries resulting in insufficient blood supply to the heart muscle, including—

- Age (≥ 50 years for men, ≥ 60 for women)
- Cigarette smoking
- Hypertension
- Diabetes mellitus
- Hypercholesterolemia or a family history of hyperlipidaemia
- Kidney disease (microalbuminuria or GFR < 60 mL/minute)
- Obesity ($BMI \geq 30$ kg/m 2)
- Exertion (exercise, hurrying, or sexual activity)
- Lack of exercise (sedentary lifestyle)
- Stress, anger, fright
- Family history of coronary artery disease

Signs and symptoms

- Chest discomfort, which may be a tightness, crushing, squeezing, burning, or choking sensation
- Increases with exercise or emotional stress
- Can occur while the patient is at rest (unstable angina pectoris)

Diagnosis

Based on the clinical history and signs and symptoms and response to rest and to sublingual nitroglycerine

Management objectives

Relieve the pain as soon as possible

Nonpharmacological management

- Reassure patient.
- Advise the patient to rest.
- Determine existing risk factors and manage appropriately.

Pharmacological management

Give glyceryl trinitrate tablet (0.5 mg) sublingually stat and as needed.

Referral

Episodes occurring more than twice a week

Reference—1, 3

6.2 Congestive Heart Failure

Description

Congestive heart failure (HF) is the inability of the heart to pump sufficient blood through the circulatory system to meet the needs of the body. Left-sided HF (often secondary to coronary or valvular heart disease, arterial hypertension, or both) is the most common form.

Causes

- Causes—
 - Ischaemic heart disease
 - Hypertension (high BP)
 - Obesity
 - Valvular heart disease (especially in older populations)
 - Congenital heart disease
 - Severe anaemia
 - Lung disease
- Precipitating factors—
 - Infection, especially pulmonary
 - Arrhythmias
 - Physical, dietary, fluid, and emotional excesses
 - Pulmonary embolism
 - Anaemia

Classification

- Left-sided HF compromises aortic flow to the body and brain.
- Right-sided HF compromises pulmonic flow to the lungs.

Signs and symptoms

- Left-sided HF
 - Dyspnoea on exertion, then progresses to dyspnoea at rest
 - Paroxysmal nocturnal dyspnoea (difficulty breathing at night when lying down)
 - Orthopnoea (being able to breathe better when in an upright position)
 - Wheezing
 - Tachycardia
 - Tachypnoea (rapid breathing)
 - Anxiety, sweating, and nasal flare
 - On examination
 - ◆ Apex beat displaced
 - ◆ Crepitations over the lungs
 - ◆ Changes in heart sounds or rhythm
- Right-sided HF
 - Oedema of lower limbs
 - Fatigue
 - Enlargement of the liver (hepatomegaly)
 - Distension of the jugular vein in the neck
 - Ascites in advanced stages
 - Cyanosis or pallor

Diagnosis

- Based on clinical signs and symptoms
- Chest x-ray
- ECG

Management objectives

- Reduce symptoms and improve cardiac symptoms
- Correct underlying cause and aggravating factors
- Prevent deterioration of cardiac function

Nonpharmacological management

- Reassure patient.
- Place patient in an upright or semi-reclining position with legs lowered.
- Administer oxygen.

Pharmacological management

Reduce pulmonary pressure with—

- Furosemide injection (10 mg/mL) 40 mg IM or IV stat if patient severely dyspnoeic; repeat every 2 hours according to response
- HCTZ (50 mg tablet), 1 tablet daily
OR
- Furosemide (40 mg tablet) 1 tablet daily in 1–2 divided doses
- Digoxin (0.25 mg tablet)
- If urgent: 2 tablets stat then 1 tablet every 8 hours for 3 doses
 - If less urgent: 1 tablet 2 times/day for 7 days
 - Maintenance: $\frac{1}{2}$ –1 tablet daily

Follow-up

- See patient monthly.
- Control BP.
- Check for signs of heart failure.
- Advise the patient to seek medical help immediately if signs and symptoms recur.
- Instruct the patient on dietary changes (i.e., reduction in salt intake) and weight control.
- Urge the patient to take his or her medication regularly as prescribed.
- Advise on rest and low-grade exercise.

Referral

If no response to initial treatment

References—1, 3, 10

6.3 Hypertension

Description

Hypertension is defined as a BP $\geq 140/90$ mmHg at two or more consecutive readings or on two or more visits after initial screening or the use of antihypertensive medications. Hypertension may be primary/essential (the most common), with no identifiable cause, or secondary. Secondary is more likely related to hormonal or renal function, medications, neurological disorders, or coarctation of the aorta. Hypertension may also occur during pregnancy. BP must be assessed under the best conditions after the patient has been at rest for at least 5 minutes.

Causes and risk factors

- Age, race (e.g., African ancestry), and family history of hypertension or diabetes are important contributory factors.
- Obesity (especially a large waist circumference and abdominal obesity)
- Excessive intake of salt
- High fat (especially saturated fats) and calorie intake
- Diabetes mellitus
- Tobacco usage, particularly cigarettes
- High alcohol consumption
- Low potassium intake
- Psychosocial stress
- Sleep apnoea
- Elevated LDL (or total) cholesterol or low HDL cholesterol
- Inadequate physical activity

Classification

BP classifications for adults are given in table 6.3A.

Signs and symptoms

Most patients have no signs or symptoms referable to their BP elevation, and it is discovered on general physical examination. Symptoms that may occur include—

- Headache (mainly occipital) on awaking, subsiding after several hours
- Dizziness
- Palpitations

- Easy fatigability
- Impotence
- Other symptoms related to underlying disease or complications of hypertension (see table 6.3B)

Diagnosis

The diagnosis must be established by a doctor or Medex.

- Based on history and clinical findings
- Urinalysis for protein, glucose, and blood
- Check for underlying disease or complications (fasting blood glucose, cholesterol, triglycerides)

Management objectives

- Identify and manage modifiable risk factors
- Achieve and maintain the target BP (<130/80)
- Achieve target BP in special cases such as patients who have diabetes, heart, or kidney problems (<120/75 mmHg)

Nonpharmacological management

The cornerstone of hypertension management is lifestyle modification. It is indispensable both for the prevention and management of all stages of high BP, and all persons undergoing assessment or treatment for hypertension should be offered advice on lifestyle changes (diet and exercise) initially and then periodically. (See table 6.3C.)

Nonpharmacological management of hypertension entails the following approach.

- Managing pre-hypertension (BP 120–139/80–90 mmHg)–
 - Emphasize lifestyle modifications. (See table 6.3C.)
 - Reassess at 6–12 months.
- Managing stage 1 hypertension (BP 140–159/90–99 mmHg)–
 - **Step 1.** If the patient has no signs of complications, instruct him or her to make the lifestyle modifications listed in table 6.3C for 6–9 months. The target is to get the patient's BP controlled to <130/80 mmHg within 3 months. If control cannot be achieved after 3 months (in patients with or without major risk factors), then move to step 2 (pharmacological management).

Table 6.3A. Classification of BP for Adults

BP Classification	Systolic BP (mmHg)	Diastolic BP (mmHg)
Normal	<120	<80
Pre-hypertension	120-139	80-89
Stage 1 hypertension	140-159	90-99
Stage 2 hypertension	≥160	≥100
Stage 3 hypertension	≥180	≥110

Note: The classifications in this table are based on the average of two or more readings taken at each of two or more visits after initial screening.

Source: National Institutes of Health. 2004. *Report of the Joint National Committee on Prevention, Detection, Evaluation, and Treatment of High Blood Pressure*. Washington, DC: US Department of Health and Human Services.

Table. 6.3B. Hypertension Danger Signs and Symptoms

Symptoms	Signs
<ul style="list-style-type: none"> ▪ Severe headache ▪ Vertigo ▪ Confusion ▪ Drowsiness ▪ Coma ▪ Impaired vision ▪ TIA ▪ Sensory or motor deficit (paralysis) ▪ Palpitations or chest pain ▪ Shortness of breath or difficult breathing ▪ Swollen ankles ▪ Thirst, polyuria, and nocturia ▪ Haematuria ▪ Cold extremities ▪ Intermittent claudication 	<ul style="list-style-type: none"> ▪ Motor or sensory deficits ▪ Fundoscopic abnormalities ▪ Murmurs over heart and neck ▪ Arrhythmias ▪ Left ventricular hypertrophy ▪ Rhonchi and crepitations ▪ Peripheral oedema (legs) ▪ Proteinuria ▪ Pulses absent or weak

Pharmacological management

- Managing uncontrolled stage 1 and higher hypertension—
 - **Step 2.** Start treatment with a thiazide diuretic (hydrochlorothiazide 25 mg tablet), 12.5–25 mg daily. Target: control BP to <130/80 mmHg in 1 month. **Note:** Diabetes is not a contraindication to the use of low-dose thiazide.

Caution: Do not use a thiazide diuretic in gout or in severe kidney or liver failure.

 - **Step 3.** If step 2 has failed after 1 month or if the patient's hypertension is stage 3, give the medications listed below. Target: control BP to <130/80 mmHg in 1 month.
 - ◆ A diuretic
 - PLUS EITHER**
 - ◆ A long-acting calcium channel blocker amlodipine tablet (5 mg and 10 mg) (first choice)
 - OR**
 - ◆ An ACE inhibitor: captopril (25 mg tablet) 12.5–50 mg 2 times/day
 - ◆ Caution: Do not use captopril in pregnancy.
 - **Step 4.** If step 3 has failed after 3 months, then give the following. Target: control BP to <130/80 mmHg in 1 month with no side effects.
 - ◆ A diuretic
 - PLUS**
 - ◆ An ACE inhibitor
 - PLUS**
 - ◆ A beta blocker (atenolol) (50 and 100 mg tablets)/calcium channel blocker (amlodipine)
 - If step 4 fails, refer the patient for specialist evaluation.
 - Reviewing patients monthly—
 - Check and record BP.
 - Measure weight for BMI calculation, and urine for proteinuria.
 - Ask about symptoms and changes since the last visit, and any adverse medicine effects.
 - Reinforce dietary measures and health education.

Table 6.3C. Lifestyle Changes to Manage Hypertension

Lifestyle Change	Comment
Lose weight, if overweight.	Aim at a BMI of <25.
Get regular physical exercise, 30–60 minutes at least 5 times/week, preferably daily.	Walking is easiest for most people.
Stop smoking. (See appendix D, "Tobacco Cessation.")	
Restrict or eliminate alcohol intake.	Do not consume more than 2 drinks per day (for men) and 1 drink per day (for women). See table 6.3D below
Restrict salt intake.	Do not add salt in cooking or at the table; avoid canned foods and salted meat.
Restrict fat intake.	
Reduce the intake of coffee and other caffeine-containing beverages.	
Increase sources of folic acid and vitamins B12 and B6 in the diet.	Legumes, whole grain cereals, eggs, fish, and meat are all good sources of these vitamins.
Ensure an adequate dietary fibre intake.	Fruit, vegetables, and whole grains are all high in fibre.
Increase the intake of potassium by eating more fruits and vegetables.	Bananas, tomatoes, oranges, and coconut water contain potassium
If possible, see a dietitian or nutritionist for advice.	Use the dietary approaches to stop hypertension (DASH) diet. (See appendix E.)
Use stress relief and relaxation techniques.	Try, for example, meditation or biofeedback.
Monitor BP frequently.	Check at least monthly.

Table 6.3D. Size of Alcoholic Drinks

12 fl oz of regular beer	=	8–9 fl oz of malt liquor	=	5 fl oz of table wine	=	3–4 oz of fortified wine (such as sherry or port)	=	2–3 oz of cordial, liqueur, or aperitif	=	1.5 oz of brandy (a single jigger or shot)	=	1.5 fl oz shot of 80-proof spirits ("hard liquor")
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- Conducting the annual visit—
 - Update the medical history.
 - Check BP, weight, and urine as with the monthly visits.
 - Do laboratory investigations for BUN, plasma creatinine, electrolytes, fasting cholesterol and triglycerides, and blood sugar.
 - Do an electrocardiogram.

Referral

- Refer hypertensive emergencies *urgently*.
 - Patients with BP >240/140 (repeated more than once, with correct size cuff)
 - Patients with BP >210/120 and complications (e.g., hypertensive encephalopathy, grade 3 or 4 retinopathy, or accelerated or malignant hypertension)
 - Patients who have severe hypertensive complications.
- Other referrals include—
 - Young adults <30 years
 - Older adults >55
 - Patients whose BP is not controlled by two medicines and who have no doctor available
 - Pregnant patients
 - Patients who have signs of target organ damage, such as oedema, dyspnoea, proteinuria, or angina
 - Patients who have developed severe side effects to their medications

References—1, 3, 79, 80, 81, 82

6.4 Peripheral Vascular Disease

Description

Peripheral vascular disease (PWD) is a general term that covers all diseases of the blood vessels outside the heart. PVD can affect both the arteries that carry blood from the heart to the body (i.e., peripheral arterial disease) and veins that carry blood from the body back to the heart (i.e., deep vein thrombosis).

6.4.1 Peripheral Arterial Disease

Description

Peripheral arterial disease (PAD) is a condition in which the arteries that carry blood to the legs (and rarely the arms) become narrowed or obstructed, interfering with normal blood flow.

Causes and risk factors

- Atherosclerosis (fatty deposits in the artery wall)
- Narrowing of the arteries
- Smoking
- Diabetes
- Obesity (a body mass index >30)
- High BP ($\geq 140/90$ mmHg)
- High cholesterol (total blood cholesterol >240 mg/dL or 6.2 mmol/L)
- Increasing age, especially after reaching 50 years of age; highest incidence in the 60s and 70s.
- A family history of peripheral artery disease, heart disease

Signs and symptoms

- Most people have no symptoms
- Absent pulses in the limbs
- Leg pain (discomfort in the calves)
- Intermittent claudication (pain after walking a certain distance) and disappearing with rest
- Tingling and numbness in feet

Diagnosis

- Done at the primary health care level
- Based on history and clinical findings

Management objective

Slow the progress of the disease

Nonpharmacological management

Advise patient to—

- Stop smoking (see appendix D)
- Lose weight if overweight or obese
- Eat a healthy, low-fat diet
- Exercise regularly

Pharmacological management

- Continue on antihypertensive, antidiabetic medications (as indicated), or both.
- Start treatment with a cholesterol-lowering agent: tablet of atorvastatin (10 mg, 20 mg), 10 mg once daily.
- Advise the patient to take an aspirin tablet daily: (300 mg), $\frac{1}{2}$ –1 tablet once a day.

Referral

For further investigation and indicated treatment

References—1, 3

6.4.2 Deep Vein Thrombosis

Description

Deep vein thrombosis (DVT) is due to the blockage of a deep vein by a clot. It predominantly occurs in the legs. The risk of thrombosis is increased following trauma. The most significant consequence is pulmonary embolism.

Causes and risk factors

- Decreased blood flow
- Damage to the blood vessel wall
- Varicose veins
- Prolonged immobility including during travel
- Pregnancy, particularly during the third trimester and the first month postpartum
- Obesity

- Medicines (e.g., oestrogens, postmenopausal hormone replacement therapy, and oral contraceptives)

Signs and symptoms

- Pain in the lower leg
- Unilateral swelling of the leg
- Warmth, swelling, and redness of the leg

Diagnosis

- Clinical signs and symptoms
- Ultrasound
- Blood tests—coagulation

Management objectives

- Relieve pain
- Slow or stop the coagulation process

Nonpharmacological management

- Advise bed rest.
- Elevate the limb above the level of the heart, until the oedema and tenderness subside.

Pharmacological management

- For pain give paracetamol (500 mg tablet) 2 tablets 3–4 times/day for 7 days
- Start on anticoagulants.
 - Give heparin 5,000 IU stat, then IV infusion of 1,000–2,000 IU per hour (*Harrison's* suggest 7,500–10,000 stat).

OR

 - Give heparin 1 mg/kg body weight subcutaneously every 12 hours.

PLUS

 - Give warfarin 5–10 mg PO. Monitor prothrombin time.
- Continue treatment for at least 6 weeks to as long as 6 months.

References—1, 3

7. GastroIntestinal System

7.1 Anorectal Disorders

7.1.1 Anal Fissures

Description

An anal fissure is a small slit or tear in the mucosa lining the anus. Anal fissures usually extend from the anal opening and are usually located posteriorly in the midline. Fissure depth may range from superficial to deep—sometimes down to the underlying sphincter muscle. Fissures tend to self-heal in a couple of weeks, but if they become chronic and deep, they will not heal.

Causes and risk factors

- Stretching of the anal mucosa beyond its capacity
- Constipation, hard stools
- Straining at defecation
- Anal intercourse or insertion of a foreign body into the rectum

Signs and symptoms

- Anal pain or itching
- Pain on defecation
- Spasm of the anal sphincter
- Passing bright red blood per rectum

Diagnosis

- Based on history and clinical findings
- Visual and digital examination of anal area

Management objectives

- Promote healing
- Relieve symptoms

Nonpharmacological management

Advise the patient to—

- Avoid straining during defecation
- Increase his or her dietary fibre intake

- Use stool softeners (mineral oil preparations)
- Take sitz baths (particularly after bowel movements)
- Avoid chronic laxative use; use laxatives only when constipation is severe

Pharmacological management

Give a topical anaesthetic: lidocaine spray 10% and etidocaine/lidocaine cream (2.5%/2.5%)

Referral

- Severe pain or unusually tight anus
- No response to medication

References—1, 3

7.1.2 Constipation

Description

Constipation refers to persistent, difficult, infrequent bowel movements or a feeling of incomplete evacuation. Although normal bowel movements vary widely, from 1–3 times/day to one every 2–5 days, constipation is usually defined as bowel movements of fewer than 3 per week. Frequency alone, however, is not enough to make a diagnosis since patients may have a normal frequency in the presence of the other symptoms.

Causes and risk factors

Causes may be primary or dietary, related to medicines the patient is taking, or occur for medical reasons.

- Primary—not due to any underlying cause
- Dietary
 - Insufficient fibre or roughage
 - Bottle feeding in babies
 - Inadequate fluid intake
- Medications
 - Atropine
 - Codeine-containing medicines
 - Anti-inflammatory medicines
 - Morphine
 - Chronic laxative use

- Medical
 - Lack of exercise
 - Hypothyroidism
 - Pregnancy
 - Anal fissure
 - Perianal disease
 - Carcinoma of the rectum or sigmoid colon (especially in the elderly)
 - Pelvic mass (fibroid uterus)

Signs and symptoms

- Stools too hard and passed out in small or large lumps
- Infrequent defecation
- Pain or straining on defecation
- Feeling of incomplete evacuation

Diagnosis

- Based on history and clinical findings
- Digital rectal examination
- Rule out anal fissure or haemorrhoids
- Further examination may be needed in the presence of weight loss, rectal bleeding, or anaemia.

Management objective

Restore normal, regular bowel movements

Nonpharmacological management

- Advise the patient to—
 - Increase his or her intake of water to 6–8 glasses per day
 - Avoid coffee and black tea
 - Gradually increase the amount of fibre in his or her diet, especially by eating more fruit, vegetables, oats, beans, lentils, whole-wheat cereals and bread, and grains
 - Increase his or her physical activity (e.g., walking briskly every day)
- Use manual disimpaction.
- Give the patient an enema.

Pharmacological management

Give bisacodyl suppository or tablets 10–20 mg nocte.

Referral

- Unexplained rectal bleeding
- Persistent abdominal problems
- Weight loss

References—1, 3

7.1.3 Haemorrhoids (Piles)

Description

Haemorrhoids are varicose veins in the anorectal area, resulting from a persistent increase in venous pressure. Haemorrhoids may be exposed outside the rectum during defecation. They are often referred to as *piles*. They may be internal or external.

Causes and risk factors

- Constipation with straining during defecation
- Increased intra-abdominal pressure
- Low-fibre diet
- Obesity
- Pregnancy
- Sitting for long periods
- Straining during lifting of heavy weights

Signs and symptoms

- Painless rectal bleeding (bright red blood, often found on toilet paper or dripping into the toilet bowl)
- Perianal itch
- Severe anal pain if haemorrhoid is thrombosed or strangulated
- Mucous discharge
- Protrusion of the haemorrhoidal tissue
- Occasional incontinence

Classification

See table 7.1.3.

Table 7.1.3. Classification of Haemorrhoids

Mild	Moderate	Severe
Minimal pain	Severe pain	Severe pain
Minimal bleeding	Moderate bleeding	Severe bleeding
Minimal prolapse that can easily be pushed back into rectum	Prolapse that can be pushed back only with effort	Prolapse that cannot be pushed back into rectum Strangulation, thrombosis, infection, or ulceration

Diagnosis

Based on physical examinations:

- Visual examination of the anus and surrounding areas—may reveal a prolapsed haemorrhoid
- Rectal examination to rule out tumours or polyps

Investigation at the hospital level will include a proctoscopy.

Management objectives

- Prevent progression
- Reduce prolapse where present
- Rule out colorectal cancer

Nonpharmacological management

- Advise patient to avoid straining or prolonged sitting on the toilet.
- Recommend a high-fibre diet.
- Counsel against the chronic use of laxatives.
- Encourage increased fluid intake to 6–8 glasses of water a day.
- Recommend regular exercise, including walking.
- In a mild case with prolapse, tell the patient how to reduce his or her own haemorrhoids by first putting petroleum jelly on his or her finger and then lightly pushing the haemorrhoid back into the rectum.
- Recommend warm soaks (i.e., sitz baths).

Pharmacological management

- Give fibre supplements to provide bulk.
- Give bisacodyl (5 mg tablet), 2 tablets 2 times/day for 2 weeks then 2 tablets nocte PRN to soften stool.

OR

- Give bisacodyl suppository (5 mg, 10 mg) PRN for pain relief.
- Give ibuprofen tablet (200 mg) every 4–6 hours PRN for pain.

Referral

- To a specialist to rule out colorectal cancer, in patients >40 years
- For surgical intervention if—
 - The haemorrhoid cannot be reduced
 - The haemorrhoid is thrombosed

References—3, 8, 83, 84

7.2 Gastroenteritis (Diarrhoea)

Description

Gastroenteritis is an inflammation of the gastrointestinal tract, involving both stomach and intestines and resulting in diarrhoea (i.e., the passing of loose—liquid or unformed—stools >3 times/day). It may be accompanied by vomiting and abdominal cramps. Gastroenteritis may be acute (i.e., lasting only a few days), persistent (i.e., lasting for 2–4 weeks), or chronic (i.e., lasting >4 weeks). It can be mild to severe leading to loss of electrolytes and dehydration.

Causes and risk factors

More than 90% of cases of acute diarrhoea are caused by infectious agents through the faecal-oral route; the rest are caused by medications (e.g., senna, cascara, castor oil), toxins, and other conditions.

There are two clinical types, each with its own causes—

- Diarrhoea without blood (see section 7.2.1)
 - Viruses, particularly rotaviruses and enteroviruses in 60% of cases; most common cause in children
 - Bacteria, especially *E. coli* and *Salmonella*
 - Parasites such as giardia
 - Contaminated water
 - Unhygienic conditions
 - Ingestion of foods contaminated by human or animal faeces

- Diarrhoea with blood (see section 7.2.2)
 - Bacteria—*Campylobacter, E. coli, Salmonella, Shigella*
 - Parasites—amebiasis

Signs and symptoms

- General—
 - Fever may or may not be present
 - Vomiting
 - Diarrhoea
 - Blood may be present
 - Dehydration may be present (see table 7.2)
 - Abdominal cramps (may or may not be present)
- Signs of shock—
 - Tachycardia
 - Cold, pale extremities
 - Rapid, deep breathing
 - Floppy, lethargic, or comatose

Table 7.2. Assessing Dehydration

Signs and Symptoms	Mild (<3%)	Moderate (3–8%)	Severe (>8%)
General condition	Alert, responsive	Restless, irritable	Floppy, weak
Thirst	Drinks normally	Thirsty, drinks eagerly	Drinks poorly or not able to drink
Eyes	Normal	Sunken	Deeply sunken
Mucus membranes	Moist	Dry	Very dry
Skin pinch	Retracts quickly	Retracts slowly	Retracts very slowly
Skin turgor	Normal	Diminished	Very diminished
Neurological state	Normal	Drowsiness, altered neurological status	Lethargic, comatose
Signs of shock (i.e., cold, clammy skin; profuse sweating; tachycardia; hypotension)	None	None	Yes

Note: Percentage of dehydration refers to the amount of fluid lost as a percentage of body weight.

7.2.1 Diarrhoea without Blood

Diagnosis

Based on the patient's history and the physical examination

- If dehydration is present, do urea and electrolytes, Hb, WBC, and differential.
- If there is blood in the stool, send stool for culture and microscopy.

Management objectives

- Stop the diarrhoea
- Treat infection, if it is suspected to be bacterial
- Prevent or treat dehydration and electrolyte imbalance

Pharmacological management

For no or mild dehydration in children (child can be treated at home)—

- Tell the parent or caregiver—
 - To increase the child's fluid intake (children ≤2 years: 50–100 mL after every stool or vomit; children >2 years: 100–200 mL). Continue until diarrhoea has stopped.
 - To increase number of breastfeedings for breastfed children
 - To continue regular feedings for older children, giving soft porridge, pureed or liquid foods
 - To use boiled, cool water for drinking
 - How to mix and give ORS at home (provide at least 2 packs)
 - How to recognize that child is becoming dehydrated and need to be taken to clinic or hospital
- If ORS is not available, teach the parent or caregiver how to mix the equivalent. (See table 7.2.1 for amounts to give.) To 1 L boiled, cooled water add—
 - 30–40 mL (6–8 tsp) of sugar
 - 2.5 mL ($\frac{1}{2}$ tsp) of salt

OR

 - Coconut water
- Avoid liquids that do not contain salt or that contain too much sugar (e.g., carbonated drinks or commercial fruit juices).
- If diarrhoea persists or gets worse, advise parents to bring the child back to the clinic.

For moderate dehydration in adults or children—

- Give ORS.
 - In the first 4 hours, give according to IMCI guidelines.
 - Give the amount of fluid (in mL) according to age and weight of child. The amount is calculated by multiplying the child's weight in kg by 75 (i.e., mL = weight in kg × 75).
 - Adolescents (<30 kg): 1–2 L
 - Adults: 2.2–4.0 L
- Advise that ORS be taken slowly. If the patient vomits, wait 10 minutes and try again.
- Re-evaluate after 4 hours. If the patient is better, continue as for mild dehydration.

For dehydration in adults—

- Have patients drink frequent small amount of fluids.
- Give ORS, 200–300 mL after every loose stool.
- If no improvement, refer.

For severe dehydration in adults or children, see section 1.4, “Acute Diarrhoea with Dehydration.”

Table 7.2.1. ORS Guide for Children

Age	Amount of ORS Given after Each Loose Stool	Amount of ORS to Provide for Use at Home
≤24 months	50–100 mL	500 mL/day
2–10 years	100–200 mL	1 L/day
≥10 years	As much as wanted	2 L/day

7.2.2 Diarrhoea with Blood

Diagnosis

Based on investigations: culture stool for bacteria, ova, and parasites.

Nonpharmacological management

Check for dehydration and treat as above.

Pharmacological management

Start empirical treatment.

- First-line treatment: co-trimoxazole (80 mg/400 mg tablet)
 - Adults and children ≥12 years: 2 tablets 2 times/day for 3–5 days
 - Children <12 years
 - ◆ Children 6 weeks to 5 months: 120 mg 2 times/day
 - ◆ Children 6 months to 5 years: 240 mg 2 times/day
 - ◆ Children 6–11 years: 480 mg 2 times/day
- Second-line treatment:
 - Ciprofloxacin (500 mg tablet)
 - ◆ Adults: 500 mg 2 times/day for 3–5 days
 - ◆ Children >14 years: 30 mg/kg/day in 2 divided doses for 3–5 days

Caution: Ciprofloxacin is contraindicated in pregnant women. In pregnant women, use ceftriaxone IM 1 g once daily for 3–5 days.

PLUS

- Metronidazole (200 mg and 400 mg tablets)
 - ◆ Adults and children >12 years: 800 mg stat followed by 400 mg at 8-hour intervals
 - ◆ Children 8 weeks to 12 years: 20–30 mg/kg/day as a single dose or divided into 7.5 mg/kg every 8 hours for 7 days

Note: In immunocompromised patients (i.e., HIV) or the elderly, antibiotic coverage is indicated whether or not a causative organism is found.

References—1, 3, 8

7.3 Bacterial Food Poisoning

Description

Bacterial food poisoning is an illness resulting from the ingestion of food or drink contaminated with bacteria, bacterial toxins, or both. The illness tends to be self-limited.

Causes and risk factors

Several organisms can cause food poisoning, and the time of onset of the symptoms after ingestion of the food and the duration of symptoms gives an idea of which organism (table 7.3A).

Table 7.3A. Bacterial Food Poisoning Indicators

Incubation Period	Most Likely Bacterium	Duration
1-6 hours	<i>Staphylococcus aureus</i> or <i>Bacillus cereus</i>	Less than 12 hours
8-16 hours	<i>Clostridium acillus cereus</i>	Rarely lasting more than 24 hours
>16 hours	<i>E. coli</i> , <i>Salmonella</i> , <i>Shigella</i> , <i>botulism</i>	Can last for several days

Sources of contamination:

- Food usually becomes contaminated from poor sanitation or preparation.
- Food handlers who do not wash their hands after using the bathroom or who have infections themselves often cause contamination.
- Improper packaging food or storing it at the wrong temperature also promotes contamination.

Signs and symptoms

- Fever
- Chills
- Nausea
- Vomiting
- Diarrhoea
- Abdominal cramps

See section 7.2, “Gastroenteritis (Diarrhoea)” for signs and degree of dehydration (table 7.2).

Diagnosis

Specific diagnosis is not necessary. Many food-borne infections are not identified by routine laboratory procedures; they require specialized, experimental, and expensive tests that are not generally available.

Management objectives

- Maintain proper hydration
- Prevent recurrence

Nonpharmacological management

- Advise patients to wash their hands thoroughly after going to the toilet and before eating.
- Remind patients that vegetables to be eaten raw must be thoroughly washed.
- Instruct patients on how to rehydrate as required (see section 7.2.1, “Diarrhoea without Blood”).

Pharmacological management

Not indicated at the primary care level except in case of infection. If needed, see table 7.3B.

Table 7.3B. Pharmacological Management of Infection Caused by Bacterial Food Poisoning

Organism	Medicine	Dose	Duration
<i>Salmonella</i>	Ciprofloxacin	Adults: 500 mg every 8 hours	14 days
	Chloramphenicol	Children: 50–100 mg/kg/day	14 days
<i>Giardia</i>	Metronidazole	Adults: 800 mg stat then 400 mg every 8 hours	3–5 days
		Children: 250 mg every 8 hours	5 days
<i>Other</i>	Co-trimoxazole	Adults: 960 mg every 12 hours	5–10 days
		Children: 30 mg/kg every 12 hours	5 days

Referral

- Nonresponse to conservative treatment
- Signs of severe dehydration

References—1, 3, 85, 86, 87

7.4 Epigastric Disorders

7.4.1 Gastro-oesophageal Reflux Disease

Description

Gastro-oesophageal reflux disease is characterized primarily by heartburn and caused by the regurgitation of stomach acid and other contents into the oesophagus.

Causes and risk factors

- Poor functioning of the lower oesophageal sphincter
- Slow stomach emptying as in pyloric stenosis
- Hiatus hernia
- Abdominal distension or raised abdominal pressure

Signs and symptoms

- Regurgitation of sour material into the mouth
- Heartburn
- Pain on swallowing (i.e., dysphagia)
- Retrosternal chest pain
- Vomiting
- Reflux can occur into the respiratory tract causing a chronic cough and signs of respiratory tract infection, especially laryngitis.
- Difficulty in swallowing suggests the development of a stricture.

Diagnosis

- Usually based on history alone
- For patients >50 years and patients who are not responding to treatment or who have developed complications (e.g., unexplained weight loss, painful swallowing, bleeding, or anaemia), do the following investigations to rule out underlying conditions:
 - Full blood count, ESR
 - Barium meal
 - *H. pylori* test
 - Oesophagoscopy (at a level 4 or 5 facility)

Management objectives

- Provide relief of symptoms
- Heal the oesophagitis
- Prevent complications

Nonpharmacological management

Advise the patient to make the following *lifelong* lifestyle changes:

- Change eating habits to avoid foods that precipitate symptoms (e.g., citrus, tomatoes and tomato-based products, caffeine, chocolate, peppermint, carbonated soft drinks, and fatty foods).
- Eat smaller more frequent meals.
- Eat the last meal of the day 2–3 hours before going to bed.
- Do not drink large quantities of fluids with meals.
- Avoid medicines that exacerbate reflux (e.g., beta-blockers, calcium channel blockers, alpha-adrenergic agonists, theophylline).
- Avoid tobacco and alcohol. (See appendix D, “Tobacco Cessation.”)
- Elevate the head of the bed 10–20 cm using blocks.
- Lose weight (for overweight patients).
- Avoid clothing that is tight around the waist.
- Avoid pain pills such as aspirin and other NSAIDs.

Pharmacological management

- ***First-line management.*** Give aluminium hydroxide plus magnesium hydroxide antacid 1–2 tablets 4 times/day 20–60 minutes after eating.
Note: Although antacids may be useful for relief of mild symptoms, they are generally ineffective in severe cases of reflux. Do this for 5–7 days.
- ***Second-line management.*** Give H₂ blockers.
 - Give either—
 - ◆ Ranitidine (150 mg tablet): 150–300 mg nightly
 - ◆ OR
 - ◆ Ranitidine (150 mg tablet): 150 mg 2 times/day for 4 weeks
 - Increase to 300 mg 2 times/day if necessary. Then reduce to a maintenance dose of 150 mg nightly.
- ***Third-line management.*** Add a pro-kinetic agent. If the patient has no response to ranitidine after 10 days, change to metoclopramide 10 mg 2 times/day for 14 days.

- ***Fourth-line management.*** Add a PPI. If the patient has no response to metoclopramide after 14 days, change to a PPI: omeprazole (10 mg and 20 mg tablets) 20 mg daily. This may be continued for several weeks.

Note: It may take 8–12 weeks for significant improvement of symptoms while on treatment for gastro-oesophageal reflux disease.

Referral

Nonresponse to treatment

References—1, 3, 88, 89

7.4.2 Gastritis and Peptic Ulcer Disease

Description

Gastritis is the inflammation of the mucosa (lining) of the stomach and duodenum resulting from excessive acid in the stomach, which eventually can cause a peptic ulcer. Gastritis can be classified as acute or chronic.

Causes and risk factors

- Excessive alcohol consumption
- Stress
- Prolonged consumption of NSAIDs (e.g., aspirin, ibuprofen, indomethacin, and others)
- Bacterial infection, primarily *H. pylori*

Signs and symptoms

See table 7.4.2.

Diagnosis

- Base the diagnosis on clinical findings.
- A definitive diagnosis can be made only by endoscopy at a level 5 facility or diagnostic centre.
- Test for *H. pylori*.

Management objectives

- Relieve the symptoms
- Remove the cause of the inflammation
- Treat any underlying infection

Table 7.4.2. Signs and Symptoms of Gastritis and Peptic Ulcer Disease

Condition	Signs and Symptoms
Gastritis	Nonspecific clinical signs and symptoms such as— <ul style="list-style-type: none"> • Abdominal tenderness • Bloating • Poor appetite • Nausea (with or without vomiting) • Epigastric and retrosternal pain
Gastric ulcer	Pain immediately after eating
Duodenal ulcer	Pain before eating, which is relieved by food
Nonbleeding ulcer	<ul style="list-style-type: none"> ▪ Gastritis, usually after excessive alcohol intake ▪ Epigastric abdominal pain 1-2 hours after eating (i.e., stomach empty); pain alleviated by food, milk, or antacids ▪ Nausea and vomiting ▪ Discomfort on palpation of the upper abdomen
Bleeding ulcer	<ul style="list-style-type: none"> ▪ Sudden weakness and dizziness ▪ Cold and clammy skin ▪ “Coffee grounds” vomitus ▪ Shock (i.e., weak pulse, clammy skin, and low BP)

Nonpharmacological management

Advise the patient to—

- Avoid substances that irritate the stomach mucosa, such as pepper, alcohol, coffee, acidic substances, and NSAIDs
- Make lifestyle modifications, including avoidance of tobacco (see appendix 4) and foods that might trigger the symptoms

Pharmacological management

- ***First-line treatment:*** give an antacid.

- Aluminium hydroxide and magnesium hydroxide (1–2 tablets or 10–20 mL liquid) 4 times/day, 20–60 minutes after eating and at bedtime.
- If vomiting is present, give dimenhydrante (gravol) 50 mg 3 times/day $\frac{1}{2}$ hour before meals. Do this for 3–5 days. If symptoms persist, move to second-line treatment.

- **Second-line treatment:** give an antacid plus an H₂ blocker. To the first-line medication, add—
 - Ranitidine (150 mg tablets) 150 mg 2 times/day. Severe cases may need a maximum of 600 mg (300 mg 2 times/day) for 2 weeks.
 - If symptoms improve, switch to maintenance therapy: ranitidine 150 mg at night for 6–8 weeks.
 - If symptoms persist, move to third-line treatment.
- **Third-line treatment:** give an antacid plus an H₂ blocker plus a PPI.
- To the second-line medications, add omeprazole tablets (10 mg and 20 mg) in all patients who are chronic NSAID users.
 - Adults: 20–40 mg/day
 - Children:
 - ◆ >5 kg to <10 kg: 5 mg/day
 - ◆ 10 kg to ≤20 kg: 10 mg/day
 - ◆ >20 kg: 20 mg/day
- **Fourth-line treatment:** give antibiotics to eradicate *H. pylori* bacteria.
 (All patients with a history of peptic ulcer disease, active gastric ulcer, or active duodenal ulcer associated with *H. pylori* infection should be treated. Successful treatment of *H. pylori* can help the ulcer to heal, prevent ulcers from coming back, and reduce the risk of complications such as bleeding.)
 Use a combination of two antibiotics plus an H₂ blocker or a PPI for 14 days.
 - Common antibiotic combinations are—
 - ◆ Metronidazole and amoxicillin
 - ◆ Metronidazole and tetracycline (for penicillin-allergic patients)
 - At the following dosages—
 - ◆ Metronidazole: Adults: 500 mg 2 times/day. Children: 250 mg 2 times/day.
 - ◆ Amoxicillin: Adults: 500 mg 2 times/day. Children: 125–250 mg 2 times/day.
 - ◆ Tetracycline: Adults: 500 mg 2 times/day. Do *not* use in pregnancy. Children >8 years: 25–50 mg/kg/day divided in 4 equal doses.
 - OR**
 - ◆ Doxycycline: Adults: 100 mg 2 times/day. Do *not* use in pregnancy. Children >8 years: 100 mg 2 times/day.
- PLUS**

- ◆ H₂ blocker (see above)

OR

- ◆ If no response after 7 days, change to PPI (see above).

Referral

- Failure to respond to treatment after 2 weeks
- Suspicion of development of a peptic ulcer or cancer of the stomach

References—1, 3, 90, 91

7.4.3 Gastrointestinal Bleeding

Description

Gastrointestinal bleeding is defined as bleeding originating in any part of the GI tract, from the mouth to the anus, although it occurs most often from the upper GI tract (i.e., between the mouth and the upper small intestines). The amount of bleeding can range from undetectable to acute, massive, and life threatening.

Causes and risk factors

- Causes of upper GI tract bleeding—
 - Peptic ulcers (most common cause)
 - Varicose veins in the oesophagus
 - Tears across the gastroesophageal junction
 - Gastritis
 - Cancer
- Causes of lower GI tract bleeding—
 - Haemorrhoids (most common cause)
 - Anal fissures, which contribute to minor bleeding
 - Diverticular disease
 - Colitis
 - Cancer

Signs and symptoms

Signs and symptoms are dependent on the site of the bleeding as well as the severity and duration.

- Bleeding from upper GI tract—
 - Vomiting of bright red or “coffee grounds” material (i.e., haematemesis)
 - Passage of black, tarry, foul-smelling stool (i.e., melena)

- Bleeding from lower GI tract—passage of bright red or maroon blood from the rectum (i.e., haematochezia)
- Other symptoms relate to the underlying disease.

Slow, chronic bleeding can lead to iron-deficiency anaemia with listlessness and pale mucosa. Severe bleeding leads to increased heart rate and falling or low BP.

Caution: Severe bleeding is a medical emergency. Refer the patient immediately. Set up IV infusion of normal saline or Ringer's lactate.

Diagnosis

- A careful history of onset and frequency of the bleeding and the patient's previous history will help to determine cause and possible site of bleeding.
- Order an endoscopy to determine the site of the bleed (at the hospital level).
- Test the stool for occult blood.

Management objectives

- Replace blood loss
- Stop the bleeding
- Treat the underlying cause

Nonpharmacological management

In heavy drinkers, advise a reduction or cessation of alcohol intake.

Pharmacological management

- For upper GI bleeding, give—
 - Injectable ranitidine (50 mg/mL) 50 mg dosage stat then 2 times/day for 7 days
 - Dimenhydrinate tablet (50 mg) 3 times/day, $\frac{1}{2}$ hour before meals
 - If indicated, provide fluid replacement.
 - If patient is anaemic, see section 12.1, "Anaemia."
- For lower GI bleeding—
 - For anal fissure, give—
 - ◆ Bismuth subgallate compound, ointment, topical, applied 2 times/day
 - OR**
 - ◆ Tetracaine 1%, cream, topical, applied after each bowel action
 - For haemorrhoids, use antihemorrhoidal suppositories (see section 7.1.3, "Haemorrhoids").

Referral

- Falling BP and increasing heart rate, for blood replacement and surgical or other intervention
- Vomiting blood or passing frank blood PR

At the district hospital level—

- Rehydrate with an IV of Ringer's lactate.
- Give H₂ blocker: ranitidine.
- Refer the patient to the regional hospital.

References—1, 3, 92, 93

7.5 Liver Disease

7.5.1 Jaundice

Definition

Jaundice is the yellowish discolouration of the conjunctiva of the eyes, mucous membranes, and skin due to deposition of bilirubin from an increased level in the blood. It can be a symptom of either liver disease or a haemolytic disorder.

Causes

- Prehepatic (increased breakdown of red blood cells)
 - Haemolytic anaemia
 - Incompatible blood transfusion
 - Hypersplenism
 - Infections (e.g., malaria)
 - Sickle cell disease
 - Thalassemia
- Intrahepatic
 - Hepatitis (e.g., leptospirosis)
 - Cirrhosis
 - Hepatocellular cancer
 - Medicines (e.g., HAART, isoniazid)
 - Pregnancy
- Extrahepatic (obstructive jaundice)
 - Gallstones in common bile duct
 - Pancreatic cancer

- Pancreatitis
- Bile duct atresia

Diagnosis

- Base on a careful medical history and clinical signs to identify possible cause.
- Pay particular attention to the abdomen.
- Investigations
 - Liver function tests
 - Urine

Note: Rule out sickle cell disease. (See chapter 13, “Haemoglobinopathy—Sickle Cell Disease.”)

Management objectives

- Determine the underlying cause of the jaundice
- Treat accordingly

Nonpharmacological and pharmacological management

- At the health centre level, refer to the hospital.
- In the hospital, treat according to the underlying cause.

7.5.2 Hepatitis

Description

Hepatitis is the acute inflammation of the liver cells.

Causes and risk factors

- Viral infection. There are five main hepatitis viruses, referred to as types A, B, C, D, and E. These five types are of greatest concern because of the burden of illness and death they cause and the potential for outbreaks and epidemic spread.
 - Hepatitis A and E can be transmitted by eating food or water contaminated by faecal matter.
 - Hepatitis B and C and D can be transmitted through parenteral contact with infected body fluids (e.g., transfusion with contaminated blood or blood products or during invasive procedures using improperly sterilized instruments).

- Hepatitis B can also be transmitted from mother to baby at birth and through sexual contact. It is one of the world's most common and serious infectious diseases.
- The clinical characteristics of all five diseases are similar enough to make differential diagnosis difficult.
- Nonviral infections (e.g., toxoplasmosis, leptospirosis)
- Illicit drugs, poisons, and medicines
- Alcohol

Signs and symptoms

Acute infection may occur with limited or no symptoms or may include symptoms that are insidious or sudden in onset, with varying intensity, such as—

- Fever
- Weakness and malaise
- Nausea, loss of appetite, and vomiting

Early symptoms are followed by—

- Jaundice
- Enlarged liver
- Pain or tenderness over to right upper quadrant of the abdomen
- Dark urine
- Stool may be pale
- Severe itching of the skin

Diagnosis

Use the same investigations as for jaundice. (See section 7.5.1, “Jaundice.”)

Management objective

Determine underlying cause and treat accordingly

Nonpharmacological management

- Recommend—
 - Rest and hydration.
 - High sugar diet, best tolerated in the morning
- Advise the patient to—
 - Avoid fatty foods
 - Avoid alcohol
 - Boil all drinking water

- Protect all food from flies
- Wash hands with soap and water after using the toilet; all family members must do the same
- Not share items that go in the mouth (e.g., cutlery, crockery, toothbrushes)

Pharmacological management

- In the hospital, give symptomatic pharmaceutical therapy.
- Analgesics, antipyretics, antidiarrhoeals, and antiemetics are contraindicated during the acute phase because they may aggravate the symptoms.

Referral

- At the health centre level, refer to the hospital.
- In the hospital—
 - Treat according to underlying cause.
 - In general, follow the nonpharmacological and pharmacological management above.

References—1, 3, 10, 94

7.6 Parasitic Infestations

7.6.1 Giardiasis

Description

Giardiasis is the infestation of the small intestines by Giardia lamblia.

Causes and risk factors

- Ingestion of infective cysts
- Poor hygiene and sanitation, leading to person-to-person transmission
- Can also be waterborne

Signs and symptoms

Onset of symptoms may be gradual or sudden and includes—

- Loose, foul-smelling stools
- Abdominal pain
- Bloating
- Nausea and vomiting

- Diarrhoea; when profuse, can lead to dehydration
- Weight loss

Giardiasis can become chronic with symptoms recurring from time to time.

Diagnosis

Microscopic examination of the stool

Management objectives

- Treat the infection
- Prevent reinfection and spread to others

Nonpharmacological management

- Assess for dehydration (see table 7.2, “Assessing Dehydration”). If the patient is dehydrated, follow guidelines for rehydration in section 7.2.
- If diarrhoea continues for more than 1 day in a child, but the child is not dehydrated, give ORS as follows:
 - Adults: Refer to section 1.4 “Acute Diarrhoea with Dehydration.”
 - Children <2 years: 50–100 mL after each bout of diarrhoea, up to ~½ L/day
 - Children 2–9 years: 100–200 mL after each bout of diarrhoea, up to 1 L/day
 - Children >10 years: can have as much as wanted, up to ~2 L/day
- Advise the patient on good hygiene practices.
 - Wash hands thoroughly with soap and water—
 - ◆ After using the toilet
 - ◆ Before any sort of food preparation
 - ◆ After handling raw meat and fish
 - ◆ Before eating
 - ◆ After gardening
 - ◆ Soak soiled clothing and bed linens in disinfectant before washing; wash in hot water.
 - Clean toilet seats, flush handles, door handles, and taps frequently.
 - Use bottled or boiled water.
 - Wash fruit, salad, or vegetables thoroughly using water treated with bleach.

Pharmacological management

Give—

- Adults: metronidazole (250 mg tablets), 1 tablet, 3 times/day for 5 days
- Children: metronidazole (125 mg/5 mL suspension), 5 mL (1 tsp) 3 times/day for 5 days

Note: Do not drink alcohol with metronidazole. In pregnant women, withhold treatment until after delivery.

Referral

Cases not responding to oral treatment

References—1, 8, 95, 96

7.6.2 Helminthiasis

Description

Helminthiasis is infestation with one or more intestinal parasitic worms such as roundworms (*Ascaris lumbricoides*), whipworms (*Trichuris trichiura*), or hookworms (*Necator americanus* and *Ancylostoma duodenale*). In Guyana pinworm (*Enterobius vermicularis*) is also a likely cause.

Causes and risk factors

- Causes—
 - Ingestion of infective cysts
 - Poor hygiene and sanitation, leading to person-to-person transmission
 - Can also be waterborne
- Risk factors—
 - Infected people excrete helminth eggs in their faeces, which then contaminate the soil in areas with inadequate sanitation.
 - Other people can then be infected—
 - ◆ By ingesting eggs or larvae in contaminated food
 - ◆ Through penetration of the skin by infective larvae in the soil (hookworms)
 - ◆ By person-to-person contact (pinworms)

Signs and symptoms

Soil-transmitted worms produce a wide range of symptoms including—

- Intestinal symptoms (e.g., diarrhoea, abdominal pain)
- Vomiting (if present, suspect an intestinal obstruction)
- General malaise and weakness
- Anaemia (from chronic blood loss from the gut, especially with hookworm)
- Irritating nonproductive cough or wheezing (during migration of larvae through the lung)
- Adult worms in the stool
- Anal itching, worse at nights (with pinworms)
- With severe infestation, rectal prolapse; pinworms visible in the area
- Possible signs of undernutrition

Diagnosis

- Based on history and clinical findings
- Stool test for ova and parasites (can be carried out at level 3 facility)
- Blood test for Hb and eosinophil count
- Adhesive tape test (for pinworms)

Management objectives

- Treat the worms
- Prevent further infestation
- Treat any anaemia or nutritional disorder

Nonpharmacological management

- Provide patient counselling and education.
- Advise the patient to practice good hygiene.
 - Wash hands with soap and water—
 - ◆ After passing a stool
 - ◆ Before working with food or eating
 - Keep fingernails short and clean
 - Wash fruit and vegetables well or cook
 - Keep toilet seats clean
 - Teach children to use toilets properly and wash hands
 - Dispose of faeces properly

Pharmacological management

- Give albendazole (200 mg and 400 mg tablets; oral suspension 200 mg/5 mL) single dose. Repeat after 3–4 weeks if needed.
 - Adults: 400 mg
 - Children 1–2 years: 200 mg
 - Children >2 years: 400 mg

Caution: Do not use albendazole during the first trimester of pregnancy.

- Give mebendazole (100 mg and 500 mg tablets; 100 mg/5 mL suspension).
 - For pinworms, give children and adults: 100 mg once. Repeat in 2 weeks if not cleared.
 - For other worms, give children and adults: 100 mg morning and evening for 3 days.

Caution: Do not use mebendazole during the first trimester of pregnancy since it may cause congenital defects.

Referral

- Abdominal tenderness
- Pain
- Vomiting
- Pregnancy

References—1, 8, 97, 98

8. Urogenital System

8.1 Urinary Tract Infection

Description

A urinary tract infection is caused by bacteria that spread upwards from the urethra or via the blood stream from another septic focus.

Classification

There are two categories:

- Lower tract infections—urethritis (infection of the urethra) and cystitis (infection of the bladder)
- Upper tract infections—pyelonephritis (infection of the kidney)

Causes and risk factors

- Females are more prone because of transfer of organisms from anus to urethra
- Organisms:
 - Enterobacteria (*E. coli*, *Klebsiella*, *Proteus*)
 - Anaerobic bacteria
 - STIs
 - Chlamydia
 - Trichomonas
 - Candida
- Catheterization
- Incomplete emptying of bladder leading to vesicoureteral reflux
- Obstruction (e.g., kidney, ureteric or bladder stones)
- Use of spermicidal compounds with diaphragm, cervical cap, or condom
- Diabetes
- Menopause
- Pregnancy
- Chronically ill, debilitated patients

Signs and symptoms

- General—
 - Dysuria, abnormal smell, cloudy urine
 - Frequency
 - Occasionally, fever
 - Occasionally, lower back pain
 - Suprapubic tenderness
- In neonates—
 - Fever
 - Poor feeding
 - Vomiting
 - Prolonged jaundice
 - Failure to thrive
- In infants and young children—
 - Vomiting and poor appetite (may be the only symptoms)
 - Failure to thrive
 - Persistent fever
 - Abdominal pain
 - Frequency and dysuria

Diagnosis

- Based on history, clinical signs, and symptoms
- Urine analysis (blood, WBC, and proteins) and culture

Management objectives

- Identify factors predisposing to infection
- Determine the cause of infection and treat

8.1.1 Urethritis

Signs and symptoms

- Dysuria and frequency
- Pain at the start of urination
- Mucopurulent urethral discharge in men is suggestive of gonococcus or chlamydia

Nonpharmacological management

Advise the patient to—

- Increase fluid intake to at least 1.5 L/day
- Refer his or her partner for treatment if an STI is suspected

Pharmacological management

▪ Give—

- Doxycycline (100 mg tablet) 1 tablet PO 2 times/day for 7 days

Caution: Doxycycline is contraindicated in pregnancy.

OR

- Erythromycin (250 mg, 500 mg tablets) 500 mg PO 4 times/day for 7 days

OR

- Cefixime 400 mg PO in a single dose

PLUS

- Azithromycin 1 g PO in a single dose

▪ For male child <9 years, give—

- Cefixime (400 mg tablet) 8mg/kg PO in a single dose, not to exceed 400 mg

PLUS

- Azithromycin (500 mg tablet; 125 mg/5 mL suspension), 10–15 mg/kg PO in a single dose, not to exceed 1 g

▪ For persistent urethritis, give metronidazole (250 mg tablet; 125 mg/5 mL suspension), adults: 2 g PO in a single dose.

▪ Follow-up

- Patients should be instructed to return for evaluation if symptoms persist or recur after completion of therapy.
- Repeat testing of all men diagnosed with chlamydia or gonorrhoea is recommended 3–6 months after treatment, regardless of whether patients believe that their sex partners were treated.

Referral

- No improvement after 48 hours
- Children <9 years

References—1, 3, 99, 100

8.1.2 Cystitis

Cystitis is more common in women than men, especially in the reproductive years, basically because of the closeness of the urethra to the vagina and anus.

Signs and symptoms

- Dysuria and frequency and urgency
- Nocturia
- Cloudy, foul-smelling urine, sometimes haematuria (30% of cases)
- Suprapubic pain
- Tenderness over lower abdomen
- Pain at the end of urination

Management objective

Determine the cause and treat appropriately

Nonpharmacological management

Increase fluid intake to at least 1.5 L/day

Pharmacological management

- For uncomplicated cystitis in nonpregnant women—
 - Give ciprofloxacin (500 mg tablet) 500 mg PO as a single dose
 - If no relief after 48 hours, give ciprofloxacin (500 mg tablet) 500 mg PO 2 times/day for 5 days
- For cystitis in men, give ciprofloxacin (500 mg tablet) 500 mg PO 2 times/day for 10 days
- In pregnant and lactating women, refer to a doctor or the hospital.

References—1, 3, 101

8.1.3 Pyelonephritis

Description

Pyelonephritis is an infection of the kidneys that generally starts in the urethra and travels up to the kidneys.

Causes

- Uropathogenic *E. coli*
- The following microorganisms are also commonly isolated:
 - *Staphylococcus saprophyticus*
 - *Klebsiella pneumoniae*
 - *Proteus mirabilis*
 - Enterococci
 - *S. aureus*
 - *Pseudomonas aeruginosa*
 - *Enterobacter* species

Risk factors

- Female anatomy (i.e., urethra closer to anus)
- Obstruction in the urinary tract—anything that impedes the flow of urine or complete emptying of bladder
- Weakened immune system
- Prolonged use of a urinary catheter

Signs and symptoms

Acute pyelonephritis is complex, and there is no consistent set of signs and symptoms that is both sensitive and specific for the diagnosis. Therefore, clinicians must maintain a high index of suspicion.

In infants and young children, the only sign may be high fever. In older children and adults, the classic signs are—

- Fever sometimes $>39.4^{\circ}\text{C}$ ($>103^{\circ}\text{F}$)
- Costovertebral (i.e., flank) or groin pain
 - Mild, moderate, or severe
 - Flank pain—unilateral but sometimes bilateral
- Nausea, vomiting, or both

Other signs that may be present are—

- Abdominal pain
- Frequent urination
- Strong, persistent urge to urinate
- Burning sensation or pain when urinating
- Pus or blood in the urine

Nonpharmacological management

Provide patient education—

- Advise females to wipe to the back after defecation to reduce risk of anal-urethral transfer of microorganisms.
- Advise all patients to drink plenty of fluids, at least 1.5 L/day to help to flush bacteria from the urinary tract, but not coffee or alcohol. Coffee and alcohol should be avoided until the infection has cleared.
- Advise all patients to take antibiotics as directed and complete the course as prescribed, since doing so minimizes the risk of recurrence and the development of resistant organisms.

Referral

- All cases
- If there is a delay in transfer, start on an antibiotic (ampicillin)-
 - Adults (except pregnant and lactating women): ampicillin (powder for injection 500 mg, 1 g) 8 g IV daily in 3 divided doses
 - Children: ampicillin (powder for injection 500 mg, 1 g) 200 mg/kg/day IV, in 3 divided doses, every 8 hours

OR

- For penicillin-allergic adults and children, give—
 - Ceftriaxone: 1 g IV every 24 hours

OR

- Cefotaxime: 1–2 g IV every 8 hours

Note: Only a doctor can administer IV medication.

OR

- For pregnant or lactating women, refer.
- Give ciprofloxacin 500 mg 2 times/day while waiting for transfer.

References—1, 3, 102, 103

8.2 Renal Disorders

8.2.1 Nephrotic Syndrome

Description

Nephrotic syndrome is a clinical syndrome characterized by a number of renal and extrarenal features, the most prominent of which is massive proteinuria due to increased permeability of the glomerular basement membrane.

Classification

Nephrotic syndrome can be either—

- Primary, being a disease specific to the kidneys
- Secondary, being a renal manifestation of a systemic general illness

In all cases, injury to glomeruli is an essential feature.

Causes and risk factors

- Primary causes of nephrotic syndrome include the following, in approximate order of frequency:
 - Minimal-change nephropathy
 - Focal glomerulosclerosis
 - Membranous nephropathy
 - Hereditary nephropathies
- Secondary causes include the following, again in order of approximate frequency:
 - Diabetes mellitus
 - Lupus erythematosus
 - Amyloidosis and paraproteinemias
 - Viral infections (e.g., hepatitis B, hepatitis C, HIV)
 - Preeclampsia

Signs and symptoms

- In children, swelling of the face followed by swelling of the entire body
- In adults, dependent oedema
- Proteinuria of $>50 \text{ mg/kg}$ in 24 hours in children and $>3 \text{ g/day}$ in adults
- Single test: 2 g protein to 1 g urine creatinine
- Hypoalbuminaemia $<25 \text{ g/L}$
- Hyperlipidaemia

Management objectives

- Treat underlying causative disease
- Control proteinuria
- Control nephritic complications

Nonpharmacological management

All patients should be referred to the hospital, but while awaiting transfer if delayed, begin treatment.

Assess hydration status

- If not dehydrated—
 - Restrict salt intake
 - Impose no fluid restrictions
- If dehydrated (often preceded by diarrhoea and vomiting)—
 - Check urine, sodium, potassium, and creatine
 - Give IV fluid, sodium chloride 0.9%, 20 mL/kg over 10 minutes

Pharmacological management

Begin symptomatic treatment of oedema.

- For severe oedema, give furosemide injection IV 2 mg/kg, slow IV infusion over 5 hours.
- For mild to moderate oedema, give furosemide tablets (40 mg)
PLUS
 - hydrochlorothiazide tablets 1 mg/kg once daily, not to exceed 25 mg/day.
 - For children, give furosemide syrup (20 mg/mL) 1 mg/kg/day.

Referral

Refer all patients to the hospital.

References—1, 8, 10, 104

8.2.2 Glomerulonephritis

Description

Acute glomerulonephritis refers to the inflammation and proliferation of glomerular tissue, triggered by an immunologic mechanism that can result in damage to the basement membrane, mesangium, or capillary endothelium. It is most common in children >3 years and in young adults.

Causes and risk factors

Previous streptococcal infection (most common)

Signs and symptoms

- Fluid retention
- Hypertension
- Haematuria
- Oliguria with concentrated urine
- Significant proteinuria
- In mild glomerulonephritis—
 - Oedema around the eyelids
 - Pitting oedema of the lower limbs
- In severe glomerulonephritis—
 - Acute pulmonary oedema
 - Cerebral oedema with seizures

Management objectives

- Give highest priority to patients who present with hypertension or with pulmonary or CNS symptoms
- Eradicate streptococcal causes by oral antibiotic therapy
- Treat complications

Nonpharmacological management

All patients should be referred to the hospital, but while awaiting transfer if delayed, begin treatment.

- With mild oedema, the most effective treatment is sodium and fluid restriction.
- Advise bed rest.

Pharmacological management

- For severe oedema, give furosemide PO (40 mg tablets; 20 mg/mL syrup)
 - Adults: 40–60 mg/day in 1–2 divided doses
 - Children: 1–2 mg/kg/day in 1–2 divided doses
- Give penicillin (250 mg 4 times/day for 7–10 days) is indicated for non-allergic patients. For penicillin-allergic patients, give erythromycin (500 mg 4 times/day for 7 days)

Note: Early antibiotic therapy does not affect the development of post streptococcal glomerulonephritis.

- For complications, see—
 - Section 6.3, “Hypertension”
 - Section 1.13 “Seizures and Convulsions”

Referral

- Refer all patients to the hospital.
- Watch especially for the presence of following—
 - Oliguria and renal failure
 - Immunosuppression
 - Anuria
 - Nephritic syndrome
 - Massive proteinuria
 - Significant hypertension
 - Pulmonary symptoms

References—1, 10, 105

8.2.3 Haematuria

Description

Haematuria is blood in the urine, which may be either visible or microscopic.

Microscopic haematuria is defined as 2–5 RBCs per high power field and can be detected by dipstick.

Classification

- Gross haematuria
- Microscopic haematuria

Causes and risk factors

- Causes
 - Urinary tract infections
 - Kidney infections
 - A bladder or kidney stone
 - Enlarged prostate or prostatitis
 - Kidney disease (i.e., glomerulonephritis)
 - Cancer
 - Inherited disorders (e.g., sickle cell anaemia)

- Kidney injury
- Medications (e.g., aspirin, penicillin, heparin, and cyclophosphamide)
- Risk factors
 - Age (men >50 years)
 - A recent infection
 - Family history
 - Strenuous exercise (particularly long-distance running)
 - Certain medications (e.g., aspirin, NSAIDs, and antibiotics such as penicillin)

Signs and symptoms

- Pink, red, or cola-coloured urine
- Usually no other signs or symptoms

Diagnosis

Use the following to determine the underlying cause.

- History and physical findings
- Urinalysis to indicate presence of infection or stones
- In the hospital—
 - Ultrasound
 - Cystoscopy

Management objective

Determine underlying cause and treat

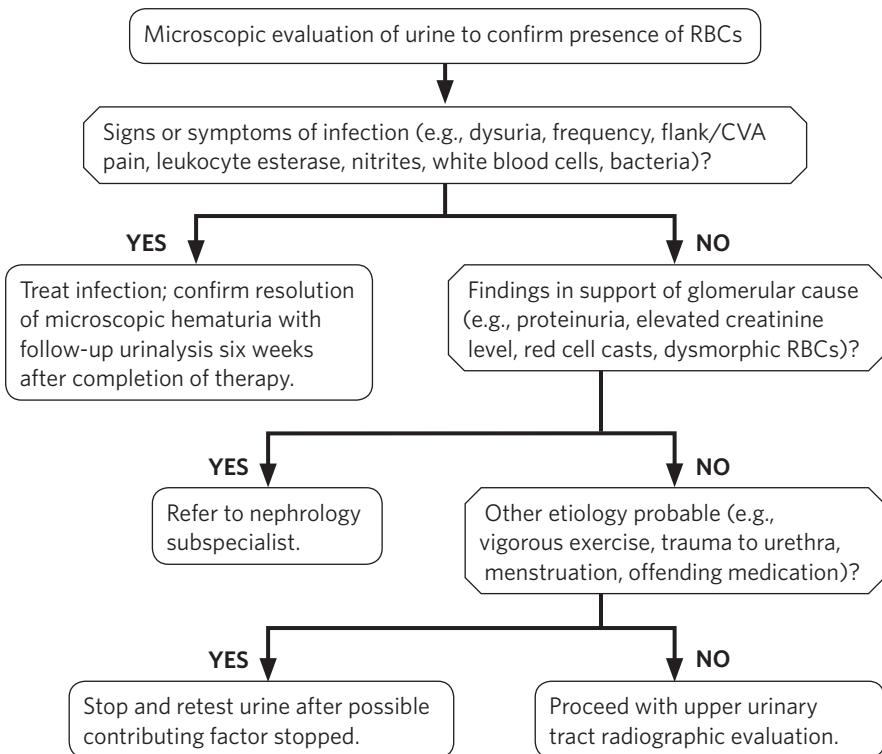
Management

The nonpharmacological and pharmacological management required depends on the underlying cause. See figure 8.2.3.

Referral

See figure 8.2.3.

References—1, 106

Figure 8.2.3. Algorithmic approach to microscopic haematuria in adults

Note: High risk = smoking, history of urothelial neoplasm, age older than 40 years, occupational exposure to benzenes or aromatic amines.

8.3 Sexually Transmitted Infections

Description

Sexually transmitted infections (STIs) are infections that are spread primarily through person-to-person sexual contact. There are more than 30 different sexually transmissible bacteria, viruses, and parasites.

Causes and risk factors

The most common causes of STIs in Guyana are listed below:

- *Neisseria gonorrhoea* (gonorrhoea)
- *Chlamydia trachomatis* (genital chlamydia and Lymphogranuloma venereum)
- *Trichomonas vaginalis* (trichomoniasis)
- *Candida albicans* (vulvo-vaginal candidiasis)
- *Treponema pallidum* (syphilis)
- *Herpes simplex* (genital herpes)
- *Haemophilus ducreyi* (chancroid)
- *Klebsiella granulomatis* (granuloma inguinale/donovanosis)

Risk factors include the following:

- Sexual contact with someone who has a known STI
- Age <30 years with multiple partners
- Homelessness, dwelling on the street
- Unprotected intercourse with a new partner in the preceding 2 months
- >2 partners in the previous 12 months
- Men who have sex with men
- Commercial sex workers

Signs and symptoms

See individual disease entities.

Diagnosis

- Based on history, physical examination
- Laboratory examination and culture—discharge, swab from ulcers, or both
- Screening questions
 - Is the patient currently sexually active?
 - Has he or she had a new sex partner in the previous 2 months?

- Has he or she had multiple partners in the past 12 months?
- Does the patient have any history of past STI?

Management

Management should include—

- Partner notification
- Partner treatment
- Counselling, to help prevent repeat infection
- Syphilis and HIV testing
- Promotion of condom use (offer condoms)

8.3.1 Gonorrhoea

Signs and symptoms

In men—

- Burning on micturition
- White, yellow, or green discharge from penis
- Occasionally, painful or swollen testicles

In women, usually asymptomatic, but may present with—

- Pain or burning sensation on micturition
- Increased vaginal discharge
- Vaginal bleeding between periods

Diagnosis

Signs and symptoms are similar to those of a chlamydial infection except that the latter tends to be milder. Sometimes coinfection exists. Perform gram stain of the discharge.

Management objective

Prevent the spread of the infection to adjacent structures

- In men, prevent epididymitis
- In women, prevent pelvic inflammatory disease

Nonpharmacological management

Advise the patient on the consistent use of condoms if he or she is not in a mutually monogamous relationship.

Pharmacological management

- Uncomplicated anogenital infection in males—
 - For first-line treatment, give cefixime (200 mg tablet) 400 mg PO as a single dose
 - For second-line treatment, give—
 - ◆ Ceftriaxone, 125 mg by IM injection as a single dose

OR

 - ◆ Spectinomycin, 2 g by IM injection as a single dose
 - ◆ If second-line treatment fails, refer patient.
- Uncomplicated anogenital infection in females, give—
 - Cefixime (200 mg tablet) 400 mg stat

OR

 - Ceftriaxone (500 mg, 1 g injections) 250 mg IM stat

PLUS

 - Fluconazole (150 mg) PO stat

PLUS

 - Metronidazole (500 mg tablet) PO 2 times/day for 7 days
- Disseminated infection, give ceftriaxone (500 mg injection) 1 g IM or IV, once daily for 7 days

Reference—107

8.3.2 Chlamydial Infections

8.3.2.1 Genital Chlamydia

Signs and symptoms

Similar to that of gonorrhoea. Often coinfection exists. There may be few or no symptoms.

8.3.2.2 Lymphogranuloma Venereum

Signs and symptoms

- Ulcerative genital lesions (see table 8.3.9)
- Marked swelling of the lymph nodes in the groin
- Headache
- Fever and malaise

Diagnosis

Blood or urine tests or cultures

Pharmacological management

- For first-line treatment, give—
 - Doxycycline, (100 mg tablet) PO 2 times/day for 7 days.

Caution: Doxycycline is contraindicated in pregnancy. See below for alternative.
- OR**
- Azithromycin (250 mg tablet) 1 g PO in a single dose
- For second-line treatment, give—
 - Amoxicillin (250 mg, 500 mg tablets) 500 mg PO 3 times/day for 7 days

OR

 - Erythromycin (250 mg, 500 mg tablets) 500 mg 4 times/day for 7 days

OR

 - Ofloxacin (200 mg tablet) 300 mg 2 times/day for 7 days

Note: Authorized at the region hospital level only.

OR

 - Tetracycline (500 mg tablet) PO 4 times/day for 7 days

Caution: Tetracycline is contraindicated in pregnancy. See below for alternative.
- In pregnancy, give—
 - Erythromycin (250 mg, 500 mg tablet) 500 mg 4 times/day for 7 days

OR

 - Amoxicillin (250 mg, 500 mg tablet) 500 mg PO 3 times/day for 7 days

8.3.3 Trichomoniasis

Cause and risk factors

- Infection with *T. vaginalis*
- Multiple sex partners
- Other STIs

Signs and symptoms

Symptoms of the disease vary, and most patients are asymptomatic. Women are more likely to have symptoms than men, however.

- Symptoms in men are related to—
 - Burning on urination or ejaculation
 - Itching or irritation inside the penis
 - Penile discharge
- Symptoms in women—
 - Malodorous vaginal discharge (often yellow or green)
 - Vulvar erythema and itching
 - Dysuria or urinary frequency
 - Dyspareunia

Diagnosis

Microscopic examination of vaginal or prostatic secretions

Management objective

Effect early cure especially in pregnancy, since infection can result in adverse pregnancy outcomes

Pharmacological management

- In men and nonpregnant women, give—
 - Metronidazole (250 mg tablet) 2 tablets (500 mg) 2 times/day for 7 days
OR
 - Metronidazole (2 g tablet) PO in a single dose
- During pregnancy, give metronidazole (250 mg tablet) 2 g PO as a single dose

Caution: Not recommended during the first trimester.

8.3.4 Vulvo-vaginal Candidiasis

Cause

Mainly *C. albicans*

Signs and symptoms

- Vulvar itching and soreness
- Inoffensive vaginal discharge
- Vulvar erythema or excoriations from scratching
- Vulvar oedema
- Pain on urination and sexual intercourse

Diagnosis

Microscopy of wet smear

Management objective

- Remove any predisposing factors
- Treat the infection

Pharmacological management

Give—

- Miconazole cream or suppository 200 mg intravaginally daily for 3 days
OR
- Clotrimazole pessary 200 mg intravaginally daily for 3 days
OR
- Fluconazole (150 mg tablet) 1 tablet PO as a single dose
OR
- Nystatin suppository (100,000 IU) intravaginally daily for 14 days

8.3.5 Syphilis

Characterized by episodes of active disease interspersed with periods of latency

Classification

- Congenital (i.e., transmitted from mother to child in utero). Not a problem in Guyana.
- Acquired through sexual intercourse or blood transfusion. Acquired syphilis may be primary, secondary, or latent.

Signs and symptoms

- For primary syphilis—
 - Usually the appearance of a single sore at the site of inoculation, but multiple sores are possible (for characteristics of the sore, see table 8.3.9). The locations are—
 - ◆ In heterosexual men, usually on the penis
 - ◆ In homosexual men, the anus, rectum, penis, or mouth
 - ◆ In women, the cervix and labia
 - Sore lasts 3–6 weeks whether treated or not.
 - Regional lymphadenopathy is present.
 - Primary syphilis may go on to become secondary syphilis.

- For secondary syphilis—
 - Generalized skin rash
 - Symmetric mucocutaneous lesions
 - Generalized, nontender lymphadenopathy
 - Condylomata lata (in 10% of patients) in warm moist body areas
- For latent syphilis, there are no clinical manifestations.
- Late latent syphilis is an infection of >2 years without evidence of treponemal infection.

Diagnosis

VDRL, RPR

Management objectives

Prevent the progression of the disease to the secondary and latent phases

Nonpharmacological management

Advise patient on—

- Consistent use of condoms during sexual intercourse, if not in a mutually monogamous relationship
- Need for treatment for partner(s)

Pharmacological management

- For early syphilis
 - Give first-line treatment—
 - ◆ Benzathine benzylpenicillin injection (2.4 MIU) IM as a single dose (divide between 2 sites)
 - OR**
 - ◆ Procaine benzylpenicillin injection (1.2 MIU) IM daily for 10 days.
- For penicillin-allergic, nonpregnant patients, give—
 - ◆ Doxycycline (100 mg tablet) PO 2 times/day for 14 days
 - OR**
 - ◆ Tetracycline (500 mg tablet) PO 4 times/day for 14 days
- For penicillin-allergic or pregnant patients, give erythromycin (250 mg, 500 mg tablets) 500 mg 4 times/day for 14 days
- Follow-up
 - ◆ Re-evaluate clinically and serologically 3 months after treatment
 - ◆ Do a second evaluation 6 months later if indicated by results and a third 12 months later.

- ◆ Check for possible reinfection.
- ◆ Consider repeat treatment if—
 - Clinical signs or symptoms of active syphilis persist or recur
 - There is confirmed increase in the titre of a non-treponemal test
- For late latent syphilis
 - Give first-line treatment—
 - ◆ Benzathine benzylpenicillin injection (2.4 MIU) IM once weekly for 3 weeks
 - OR**
 - ◆ Procaine benzylpenicillin injection (1.2 MIU) IM daily for 20 days
- For penicillin-allergic nonpregnant patients, give—
 - ◆ Doxycycline (100 mg tablet) PO 2 times/day for 30 days
 - OR**
 - ◆ Tetracycline (500 mg tablet) PO 4 times/day for 30 days
- For penicillin-allergic or pregnant patients, give erythromycin (250 mg, 500 mg tablets) 500 mg 4 times/day for 30 days.

8.3.6 Genital Herpes

Cause

Herpes simplex virus type 2 (HSV-2)

Signs and symptoms

Most individuals infected with HSV-1 or HSV-2 experience either no symptoms or have very mild symptoms that go unnoticed. Because of this, most people infected with HSV-2 are not aware of their infection. When symptoms do occur, they typically appear as—

- One or more vesicles, pustules, or ulcers on or around the genitals, rectum, or mouth that may take 2–4 weeks to heal (see table 8.3.9)
- Tender and swollen inguinal glands
- Dysuria
- Vaginal and urethral discharge in women
- During a first outbreak, the patient may have flu-like symptoms such as—
 - Fever
 - Headache
 - Body aches and muscle pain

Repeat outbreaks of genital herpes are common, in particular during the first year of infection. Symptoms of repeat outbreaks are typically shorter in duration and less severe than the first outbreak of genital herpes.

Diagnosis

- By visual inspection if the outbreak is typical
- Swab and culture
- Blood test (ELISA)

Management objectives

There is no cure for herpes so the aim is to shorten the episode and prevent transmission to the patient's partner(s).

Nonpharmacological management

Advise the patient on the correct and consistent use of latex condoms.

Pharmacological management

- For the first clinical episode, give—
 - Acyclovir (200 mg tablets) 2 tablets PO 3 times/day for 7 days
OR
 - Valaciclovir (500 mg tablets) 1 g PO twice/day for 7 days
OR
 - Famciclovir (125 mg, 500 mg tablet) 250 mg 3times/day for 7 days
- For recurrent infection, give—
 - Acyclovir (200 mg tablet) 400 mg PO 3 times/day for 5 days
OR
 - Acyclovir (200 mg tablet) 800 mg PO 2 times/day for 5 days

Note: For patients who have recurrent infections, provide a prescription for the medication so that the patient can start treatment at the first sign of the disease.

Note: Patients who have ≥ 6 recurrences during the year should go on suppressive therapy.
- Recommended regimen for suppressive therapy: give acyclovir (200 mg tablet) 400 mg PO 2 times/day continuously for up to 1 year

8.3.7 Chancroid

Cause

H. ducreyi

Signs and symptoms

- Genital ulcers (see table 8.3.9)
- Inguinal adenitis

Diagnosis

The combination of one or more painful genital ulcers and tender, suppurative inguinal adenopathy suggests the diagnosis of chancroid.

Management objective

Promote early healing of the ulcers

Nonpharmacological management

Advise patient to keep ulcerative lesions clean.

Pharmacological management

- For first-line treatment, give—
 - Ciprofloxacin (500 mg tablet) 1 tablet PO 2 times/day for 3 days.

Caution: Ciprofloxacin is contraindicated in pregnant women.

OR

- Erythromycin (250 mg, 500 mg tablets) 500 mg 4 times/day for 7 days

OR

- Azithromycin (250 mg tablet) 1 g PO as a single dose

- For second-line treatment, give ceftriaxone (500 mg, 1 g injection) 250 mg as a single dose.
- Follow-up weekly until there is clear evidence of improvement.

8.3.8 Granuloma Inguinale/Donovanosis

Cause

K. granulomatis

Signs and symptoms

- Subcutaneous nodules progress to painless ulcerative lesions (see table 8.3.9) that bleed readily on contact.
- Genital swelling (particularly the labia) may be present.

Diagnosis

Microscopy of smear or biopsy from lesion

Management objective

Early resolution of signs and symptoms

Pharmacological management

- Give first-line treatment until lesions are healed—
 - Azithromycin (250 mg tablet) 1 g PO on the first day, then 500 mg once daily
 - OR**
 - Doxycycline (100 mg tablet) 1 tablet 2 times/day

Caution: Doxycycline is contraindicated in pregnancy.

- If lesions are unhealed after 2 weeks, use alternative therapy—
 - Erythromycin (250 mg, 500 mg tablets) 500 mg PO 4 times/day
 - OR**
 - Trimethoprim (80 mg/sulfamethoxazole 400 mg) 2 tablets PO 2 times/day for a minimum of 14 days
- Follow-up—
 - Reassess weekly
 - Continue therapy until lesions have healed (usually 3–5 weeks)

8.3.9 Genital Ulcers

Description

A genital ulcer is an ulcer located on the genital area. It reflects the presence of an important set of STIs. It sharply increases the risk of the acquisition and shedding of HIV.

Causes

- Syphilis
- Genital herpes (this is a chronic lifelong infection)
- Chancroid

Diagnosis

- Isolation of HSV in cell culture is the preferred virologic test.
- Serological test (ELISA)

Table 8.3.9. Clinical Features of Genital Ulcers

Feature	Syphilis	Herpes	Chancroid	Lymphogranuloma venereum	Donovanosis
Incubation period	9–90 days	2–7 days	1–14 days	3 days to 6 weeks (up to 4 months)	1–4 weeks (up to 4 months)
Early primary lesions	Papule	Vesicle	Pustule	Papule, pustule, or vesicle	Papule
Number of lesions	Usually one	Multiple, may coalesce	Usually multiple, may coalesce	Usually one	Variable
Diameter edges	5–15 mm sharp, demarcated, elevated, round or oval	1–2 mm erythematous	Variable, undetermined, ragged, irregular	2–10 mm elevated, round or oval	Variable, elevated, irregular
Depth base	Superficial or deep; smooth, nonpurulent; relatively nonvascular	Superficial, serous, erythematous, nonvascular	Necrotic, purulent; bleeds easily	Superficial or deep; variable, nonvascular	Elevated, red, and velvety; bleeds readily
Induration	Firm	None	Soft	Occasionally firm	Firm
Pain	Uncommon	Frequently tender	Usually very tender	Variable	Uncommon
Lymphadenopathy	Nontender, bilateral	Firm, tender, often bilateral with initial episode	Tender, may suppurate, loculated, usually unilateral	Tender, may suppurate, loculated, usually unilateral	None, pseudobubo

Pharmacological management

- For syphilis, give benzylbenzatine penicillin (injection 1.2 IU) 2.4 IU once weekly for 3 weeks.
- For herpes, give—
 - Acyclovir (200 mg tablet) 400 mg PO 3 times/day for 7–10 days
OR
 - Acyclovir (200 mg tablet) 200 mg PO 5 times/day for 7–10 days
- For chancroid give—
 - Azithromycin (250 mg tablet) 1 g PO in a single dose
OR
 - Ceftriaxone (500 mg and 1 g injections) 250 mg IM in a single dose
OR
 - Ciprofloxacin (500 mg tablet) 500 mg PO 2 times/day for 3 days.

Caution: Ciprofloxacin is contraindicated for pregnant and lactating women.

OR

- Erythromycin base (250 mg and 500 mg tablets) 500 mg PO 3 times/day for 7 days

8.3.10 Urethral Discharge

Description

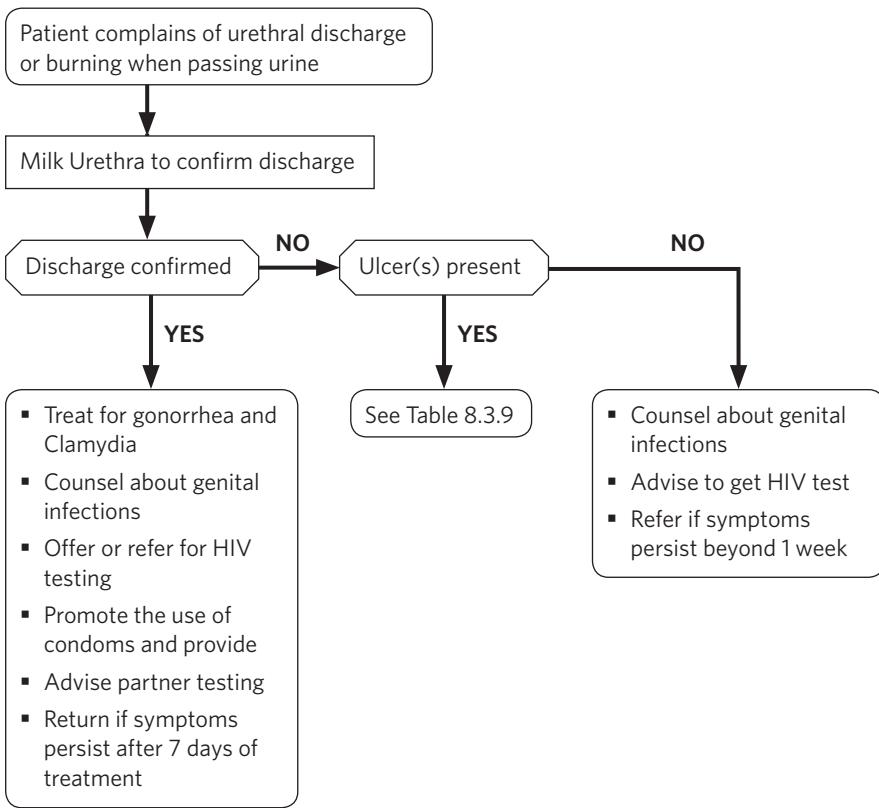
Urethral discharge is defined as discharge from the urethra and may be creamy or yellow. See figure 8.3.10.

Causes and risk factors

N. gonorrhoeae, *C. trachomatis*, or both

Pharmacological management

- Treat for both organisms, using—
 - Cefixime (200 mg tablet) 400 mg PO as a single dose/day for 7 days
OR
 - Ceftriaxone (500 mg, 1 g injections), 125 mg IM as a single dose/day for 7 days
PLUS
 - Doxycycline (100 mg tablet) 1 tablet 2 times/day for 7 days

Figure 8.3.10. Urethral discharge algorithm

- Patients should be advised to return if symptoms persist 7 days after start of therapy.

References—1, 107

8.4 Testicular Disorders

8.4.1. Scrotal Swelling

Description

Scrotal swelling is the abnormal enlargement of the scrotum. It can occur in males at any age. The swelling can be on one or both sides and vary in size. The testicles and penis may or may not be involved. It can be with or without pain, acute or long-standing.

Causes

- Infection—STIs, coliform bacteria, mumps, or TB
- Fluid collection around the testes (i.e., hydrocele)
- Testicular cancer (common in young men, often a painless lump)
- Inguinal hernia
- Trauma
- Epididymo-orchitis (ascending or haematogenous)
- Urogenital TB
- Varicocele

Signs and symptoms

- Scrotum feels cystic or rubbery on palpation
- If reducible and nontransilluminating by torchlight, a hernia is indicated.
- If nonreducible and transilluminating, a hydrocele is indicated.
- Occasional urethral discharge
- Occasional dysuria

Diagnosis

- A careful history and physical examination should suggest the cause.
- Take blood for RPR/VDRL, and check for gonococcus if indicated

Management objectives

- Determine the cause of the condition, particularly torsion of the testis; because the latter may lead to gangrene in 6–12 hours, immediate referral for surgery is indicated.
- Treat infection if present
- Refer to next level if due to causes other than infection

Nonpharmacological management

- Counsel on compliance with treatment and risk reduction.
- Provide and promote use of male and female condoms (in the case of a suspected STI).
- Apply cold compresses and provide support for the testes in the case of mumps orchitis.

Pharmacological management

- If due to an STI and no diagnostic tests are available to rule out gonococcus, give—
 - Cefixime (200 mg tablet) 400 mg PO as a single dose/day for 7 days

OR

 - Ceftriaxone (500 mg, 1 g injection), 125 mg IM as a single dose/day for 7 days

PLUS

 - Doxycycline (100 mg tablet) 1 tablet 2 times/day for 7 days
- Have the patient return after 1 week.
- Notify partner and treat.

Referral

- Immediate—
 - Suspected torsion of the testis
 - Cause unknown
- Subsequent—
 - Person who is not sexually active
 - Sudden onset of pain
 - History of trauma
 - History of serious non-STI disease

References—1, 3, 108, 109

8.4.2. Torsion of the Testis

Description

Testicular torsion, although it can occur at any age, is primarily a disease of adolescents and neonates. It is caused by the spontaneous twisting of the spermatic cord and the blood supply to the testicle, thus cutting off its own blood supply.

Cause

The cause is probably anatomical attributable to the failure of proper fixation of the testes posteriorly.

Signs and symptoms

- Testicular torsion is characterized by—
 - Excruciating one-sided testicular pain, with sudden swelling
 - Nausea or vomiting
 - High position of the testicle
 - Absent cremasteric reflex
- Consequences of torsion
 - Infarction of testicle
 - Loss of testicle
 - Infection
 - Infertility secondary to loss of testes

Diagnosis

Differentiate from other causes of testicular pain because a delay in diagnosis and management can lead to the above consequences.

Management objective

- Save the testes
- Maintain its integrity

Management

Caution: Torsion of the testis is an emergency.

Refer the patient immediately to the next level where surgery can be performed because a delay in diagnosis and management can lead to the loss of the testicle. The time elapsed between onset of pain and performance of detorsion, and the corresponding salvage rate, is as follows:

- <6 hours: 90–100% salvage rate
- 12–24 hours: 20–50%
- >24 hours: 0–10%

If transfer cannot take place ≤6 hours, attempt manual detorsion.

- The procedure for manual detorsion of the testis is analogous to the opening of a book when the physician is standing at the patient's feet.

- Most torsions twist inward and toward the midline; thus, manual detorsion of the testicle involves twisting outward and laterally.
Note: Lateral rotation has been described in up to a third of testicular torsions, however, and in such cases, further lateral rotation will worsen the condition.
- For suspected torsion of the *right* testicle—
 - ◆ Position yourself in front of the standing or supine patient.
 - ◆ Hold the patient's right testicle with your left thumb and forefinger.
 - ◆ Rotate the right testicle outward 180° in a medial-to-lateral direction.
- For suspected torsion of the *left* testicle—
 - ◆ Position yourself in front of the standing or supine patient.
 - ◆ Hold the patient's left testicle with your right thumb and forefinger.
 - ◆ Rotate the patient's left testicle in an outward direction 180° from medial to lateral.
- Rotation of the testicle may need to be repeated 2–3 times for complete detorsion.
- Pain relief serves as a guide to successful detorsion, but restoration of blood flow must be confirmed following the maneuver.
- Subsequent elective orchiopexy is recommended to prevent recurrent torsion.
- In the literature, the success rate of manual detorsion has varied widely. Success rates have ranged from 26.5% to more than 80%.

References—3, 110

9. Musculoskeletal System

9.1 Lower Back Pain

Description

Lower back pain is a common presenting symptom especially in the elderly, but it can present in a young person as well. The pain can be local in origin or referred and can be acute or chronic.

Causes

Pain in the low back can relate to the bony lumbar spine, discs between the vertebrae, ligaments around the spine and discs, spinal cord and nerves, muscles of the low back, internal organs of the pelvis and abdomen, and the skin covering the lumbar area. It can be inflammatory, mechanical, neurological, traumatic, or due to other disease.

- Mechanical
 - Lumbar strain (acute, chronic)
 - Carrying heavy objects
 - Pregnancy
 - Physical training
 - Bending down; dragging or pulling heavy objects
 - Lesions to the muscles or ligaments (sprains or trauma)
 - Posture
- Neurological
 - Nerve irritation
 - Mechanical pressure (e.g., pinching in sciatica) by bone or other tissues
 - Lumbar radiculopathy—nerve irritation caused by damage to the discs between the vertebrae
 - Slipping of the vertebrae or spondylolisthesis
- Bone and joint conditions
 - Congenital or developmental
 - Degenerative
 - Injury (fractures)
 - Inflammation of the joints (arthritis)

- Infections (abscesses, TB, HIV and AIDS)
- Malignancies (primary or metastatic)

Signs and symptoms

- Pain and tenderness in the lumbosacral area (i.e., the lower part of the back) is the primary symptom.
- The pain may radiate down the front, side, or back of the leg, or it may be localised to one area of the backbone.
- The pain may increase with—
 - Activity
 - Lifting or carrying heavy loads
 - Bending down
 - Sitting for long periods
- Neurological changes or disorders may occur, such as—
 - Weakness or loss of sensitivity in the legs
 - Inability to plantar flex the foot
 - Inability to stand on the toes
 - Pain with straight leg raising test

Diagnosis

Based on the history of the illness and a physical examination. It is essential that the history include injury history, aggravating, and alleviating conditions, associated symptoms (e.g., fever, numbness, tingling, incontinence), as well as the duration and progression of symptoms.

Management objectives

- Determine the cause of the pain
- Treat the condition
- Relieve the pain

Management

Management depends greatly on the precise cause of the low back pain.

Nonpharmacological management

- Application of ice and heat on affected area provides relief for some people and should be tried.
- Recommend that the patient rest as much as possible.
- Instruct the patient not to lift or pull heavy objects.

- Advise the patient to—
 - Apply warm compresses on the affected area 3 times/day
 - Bend at the knee, keeping the back straight, when lifting objects
 - Avoid turning or rotating the back too much
 - Sleep on a firm mattress
 - Sleep with pillow between the knees while lying in the side
 - Use correct posture (e.g., adjust chair, height of desk, position of computer)

Pharmacological management

- Give—
 - Paracetamol (500 mg tablet) 1 g PO 3 times/day for 4 days
OR
 - Aspirin (300 mg tablet) 600 mg 4 times/day (adults only)

Caution: Acetylsalicylic acid (aspirin) is not recommended for children <12 years old because of the risk of Reye's syndrome.
- If pain persists, give—
 - Diclofenac injection (25 mg/mL) 50 mg stat then every 12 hours for 3 days
OR
 - Ibuprofen (200 mg, 400 mg tablets) 200–400 mg 3 times/day for 5 days

Referral

- No improvement after 2–4 weeks
- Any neurological or nerve involvement
- Severe continuous neurological pain
- Weakness of limb
- Localised vertebra involvement
- Bladder or bowel incontinence

References—1, 3, 111

9.2 Joint Pain

9.2.1 Osteoarthritis

Description

Arthritis is a group of conditions involving damage to the joints of the body. There are different forms of arthritis and each has a different cause. The most common form of arthritis is osteoarthritis (i.e., degenerative joint disease), with damage to articular cartilage. It may be primary or secondary to systemic disease.

Causes and risk factors

- Injury to the joint
- Infection of the joint
- Obesity and overweight
- Age

Signs and symptoms

- Pain in the joint(s):limbs, neck, hips, knees, and fingers; usually asymmetrical
- Joint pain with swelling, warmth, and redness
- Stiffness of joints (usually in the morning)
- Decreased joint movement
- Joint deformation
- Deterioration with physical activity
- Improvement with rest
- Nodular thickening of the finger joints, especially the end joints

Diagnosis

Diagnosis is guided by the history. Important features are—

- Speed and time of onset
- Pattern of joint involvement
- Symmetry of symptoms
- Early morning stiffness
- Tenderness, gelling, or locking with inactivity
- Aggravating and relieving factors

In children, rule out rheumatic fever especially if several joints are affected in succession.

Run the following—

- Blood tests
- ESR and full blood count
- x-ray of affected joints

Management objectives

- Identify the nature of the underlying process
- Relieve symptoms
- Maintain the integrity of the joint

Nonpharmacological management

- Apply heat to the affected joint, making sure not to burn the patient.
- Provide physical and occupational therapy.
- Encourage the patient to make lifestyle changes including exercise and weight control.
- Recommend dietary supplements (symptomatic or targeted at the disease process causing the arthritis) such as glucosamine, chondroitin, and turmeric.
- Arthroplasty (joint replacement surgery) may be required in eroding forms of arthritis.

Pharmacological management

For pain relief, give—

- Ibuprofen (200 mg, 400 mg, 600 mg tablets; 100 mg/5 mL suspension)
 - Adults: 200–600 mg 4 times/day depending on severity
 - Children: 20–40 mg/kg/day in 4 divided doses

PLUS

- Aluminium hydroxide + magnesium hydroxide tablet, 1 tablet 4 times/day after meals,

OR

- Paracetamol (500 mg tablet; 120 mg/5 mL suspension). See table 9.2.1 for dosages.

OR

- Acetylsalicylic acid (300 mg, 500 mg tablets) 1–2 tablets 4 times/day

Caution: Acetylsalicylic acid (aspirin) is not recommended for children <12 years old because of the risk of Reye's syndrome.

Table 9.2.1. Paracetamol Dosages by Age and Weight for the Management of Pain Associated with Osteoarthritis

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3–12 months	6–10 kg	60	2.5 mL (½ tsp)	3 times/day	5–7 days
1–5 years	10–18 kg	120	5 mL (1 tsp)	3 times/day	5–7 days
5–8 years	18–25 kg	240	10 mL (2 tsp) or ½ tablet	3 times/day	5–7 days
8–14 years	25–50 kg	500	1 tablet	3–4 times/day	5–7 days
>14 years	>50 kg and adults	1,000	2 tablets	3–4 times/day	5–7 days

Referral

- Swelling, warmth, redness, and tenderness on exerting pressure
- Suspicion of a systemic disease
- Failure to respond to NSAIDs
- Chronic pain for 1 week in children or >2 weeks in adults
- Incapacitating pain
- Fever

References—1, 3, 8**9.2.2 Rheumatoid Arthritis****Description**

Rheumatoid arthritis (RA) is a chronic, systemic inflammatory disorder of the connective tissue. It can affect the whole body, but it principally attacks the peripheral joints, in a symmetric fashion, producing an inflammatory synovitis that often progresses to destruction of the articular cartilage and bone erosion leading to ankylosis of the joints. The joints most often affected are those of the hands, wrist, feet, ankles, neck, knees, and shoulders. Although RA primarily affects the joints, problems affecting other parts of the body—such as the heart, lungs, and spleen—can occur. People who have RA are more prone to atherosclerosis, and the risk of myocardial infarction (heart attack) and stroke is markedly increased.

Cause

The cause is unknown but autoimmunity plays a part in making it chronic and in its progression.

Signs and symptoms

Increased stiffness of ≥ 3 joints, usually worse in the morning and lasting for at least an hour (for > 6 weeks)

- Joints red, swollen, and painful
- Fingers most affected with spindle-shaped metacarpal-phalangeal, or proximal interphalangeal joint swelling
- Arthritis of hand joints, present for at least 6 weeks
- Symmetric arthritis (i.e., involvement of the same joint areas on both sides) present for at least 6 weeks
- Subcutaneous nodules over bony prominences
- Abnormal amounts of serum rheumatoid factor
- Radiographic changes

The following may also be present—

- Limitation of movement progressing to loss of movement and joint deformity
- Constitutional symptoms including—
 - Fatigue
 - Low-grade fever
 - Malaise
 - Loss of appetite
 - Loss of weight

Diagnosis

- At least four of the first eight signs and symptoms listed above must be present for the diagnosis to be made.
- x-ray of the hands and feet
- Blood test for rheumatoid factor, ESR, uric acid

Management objectives

There is no known cure for RA, but many different types of treatment can alleviate symptoms, modify the disease process, or both. Management therefore aims to—

- Relieve pain
- Reduce inflammation
- Protect the joints
- Maintain function
- Prevent further destruction of the joints
- Control systemic involvement

Nonpharmacological management

Advise the following:

- Daily rest, but not all day because of risk of permanent stiffening of joints
- Splinting of joints, when inflamed and swollen, to reduce movement
- Exercise to maintain muscle strength and joint movement
- Lifestyle changes to minimize stress on joints
- An adequate intake of omega-3 fatty acids (i.e., eat more fish and less meat)
- Use of soya, canola, and olive oil in preference to others
- Losing weight (if the patient is overweight or obese)

Pharmacological management

Treat pain and inflammation with—

- Ibuprofen (first choice) (200 mg, 400 mg tablet) 200–400 mg 4 times/day
OR
- Paracetamol (500 mg tablet) (See table 9.2.1 for dosages.)
OR
- NSAIDs
- OR**
- Acetylsalicylic acid (300 mg tablets) 2 tablets 4 times/day for pain

Caution: Acetylsalicylic acid (aspirin) is not recommended for children <12 years old because of the risk of Reye's syndrome.

OR

- Diclofenac sodium (25 mg, 75 mg tablets) 2 (25 mg) tablets 3 times/day or 1 (75 mg) tablet 2 times/day (injection not authorized for use at the HC level)

Reassess the patient in 2 weeks and continue on therapy if response is acceptable.

Referral

Refer to level 4 or 5 for additional treatment if—

- The patient is not responding to NSAIDs alone
- The patient shows progressive disability and joint damage

In the hospital, confirm the diagnosis and take the following steps—

- Provide pain relief (see above)
- Give corticosteroids
- Give prednisolone (5 mg tablet) 1 tablet 3 times/day

References—1, 3, 8, 34, 112, 113

9.2.3 Gout

Description

Gout is a metabolic disease, most often affecting middle-age to elderly men and postmenopausal women. It is typically associated with an elevated level of uric acid in the blood (i.e., hyperuricaemia), that results in the deposit of uric acid crystals in tissues. Recurrent bouts of acute gout can lead to a degenerative form of chronic arthritis called gouty arthritis. Gout is also associated with an increased risk of kidney stones.

Stages and classification

- ***Asymptomatic tissue deposition.*** Gout has no overt symptoms, but hyperuricaemia and the asymptomatic deposition of crystals in tissues are present.
- ***Acute gout*** occurs when urate crystals in the joint(s) cause acute inflammation. A flare is characterized by pain, redness, swelling, and warmth lasting days to weeks.
- ***Chronic/recurrent gout*** is characterized by chronic arthritis, with soreness and aching of joints. People who have gout may also get tophi (i.e., lumps of urate crystals deposited in soft tissue), usually in cooler areas of the body (e.g., elbows, ears, distal finger joints).

Causes and risk factors

Hyperuricaemia is caused by an imbalance in the production and excretion of urate (i.e., overproduction, underexcretion, or both).

Risk factors for gout include the following:

- Being overweight or obese; weight loss lowers the risk for gout
- Having hypertension
- Consuming alcohol (beer and spirits more than wine)
- Using diuretics
- Eating a diet rich in meat and seafood

Signs and symptoms

- Acute gout will typically manifest itself as an acutely red, hot, and swollen joint (usually large toe, knee, or ankle) with excruciating pain and restricted movement.
- An attack is often preceded by a history of alcohol intake or binge eating.
- Most initial attacks occur in the lower extremities.

Management objectives

- Relieve pain and restore movement to the joint
- Prevent future attacks through lowering uric acid levels in blood

Nonpharmacological management

For acute gout, advise patient to—

- Rest the joint
- Apply an ice pack to the affected joint (for no more than 20 minutes at a time)
- Drink 2–3 litres of water and other fluids (e.g., low-fat or skimmed milk, much-diluted fruit juices)
- Avoid alcohol intake
- Avoid or strictly restrict the intake of foods such as kidney, liver, offal, sardines, foods with high yeast content, pork crackling, and the skin of fish
- Eat less fat
- Lose weight if overweight or obese, but do not fast

For chronic, recurrent gout—

- Emphasise dietary adherence
- Urge the patient to exercise regularly but not intensively

Pharmacological management

Acute gout. The mainstay of treatment during an acute attack is the administration of anti-inflammatory medicines.

- Diclofenac 50–100 mg IM stat

OR

- Indomethacin 25–50 mg TID

OR

- Ibuprofen 400–800 mg TID

OR

- If the patient has no response to anti-inflammatory medicines, give prednisone 40 mg PO daily for 3–5 days

Chronic gout

- First-line treatment—
 - Allopurinol (100 mg, 300 mg tablets) 150 mg once daily initially
 - Increase by 150 mg each week according to response, not to exceed 900 mg daily
 - If dose is >300 mg give in 2–3 divided doses
- If no response, move to second-line treatment—
 - Probenecid tablet 250 mg 2 times/day for 1 week
 - Then 500 mg 2 times/day
- Give an NSAID or colchicine as a prophylactic and continue until at least 1 month after the hyperuricaemia has been corrected.
 - Indomethacin 25–50 mg 3 times/day
 - Ibuprofen 200–400 mg 3 times/day
 - Colchicine 0.5 mg 1–2 times/day

Referral

Failure to respond to treatment

References—1, 3, 114

9.2.4 Osteoporosis

Description

Osteoporosis is defined as a reduction of bone mass (or density), which causes deterioration in the architecture of the skeleton. This deterioration leads to a marked increase in the risk of fracture. It is prevalent among postmenopausal women but also occurs in women and men with underlying conditions associated with demineralization of bone.

Causes and risk factors

- Imbalance between new bone formation and old bone resorption.
- Inadequate calcium intake or absorption
- Vitamin D deficiency (vitamin D facilitates the absorption of calcium)
- Reduction in oestrogen levels in women and androgens in men
- Inactivity—prolonged bed rest
- Lack of weight-bearing exercise
- Cigarette smoking over a long period
- Excessive alcohol use
- Certain medications:
 - Corticosteroids
 - Cytotoxic medicines
 - Anticonvulsants

Signs and symptoms

- Early in the disease, the patient may have no symptoms.
- Later, it may cause dull pain in the bones or muscles, particularly in the low back or neck.
- Later still, the patient has sudden sharp pains, made worse by activity that puts weight on the area.
- The patient experiences loss of height and a stooped posture.
- The patient may report a fall that may result in a spine or foot fracture.

Diagnosis

- X-ray the affected area.
- Test for serum calcium level.
- Test for bone density.

Management objectives

- Slow down or stop the mineral loss
- Increase bone density
- Prevent bone fractures
- Control the pain associated with the disease

Nonpharmacological management

Advise the patient to—

- Eat a diet rich in calcium (1,000 mg daily); drink milk or calcium-fortified orange juice and eat foods high in calcium. (See appendix F.)
- Get exposure to direct sunlight at least 20 minutes a day
- Restrict salt and caffeine intake
- Perform weight-bearing exercise such as walking, dancing, or aerobics at least 3 times/week
- Maintain normal body weight
- Stop smoking (see appendix D)
- Restrict alcohol intake (1 drink per day for women and 2 for men) (See table 6.3D for size of alcoholic drinks)

Pharmacological management

- Give calcium supplementation, not to exceed 600 mg at a time.
- Give vitamin D supplementation—
 - Adults <50 years: 200 IU
 - 50–70 years: 400 IU
 - >70 years: 600 IU
- Give oestrogen replacement for postmenopausal women.

Follow-up

If the patient is on oestrogens, do routine mammograms, pelvic examinations, and visual inspection of the cervix with acetic acid.

Referral

- Suspected fracture
- To physiotherapist to advise on exercise

References—1, 3, 115

9.3 Muscular Disorders—Myalgia

Description

Myalgia, or muscle pain, is a symptom of many diseases and disorders. Muscle aches and pains are common and can involve more than one muscle. Ligaments, tendons, and fascia, the soft tissues that connect muscles, bones, and organs can also be involved. The pain can be temporary or chronic.

Causes and risk factors

The most common causes of myalgia are—

- Injury or trauma, including sprains, hematoma from exercise or physically demanding work
- Overuse: using a muscle too much or too often, including protecting a separate injury
- Chronic tension

Myalgia without a traumatic history is often due to viral infections:

- Influenza
- Dengue

Myalgia can also be caused by—

- Diseases affecting the whole body:
 - Malaria
 - Metabolic disorders
- Disorders:
 - Severe potassium deficiency
 - Muscle abscess
- Medications, especially fibrates and statins; occasionally ACE inhibitors; cocaine; some antiretroviral medicines
- Autoimmune diseases:
 - Systemic lupus erythematosus
 - Polymyalgia rheumatica
 - Polymyositis
 - Dermatomyositis
 - Multiple sclerosis (i.e., neurologic pain localised to a myotome)

Longer term myalgias may be indicative of a metabolic myopathy, some nutritional deficiencies, or chronic fatigue syndrome.

Signs and symptoms

- In patients for whom the pain is related to injury or overuse, the pain tends to involve specific muscles and starts during or just after the activity. In these situations, it is usually obvious which activity is causing the pain.
- Pain is most noticeable when muscles are being used, particularly with repetitive activities.
- Accompanying symptoms may be weakness, tenderness to palpation, and swelling.

Diagnosis and management

See figure 17.4, “Algorithm for myalgia.”

9.4 Tendon Disorders

9.4.1 Carpal Tunnel Syndrome

Description

Carpal tunnel syndrome is the result of the compression of the median nerve at the wrist, which results in neurological symptoms in the affected hand.

Cause and risk factors

- Pressure on the median nerve at the wrist
- Excessive use of the wrist in repetitive actions such as uninterrupted typing
- Tenosynovitis
- Underlying systemic disease
 - Hypothyroidism
 - Diabetes mellitus
 - Rheumatoid arthritis

Signs and symptoms

- Early signs and symptoms include—
 - Nocturnal paresthesias of thumb, index, and middle fingers
 - Pain, numbness, and tingling in the hand and fingers
- As the disease progresses, patients can develop—
 - A burning sensation
 - Cramping and weakness of the hand
 - Decreased grip strength, which can lead to frequent dropping of objects from the hand

- Occasionally, sharp shooting pains in the forearm
- Chronic carpal tunnel syndrome can also lead to wasting (atrophy) of the hand muscles, particularly those near the base of the thumb in the palm of the hand.

Diagnosis

- Based on the symptoms and the distribution of the hand numbness
- Swelling, warmth, tenderness, deformity of wrist

Management objectives

- Relieve pain
- Prevent muscle deterioration
- Return the hand to normal functioning

Nonpharmacological management

Advise the patient to—

- Do stretching exercises of the wrist
- Wear a wrist splint at night

Pharmacological management

- Give paracetamol: PO (100 or 500 mg tablet; 120 mg/5 mL oral suspension). See table 9.4.1 for dosages.

Table 9.4.1. Paracetamol Dosages by Age and Weight for the Management of Pain Associated with Carpal Tunnel Syndrome

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
8–14 years	25–50 kg	500	1 tablet	3–4 times/day	5–7 days
>14 years	>50 kg and adults	1,000	2 tablets	3–4 times/day	5–7 days

OR

- Ibuprofen (600 mg tablet) dosage 600 mg 4 times/day for 5–7 days

OR

- Corticosteroids can be given by mouth or injected directly into the involved wrist joint by the appropriate, skilled professional, not to exceed 2–3 times/year.

References—1, 116

9.4.2 Tennis Elbow

Description

Tennis elbow is a condition caused by the inflammation of the tendons on the outer bony prominence (i.e., lateral epicondyle) of the elbow. Tennis elbow can occur in anyone who strains the tendons of the forearm and is not limited to tennis players.

Causes

Any repetitive motion of the wrist, including tennis, hedge clipping, excessive use of a hammer or screwdriver, painting, or any activity that requires excessive constant gripping or squeezing can cause tennis elbow.

Signs and symptoms

- Tenderness on the outer bony part of the elbow
- Morning stiffness of the elbow with persistent aching
- Soreness in the forearm
- Pain worse when grasping or holding an object

Diagnosis

- Based on medical history and physical examination
- x-ray of elbow to rule out other causes

Nonpharmacological management

- Advise the patient to—
 - Apply a cold pack to the elbow for 20 minutes twice/day
 - Rest the area to prevent further injury
- An elbow strap or splint may help take the pressure off the inflamed tendon.
- Physical therapy involves different exercises to increase flexibility and strength. These exercises are usually performed at home. Refer the patient to a physiotherapist.

Pharmacological management

- Steroid injections can be made into the inflamed area by the appropriate, skilled professional, not to exceed 2–3 times/year.

10. Dermatology

10.1 Acne

Definition

Acne is a common skin disease characterized by pimples on the face, chest, and back. It occurs when the pores of the skin become clogged with oil, dead skin cells, and bacteria, caused by changes in skin structures consisting of a hair follicle and its associated sebaceous gland. It can present in inflammatory or noninflammatory forms. Acne lesions are commonly referred to as pimples, blemishes, spots, zits, or acne.

Acne is most common during adolescence but may continue into adulthood. For most people, acne improves over time and tends to disappear in the early twenties. The most common sites for acne vulgaris are the forehead, cheeks, nose, and chin; the chest and back may sometimes be involved.

Causes and aggravating factors

- Sebum overproduction during puberty
- Altered hormonal status in adolescence with increased androgens in males
- Increased androgenic properties of progesterone in premenstrual females or those taking progesterone-containing contraceptives
- Some medicines (e.g., steroids) and cosmetics
- Family history
- Infection by propionibacterium, mainly *P. acnes*

Signs and symptoms

Acne can be categorised as mild, moderate, and severe (table 10.1A). It may worsen during menstruation. Psychological problems (i.e., depression) may occur in persistent acne.

Diagnosis

Diagnosis is based on clinical findings: the presence of a combination of papules, pustules, blackheads and whiteheads nodules, and scarring on the forehead, cheeks, nose, chin, chest, and back. Two types are recognized (table 10.1B).

Table 10.1A. Categories of Acne

Degree	Signs and Symptoms
Mild	<ul style="list-style-type: none"> ▪ Open and closed comedones (i.e., whiteheads and blackheads) ▪ Some papules and pustules (pimples), commonly on face, chest, back, and shoulders
Moderate	<ul style="list-style-type: none"> ▪ More frequent papules and pustules ▪ Mild scarring
Severe	<ul style="list-style-type: none"> ▪ All of the above plus nodular abscesses ▪ Leads to more extensive scarring that may be keloidal in some cases

Table 10.1B. Diagnosing the Two Types of Acne

Acne vulgaris	Acne
Peak prevalence in mid to late teens	Peak prevalence in patients ages 40–70
Papules, pustules, comedones, and nodules	Papules, pustules, redness, and blepharitis
Scarring	Soft tissue overgrowth in the form of rhinophyma
Improves in sunshine	Can be exacerbated by sunshine
Can affect chest and back	Usually limited to the head

Management objectives

- Alleviate symptoms by reducing the number and severity of lesions
- Limit duration and recurrence
- Decrease sebaceous gland activity
- Decrease bacterial infection and inflammation
- Minimise cosmetic disfigurement and psychological suffering

Nonpharmacological management

Advise patients to—

- Avoid squeezing pimples because doing so may increase the risk of scarring
- Avoid excessive use of cosmetics and use only water-based products
- Wash face with mild soap and water 3 times/day; minimise scrubbing
- Get some sun (sunshine is helpful), but avoid sunburn
- Shave as lightly and as infrequently as possible (male patients). Strokes should be in the direction of hair growth, shaving each area only once.

- Discontinue or avoid any aggravating factors
- Maintain a balanced diet
- Control stress

Pharmacological management

- For mild acne—
 - Start with topical benzoylperoxide cream or lotion 5%, once daily (use overnight).
 - Treatment should be assessed after 4 weeks and, if beneficial, should be continued for at least 4–6 months.
 - If the patient has no satisfactory response with benzoylperoxide, progress to topical antibiotics or a combined preparation:
 - ◆ Erythromycin lotion or solution 1.5% or 2% applied 2 times/day to the affected area

OR

 - ◆ Benzoyl peroxide 5%/erythromycin 3% gel applied 2 times/day to the affected area.
- For moderate acne—
 - Use topical treatment as for mild acne.
 - For patients who fail to respond to topical treatment, give oral antibiotics for at least 3 months:
 - ◆ Erythromycin (250 mg tablet) 1 tablet 2 times/day for 4 weeks

OR

 - ◆ Doxycycline (100 mg tablet) 1 tablet once daily; can be taken with food or milk
- Severe acne
 - Use the topical treatment as for mild acne.
 - Give also—
 - ◆ Tetracycline (250 mg tablet) 250–1,000 mg/day

Caution: Doxycycline is contraindicated in pregnancy.

- If necessary, supplement with a topical non-antibiotic.
- Consider an oral contraceptive in women. Use a product that does not contain norethisterone.

OR

- ◆ Erythromycin (250 mg, 500 mg tablets) 250–1,000 mg/day
- Duration of treatment depends on response. It may require 6 months to a year.

Referral

Patients should be referred to a dermatologist for specialist treatment if they have—

- Severe acne or painful, deep nodules or cysts (i.e., nodulocystic acne)
- No improvement after 3 months of primary care treatment, which should include several courses of topical and systemic treatment. Failure should be based upon a subjective assessment by the patient.
- Severe social or psychological problems, including a morbid fear of deformity
- A risk of (or are developing) scarring, despite treatment in primary care

References—1, 3, 34, 118, 119

10.2 Candidiasis

Description

Candidiasis is an infection caused by the fungus *Candida albicans*. It occurs more often in infants, malnourished children, and persons with AIDS. It may also be caused by prolonged broad-spectrum antibiotic use. Candidiasis is usually a very localised infection of the skin or mucosal membranes, including the oral cavity (thrush), the back of the throat or oesophagus, the gastrointestinal tract, the urinary bladder, or the genitalia (vagina, penis). Candida can also infect areas that are chronically damp, such as the inner aspects of the thighs, under the breasts, the underarms, groin, and nails.

Causes and risk factors

- Unhygienic preparation of bottle feedings
- Poor oral hygiene
- Malnutrition
- Alcohol abuse
- HIV and AIDS, leukaemia, and other cancers
- Prolonged use of antibiotic
- Diabetes mellitus

Signs and symptoms

The signs and symptoms are site specific (table 10.2A).

Table 10.2A. Signs and symptoms of candidiasis

Site	Signs and Symptoms
Oral	<ul style="list-style-type: none"> ▪ White patches on the gums, tongue, and other areas of the oral cavity ▪ Burning sensation of the tongue and sore throat ▪ Swollen lymph glands in neck ▪ Fever (possibly)
Oesophageal	<ul style="list-style-type: none"> ▪ Recent onset of retrosternal pain ▪ Difficulty swallowing ▪ Presence of oral candidiasis
Skin	<ul style="list-style-type: none"> ▪ Well-demarcated, red patches of various size and shape with itching ▪ Redness that may be difficult to see on skin
Nails	<ul style="list-style-type: none"> ▪ Thickened, brittle, crumbly, or ragged; distorted in shape, loosening or lifting up of the nail; dull with no shine; white or yellow streaks on the side of the nail; build up of debris under the nail
Vagina	<ul style="list-style-type: none"> ▪ Smelly, thick, white-yellow discharge that might be accompanied by itching, burning, and swelling. ▪ Walking, urinating, or sex painful

Diagnosis

Based on microscopy and culture

Management objectives

- Remove any predisposing factors
- Treat the infection
- Maintain proper hydration and nutrition

Management

Both nonpharmacological and pharmacological management are site specific (table 10.2B).

Table 10.2B. Nonpharmacological and Pharmacological Management of Candidiasis

Site	Nonpharmacological Management	Pharmacological Management
Oral	<ul style="list-style-type: none"> ▪ Instruct the patient on good oral hygiene. ▪ Advise the patient to— <ul style="list-style-type: none"> • Clean the mouth with a sodium bicarbonate solution ($\frac{1}{2}$ teaspoon—or 2.5 mL—in 250 mL of boiled and cooled water), 4 times/day • Apply gentian violet 2 times/day for 10 days • Keep affected area clean to prevent secondary infection • Drink plenty of water ▪ Continue feeding. Use nasogastric tube in infants if necessary. 	<p>Give nystatin suspension (100,000 IU/mL) 4–5 times/day for 5 days at the following dosages—</p> <ul style="list-style-type: none"> ▪ If the patient has had symptoms for <2 weeks: 100,000 IU 4 times/day for 5 days ▪ If the patient has had symptoms for >2 weeks: 200,000–500,000 IU 4 times/day for 5–10 days <p>When oral candidiasis is an opportunistic infection of HIV and AIDS use—</p> <ul style="list-style-type: none"> ▪ Fluconazole (150 mg tablet; 50 mg/5 mL suspension) 100 mg (or 3–6 mg/kg for children) once daily for 7 days ▪ If response is slow, continue for another 7 days
Oesophageal	None	<ul style="list-style-type: none"> ▪ Adults: Fluconazole (150 mg tablet) 1 tablet once daily for 14–21 days. ▪ Children: Fluconazole (50 mg/5 mL suspension) 6 mg/kg once then 3 mg/kg once daily for 14–21 days
Skin	None	Use topical nystatin ointment 100,000 IU/g 3 times/day for 14 days
Nails	Advise patient to soak the nails in a solution of Epsom salts for about 15 minutes every day until it clears	Give clotrimazole 1% + beclometasone 0.025% ointment 3 times/day for 14 days
Vagina	None	See section 8.3.4, "Vulvo-Vaginal Candidiasis."

Referral

- Patients who are nonresponsive to topical treatment
- Patients who have frequent recurrences
- HIV-positive patients

References—1, 3, 8, 10

10.3 Contact Dermatitis

Description

Contact dermatitis is a term for a skin reaction resulting from exposure to allergens (i.e., allergic contact dermatitis) or irritants (i.e., irritant contact dermatitis). Chronic contact dermatitis can develop when the removal of the offending agent no longer provides expected relief.

Causes

- The most common causes of allergic contact dermatitis are the following:
 - Certain plants
 - Metals such as gold and nickel in jewellery, particularly costume jewellery
 - Fragrances in cosmetics and perfumes
 - Topical antibiotics (e.g., neomycin, bacitracin)
 - Preservatives in polishes, paints, and waxes
- Irritant contact dermatitis can result from the following:
 - Highly alkaline soaps, detergents, and cleaning agents
 - Latex
- Aggravating factors include the following:
 - Dry skin
 - Emotional tension
 - Sweating, exudation
 - Excessive exposure to sun

Signs and symptoms

Allergic dermatitis usually appears on the area where the offending substance actually touched the skin. Irritant dermatitis, however, may be more widespread on the skin. Particularly affected are the flexures of the elbows and knees, but also the neck, chest, feet, and hands.

Symptoms of both allergic and irritant dermatitis include the following:

- ***Red rash.*** The rash appears immediately in irritant contact dermatitis. In allergic contact dermatitis, however, the rash sometimes does not appear until 24–72 hours after exposure to the allergen.
- ***Blisters or wheals*** and ***urticaria*** (hives) often form where the skin was directly exposed to the allergen or irritant.
- ***Itchy, burning skin.*** Irritant contact dermatitis tends to be more painful than itchy. Allergic contact dermatitis tends to be more itchy.

Although either form of contact dermatitis can affect any part of the body, irritant contact dermatitis often affects the hands, which have been exposed by resting in or dipping into a container (e.g., sink, pail, tub, swimming pools with high chlorine) containing the irritant.

Diagnosis

Based on skin appearance and history of exposure to an irritant or allergen

Management objectives

- Identify and remove or avoid further contact with the irritant or allergen
- Treat the underlying cause
- Relieve the itching

Nonpharmacological management

Advise the patient to—

- Avoid known allergens and irritants
- Use a weak acid solution (e.g., lemon juice, vinegar) to counteract the effects of irritants
- Cut a cucumber and rub it over the itchy area as a good home remedy
- If blistering develops, apply cold moist compresses for 30 minutes 3 times/day
- Avoid scratching because it can cause secondary infections
- Use bath oil, and pat skin dry after a bath with a soft towel
- Apply body oil or cream after bathing
- Use soothing lotions or creams such as calamine lotion

Food handlers and kitchen workers should wear gloves when handling products that can cause contact dermatitis. Immediately after exposure to a known allergen or irritant, they should wash with mild soap and tap water to remove or inactivate most of the offending substance.

Pharmacological management

- For mild cases that cover a relatively small area, give—
 - Hydrocortisone cream 1% 3–4 times/day as needed

OR

 - Betamethasone ointment or cream 0.1% 3 times/day for 7 days
- For relief of itching, give oral antihistamines such as chlorpheniramine maleate (4 mg tablets; 2 mg/5 mL suspension) PRN.
 - Adults: 4 mg tablet 3 times/day, not to exceed 24 mg/day
 - Children: 2 mg/5 mL (suspension)
 - ◆ <1 year: Do not administer
 - ◆ 1–2 years: 1 mg ($\frac{1}{4}$ tablet) or 2.5 mL ($\frac{1}{2}$ tsp) 2 times/day
 - ◆ 2–5 years: 1 mg ($\frac{1}{4}$ tablet) or 2.5 mL ($\frac{1}{2}$ tsp) 3 times/day, not to exceed 6 mg/day
 - ◆ 6–12 years: 2 mg ($\frac{1}{2}$ tablet) or 5 mL (1 tsp) 3 times/day, not to exceed 12 mg/day

If the patient has a secondary infection, use a topical antiseptic (e.g., Lugol's solution)

Referral

- Very severe cases
- Cases not responding to treatment

References—1, 3, 120, 121

10.4 Eczema

Description

Eczema (i.e., atopic dermatitis) is a long-term (i.e., chronic) skin disorder that involves scaly and itchy rashes. It presents with variable clinical findings and varies with age. It could be acute or become chronic. Most cases present by the age of 5 years.

Causes

- Eczema is the end result of a number of disorders including contact dermatitis and seborrheic dermatitis (i.e., dandruff). The latter is usually allergy related, and the patient may have a family history of dermatitis, asthma, or hay fever.
- Secondary infection with staphylococcus may occur with any form of eczema.

Signs and symptoms

Eczema may present with erythematous macules, papules, and vesicles that can come together to form patches and plaques that are poorly demarcated. Itching is predominant.

- In acute eczema, there is oozing.
- In chronic eczema, the area is dry and scaly.
- In childhood and adolescence, lesions appear on the inner surfaces of the elbows and knees and in the creases of the neck.

Diagnosis

Based on clinical history and physical findings

Management objectives

- Look for and treat any pre-existing skin disease
- Control the itching to prevent scratching

Nonpharmacological management

Advise patient to—

- Wear clothing made of cotton, linens, and other natural fabrics that “breathe” to prevent overheating
- Cut his or her nails short
- Avoid scratching
- Expose affected areas to sunlight
- Avoid soap because it dries the skin; use a moisturizing body wash instead
- Keep baths short and use skin moisturizer immediately after

Pharmacological management

- For acute eczema, use calamine ointment 2 times/day.
- For chronic eczema, use zinc oxide ointment—
 - Emulsifying ointment (UE), (e.g., paraffin oils) to wash or bathe

- Aqueous cream (UEA), applied to dry areas as a moisturizer
 - If the patient has no response to the zinc ointment within 3 days or for more severe eczema, give hydrocortisone 1% cream, applied 2 times/day for 7 days. Apply it sparingly to the face; do not apply around the eyes.
 - If there is a response, reduce the use of the hydrocortisone cream over a few days and maintain treatment with aqueous cream (UEA)
 - If there is no response to the hydrocortisone cream within 7 days or for more severe eczema, give betamethasone 0.1% ointment applied 2 times/day for 7 days.
- Note:** Not authorized for use at health post level.
- Do not apply to the face, neck, and flexures.
 - If there is a response, reduce the use of betamethasone ointment over a few days and maintain treatment with calamine ointment.
 - For severe itching, give chlorpheniramine PO (4 mg tablets; 2 mg/5 mL suspension)–
 - Adults: 4 mg (1 tablet) 3 times/day, but not to exceed 16 mg/day
 - Children: 2–5 years: 1 mg (2.5 mL or ½ tsp) 3 times/day, but not to exceed 4 mg/day
 - Children: 6–12 years: 2 mg (5 mL or 1 tsp) 3 times/day, but not to exceed 8 mg/day

Referral

If no improvement in 2 weeks

References—1, 3, 10

10.5 Hansen's Disease (Leprosy)

Description

Hansen's disease, also known as *leprosy*, is a curable, chronic infectious disease involving mainly the skin and peripheral nerves. It is a chronic granulomatous disease of the skin, mucous membranes, nerves, lymph nodes, eyes, and internal organs such as the liver, spleen, and testicles. The main mode of transmission is considered to be airborne, through droplets discharged from the respiratory tract of untreated infectious cases. Transmission may also occur through skin-to-skin contact with entry through broken skin.

Cause and risk factors

- Infection with *Mycobacterium leprae*
- Close contacts with patients who have untreated, active, predominantly multibacillary disease

Classification

The disease is classified as paucibacillary or multibacillary depending on bacillary load:

- Paucibacillary Hansen's disease is milder and characterized by one or more (up to 5) hypopigmented or reddish skin macules.
- Multibacillary Hansen's disease is associated with multiple symmetric skin lesions, nodules, plaques, thickened dermis, and frequent involvement of the nasal mucosa resulting in nasal congestion and epistaxis.

Signs and symptoms

Leprosy mainly affects the skin and peripheral nerves. It is characterized by the following:

- Hypopigmented skin patch with some sensory loss
- An enlarged or painful peripheral nerve (preferably with some evidence of nerve function loss)
- Nodules found mainly on nose, ears, face, limbs but can occur at any site
- Painless wounds, especially on the sole of the foot, palm of hand, and fingers
- Loss of sensation on hands, feet, or both
- Dryness of hands, feet, or both due to loss of sweating, accompanied by loss of feeling

If left untreated, leprosy can lead to progressive and permanent damage of nerves, leading to loss of sensation and sweating in the extremities and paralysis of muscles in the hands, feet, and face.

Management objectives

- Cure the patient
- Interrupt transmission
- Prevent disabilities

Diagnosis

Diagnosis can be made on clinical signs alone.

Nonpharmacological management

Household contacts should be checked for the disease. Contacts are defined as anyone who has lived with the patient for at least 1 month since the onset of symptoms.

Pharmacological management

Multidrug therapy is the cornerstone of the leprosy elimination strategy because it cures patients, reduces the reservoir of infection, and thereby interrupts its transmission. Multidrug therapy also prevents disabilities through early cure.

For purposes of treatment, leprosy is divided into two types:

- Paucibacillary leprosy (i.e., 1–5 skin lesions) is treated with a regimen of two medicines—rifampicin and dapsone—for 6 months.
- Multibacillary leprosy (i.e., >5 skin lesions) is treated with a regimen of three drugs—rifampicin, clofazimine, and dapsone—for 24 months.

Multidrug therapy is provided in blister packs, each containing 4 weeks' worth of treatment. Specific blister packs are available for multibacillary and paucibacillary leprosy as well as adults and children (table 10.5).

Table 10.5. Dosages of Medicines for Management of Hansen's Disease

Regimen	Multibacillary (Adults)	Paucibacillary (Adults)	Multibacillary (Children)	Paucibacillary (Children)
Rifampicin	600 mg once a month	600 mg once a month	450 mg once a month	450 mg once a month
Clofazimine	300 mg once a month, and 50 mg daily	—	150 mg once a month, and 50 mg every other day	—
Dapsone	100 mg daily	100 mg daily	50 mg daily	50 mg daily
Duration	24 months	6 months	24 months	6 months

Referral

All level 1 facilities should refer patients to level 2 facilities or the district hospital.

References—122, 123

10.6 Napkin Rash

Description

A diffuse, reddish eruption in the napkin (i.e., diaper) area of infants. The area may become infected with candida.

Causes

- Generally napkin rash is caused by persistent moisture from diarrhoeal stools or urine being left in contact with the skin for prolonged periods.
- Sometimes the rash may be caused by underlying skin conditions due to improper rinsing of napkins to remove soap or detergent.

Signs and symptoms

Red rash in napkin area

Diagnosis

Based on clinical signs and symptoms

Management objectives

- Relieve the symptoms
- Prevent recurrence

Nonpharmacological management

- Advise the use of cloth napkins.
- Advise against the use of waterproof pants to cover cloth napkins.
- Instruct the caregiver to expose napkin area to air and sunlight if possible especially with severe napkin rash.
- Educate caregiver and give advice on—
 - Washing and drying of the napkin area when soiled with urine or stool
 - Regular napkin changes
 - Proper washing and rinsing of napkins

Pharmacological management

- Use silver sulfadiazine cream 1%, applied at each napkin change until rash clears.
- If there is no improvement within 3 days, suspect candida:
 - Treat with nystatin ointment 100,000 IU/g, applied after each napkin change.
 - Continue to use for 2 weeks after rash clears.

Referral

If no further improvement after 7 days

References—8, 124, 125

10.7 Psoriasis

Description

Psoriasis is a chronic, noncontagious autoimmune disease. It is commonly an inherited condition that affects the skin and joints. It commonly causes red scaly patches to appear on the skin. The scaly patches are areas of inflammation and excessive skin production. Skin rapidly accumulates at these sites and takes on a silvery-white appearance. In the most common form of psoriasis, plaques occur on the skin of the elbows and knees and the trunk, but they can affect any area including the scalp and genitals. In another variation of the disease, plaques can occur under the arms, in the groin, under the breasts, and around the navel. Over half of patients report a family history of psoriasis.

The areas affected tend to be the same on both sides. Unlike with eczema, psoriasis is more likely to be found on the outer aspect of the joint.

The disorder varies in severity from minor localised patches to complete body coverage. Fingernails and toenails are frequently affected (psoriatic nail dystrophy) and can occur alone. The joints can also become inflamed causing psoriatic arthritis.

Signs and symptoms

- Slowly enlarging red, well-demarcated plaques covered by silvery scale in the affected area
- Itching possible

Diagnosis

A diagnosis of psoriasis is usually based on the appearance of the skin.

Management objective

Control the severity of the disease

Nonpharmacological management

Advise the patient to—

- Use bath solutions and shampoos that contain cold tar or oats
- Avoid excess drying or irritation of skin
- Limit periods of exposure to sunlight

Pharmacological management

Cold tar ointment 2 times/day, forever

Referral

Failure to respond to treatment

References—1, 3, 126, 127, 128, 129

10.8 Scabies

Description

Scabies is a contagious skin condition caused by a tiny mite (*Sarcoptes scabiei*) that burrows into the outer layer of the skin and deposits its eggs there. It spreads easily through person-to-person contact. It is particularly problematic in areas of poor sanitation and overcrowding.

Signs and symptoms

There may be no symptoms for the first 2–3 weeks after catching scabies. It will develop into an allergic type rash on several parts of the body, particularly—

- In the webs between the fingers
- On wrists and elbows
- Around the waist
- Under the breasts in females
- On male genitalia and on the buttocks
- In infants, on the face, scalp, neck, palms of the hands, and soles of the feet

Other symptoms will appear—

- Intense itching, particularly at night, develops
- Crusting due to secondary bacterial infection can occur, due to bruising of the skin from scratching.
- Often tunnels (burrows) made by mites may be seen.
- Often more than one member of the family is affected.

Diagnosis

Diagnosis is mainly by clinical history and physical examination. The history, particularly itching of recent onset, and careful scrutiny of hands and wrists will usually establish the diagnosis. Scabies can be confirmed with skin scrapings.

Management objectives

- Prevent re-infection or further spread of the disease
- Relieve the itching

Nonpharmacological management

- All close family and skin-to-skin contacts must be treated at the same time to prevent re-infection, even if symptoms are not evident.
- The patient should be advised to wash, boil, dry in the sun, and iron (concentrating on the seams) all clothing, bedding, and bed linens after each use.
- The mattress, pillows, and chair cushions must be placed in the sun for at least 3 consecutive days.
- Advise the patient to keep his or her nails short and clean.
- Instruct the patient to dry his or her skin thoroughly after bathing and to put on clean clothes.
- The whole house should be cleaned and disinfected with a disinfectant spray.

Pharmacological management

- Use benzyl benzoate lotion 25%.
 - Adults and children >6: full strength 25% solution
 - Children <6 years: 12% solution (dilute 25% solution 1 part solution: 1 part water or baby oil)
 - Infants: 1:3 dilution
- Apply benzyl benzoate lotion to the entire body, excluding the face and nipple area of breastfeeding women, for 3 consecutive evenings. Leave on overnight and wash off the next day. Attention should be paid to the toes, fingers, genital area and areas where the rash is seen.
- A scrub bath must be taken before and after the 3 days of application.
- Repeat the treatment after 10 days.
- Itching may persist for some weeks after completing the treatment. This can be relieved by applying calamine lotion BID or taking chlorpheniramine

maleate. Give chlorpheniramine (4 mg tablets; 2 mg/5 ml syrup) PO every 4–6 hours daily.

- Adults: One 4 mg tablet 4–6 times/day, not to exceed 24 mg/day
- Children
 - ◆ 2–5 years: 1 mg ($\frac{1}{2}$ teaspoon) syrup 4–6 times/day, not to exceed 6 mg/day
 - ◆ 6–12 years: 2 mg ($\frac{1}{2}$ tablet or 5 mL—1 teaspoon—syrup) 4–6 times/day, not to exceed 12 mg/day

Note: Itching usually starts to abate after 1 week and the rash after 3 weeks.

Referral

If there are signs of treatment resistance, refer the patient to the specialist.

References—3, 8, 130, 131, 132, 133

10.9 Tinea (Pityriasis) Versicolor (Lata)

Description

This condition is caused by a fungus that is a normal inhabitant of the skin. On dark skin, it is characterized by pale brown or hypopigmented spots; on light skin, the spots are pink or hyperpigmented. They appear mainly on the trunk and upper arms but may also be present on the face. The spots scale with scraping (whitish fine scales). Infection is promoted by heat and humidity. The condition never occurs in children. Onset is usually around puberty.

Treatment is effective, but recurrence is common. It may take months for the skin coloration to return to normal. In some people, discoloration is permanent. Since it is not known why some people develop tinea versicolor and others do not, it cannot be totally prevented.

Signs and symptoms

- Presence of pale brown, pink, or hypopigmented spots, mainly on the trunk
- Mild itching
- Spots can be dry and scaly
- Skin may itch where the spots appear
- Spots grow slowly
- As the yeast grows, the spots can combine and form patches of lighter (or darker) skin

Diagnosis

Diagnosis made on clinical appearance

Management objectives

- Get rid of the spots
- Rule out leprosy

Nonpharmacological management

- Advise the patient to use antifungal shampoos, such as—
 - Selenium sulfide (1%)
 - Extra-medicated selsun 2.5%
 - Ketoconazole 2%
- Shampoo is left on the skin for 10 minutes then rinsed off. Do this for 7 days.
- The shampoo is also used weekly as a soap substitute when bathing to prevent recurrences.

Pharmacological management

- Try topical antifungal creams, or lotions (i.e., clotrimazole or miconazole). These medicines are applied directly to the affected areas of the skin. They are used 2–3 times/day over 2 months to be effective.
- If topical treatments do not work, use oral antifungal medications.
 - Persistent cases that do not respond to other types of treatment are sometimes treated with ketoconazole 200 mg tablets once daily for 5 days.
 - Do *not* use for patients <14 years or for pregnant women.

Note: Griseofulvin is not recommended for the treatment of tinea versicolor.

Referral

Not necessary

References—1, 134, 135, 136

10.10 Tineas

Description

Tinea or ringworm is a highly contagious fungal infection of the skin. It can affect different areas of the skin from which it derives its specific names: skin on the trunk (*tinea corporis*), scalp (*tinea capitis*), groin area (*tinea cruris*, also called *jock itch*), nails (*tinea unguenum*), beard (*tinea barbae*), face (*tinea faciei*), hands (*tinea manus*), or feet (*tinea pedis*, also called *athlete's foot*). *Tinea capitis* should be considered in all adults with a patchy inflammatory scalp disorder. In infants, *tinea capitis*, also called *cradle cap*, is the most common pediatric dermatophyte infection worldwide.

Signs and symptoms

Tineas have the appearance of itchy, ringlike patches with raised borders.

- The patches slowly grow bigger.
- As a patch extends, a clear area develops in the center and becomes pigmented in dark skin.

Tinea corporis may be acute (i.e., sudden onset and rapid spreading) or chronic (i.e., a slow extension of a mild, barely inflamed rash). It usually occurs on hairless parts of the body. It can occur on the face and arms and is possible anywhere from lower jaw to knees. Itching is present.

Tinea capitis. In this tinea, the patient may have alopecia areata, infection of the area, or both. *Tinea capitis* is often found in children.

- Itchy scalp
- Hair breaks off; bald patches appear
- Dry flaky areas

Tinea cruris involves lesions specific to the groin and is sometimes pustular.

- It causes itching in the groin, thigh skin folds, or anus
- Red, raised, scaly patches that may blister and ooze form.
- It gets worse because of the moisture in the groin area especially when the patient sweats.

Tinea unguium, a fungal infection of the nails, often present in adult diabetics, presents with—

- Thin, discoloured, and brittle nail
- Swelling of the cuticle areas

Tinea pedis, which is also often present in diabetics, is characterized by—

- Itching, burning, and stinging between the toes spreading to the sole
- Vesicles, cracks, and bursts
- Frequent reinfection
- Secondary bacterial infection

Diagnosis

Diagnosis is based on clinical history and physical examination.

Management objectives

- Get rid of the fungus
- Resolve lesions and symptoms
- Prevent the spread of the infection to others

Nonpharmacological management

- General measures—
 - Advise the patient not to share clothes, towels, or toiletries, especially combs and hair brushes.
 - Instruct the patient to wash his or her skin well and to dry it before applying treatment.
 - Heat kills fungus, so all pieces of clothing, especially underwear, must be boiled when possible, dried in the sun, and then ironed. This measure is a critical part of management of fungal infections.
- With tinea pedis (athlete's foot), advise the patient to—
 - Keep his or her feet dry
 - Dry between toes carefully after wearing closed shoes for long periods, washing, or walking in water
 - Wear cotton socks; avoid socks made of synthetic materials
- With tinea cruris, advise the patient to—
 - Wear boxer shorts or no underwear
 - Wear loose sleepwear or no sleepwear
 - Sleep near a fan if possible
- With tinea capitis, hats must be treated.

Pharmacological management

Combination therapy is necessary. The duration depends on the area affected and the type of infection.

- With tinea corporis—

- Use topical antifungal creams, lotions, or ointments (clotrimazole 1%, miconazole 2%, or Whitfield's ointment). To be effective, apply directly to the affected areas of the skin, 2–3 times/day for 2 months.
- If topical treatment has failed, use griseofulvin tablets 10 mg/kg/day in single or divided doses for 3 weeks.

Caution: Do not use griseofulvin in pregnant women and women of childbearing age unless the patient is using a contraceptive.

- With tinea capitis—

- For infected scalp ringworm, treat both infections concurrently. Use an antibiotic ointment plus antifungal cream amoxil PLUS griseofulvin.
- Shave the area around the affected area before applying ointment.
- Recommend that the patient use selenium sulphide or ketoconazole shampoo.
- Use oral antifungal medications: griseofulvin tablets (125 mg, 500 mg) daily for 4–6 weeks at the following dosages.
 - ◆ Adults (>17 years): 500 mg
 - ◆ Children <6 years: 62.5 mg
 - ◆ Children 6–11 years: 125 mg
 - ◆ Children 12–17 years: 250 mg

Caution: Do not use griseofulvin in pregnant women and women of childbearing age unless the patient is using a contraceptive.

- With tinea unguium—

- Prescribe griseofulvin (125 mg, 500 mg tablets), 125–500 mg daily for 4–6 weeks at the following dosages.
 - ◆ Adults (>17 years): 500 mg
 - ◆ Children <6 years: 62.5 mg
 - ◆ Children 6–11 years: 125 mg
 - ◆ Children 12–17 years: 250 mg

Caution: Do not use griseofulvin in pregnant women and women of childbearing age unless the patient is using a contraceptive.

- With tinea cruris—
 - Use topical antifungal creams, lotions, or ointments (clotrimazole 1%, miconazole 2%, or Whitfield's ointment), 2–3 times/day for 3 months.
 - If the patient has discomfort and itching, add 1% hydrocortisone ointment.
 - If secondary bacterial infection is present, treat with
 - ◆ Amoxicillin 250 mg tablet 3 times/day for 5 days
- OR**
- ◆ In penicillin-allergic patients, erythromycin 250 mg every 6 hours for 5 days

Referral

Refer for specialist management—

- Patients who have no response to treatment after 4 weeks
- Patients who have persistent recurrence or are immuno-compromised

References—3, 8, 10, 137, 138, 139, 140

11. Endocrine System

11.1 Diabetes Mellitus

Description

Diabetes mellitus (DM) is a metabolic disorder of multiple aetiologies characterized by persistent abnormally high blood glucose with disturbances of carbohydrate, fat, and protein metabolism. It results from defects in insulin secretion, insulin action, or both. If uncontrolled, DM will eventually negatively affect the eyes, blood vessels, kidneys, and nerves and will lead to infections, especially of the skin. DM affects a large number of Guyanese, both children and adults.

Complications from DM include the following:

- Hypoglycaemia
- Hyperglycaemic ketoacidosis (i.e., nausea and vomiting, thirst, abdominal pain, shortness of breath)
- Eye problems: retinopathy with visual impairment, blindness, cataracts
- Skin problems: infections, ulcers
- Vascular problems: gangrene of toes or fingers, stroke, myocardial infarction
- Kidney problems: proteinuria, renal failure, kidney infections (pyelonephritis)
- Nerve damage or neuropathy: loss of sensation in the hands and feet
- Diabetic foot leading to leg amputations

Classification

There are two main types of diabetes:

- **Type 1 diabetes** (formerly called *juvenile diabetes*)
 - Type 1 DM affects mainly children and young adults (occurring most often before the age of 30 years), but it can affect adults as well.
 - It is a disease in which the body does not produce insulin and therefore is often referred to as *insulin dependent*.
 - Patients with type 1 DM must take insulin to stay alive.
 - Type 1 DM patients are prone to the development of ketosis.

- **Type 2 diabetes** is a chronic debilitating disease.
 - It typically develops with increasing age (≥ 45 years), but it can occur in children, especially obese adolescents.
 - Either the body does not produce enough insulin or is insulin resistant. Type 2 DM is often called *non-insulin dependent*.
 - It is associated with overweight and lack of physical activity.
 - It is the most common type accounting for nearly 95% of cases of DM.
 - If not properly controlled, it will lead to serious acute and chronic complications.

A third type of DM may also occur: *type 3, gestational diabetes*, is glucose intolerance that develops during pregnancy.

Causes and risk factors

- Family history (both types 1 and 2)
- Autoimmunity (auto-antibodies to islets of Langerhans in the pancreas) in children
- Overweight or obesity ($BMI \geq 25 \text{ kg/m}^2$)
- Poor nutrition and lifestyle
- Insulin resistance
- Deficient insulin secretion
- Race or ethnicity (e.g., persons of Asian and African descent)

Signs and symptoms

Type 1—

- Weight loss despite good appetite
- Frequent urination (polyuria)
- Frequent drinking of water (polydipsia)
- Glucose in urine
- Sweet-smelling breath
- Tiredness
- Blurred vision

Type 2—

- Polyuria, polydipsia, and unexplained weight loss
- Polyphagia (increase hunger)
- Delayed healing of wounds and sores

- Numbness and tingling of feet
- Pruritus (itching)
- Glucose in urine
- Blurred vision

Diagnosis

- Fasting or blood glucose levels (very high blood sugar levels)
- Glucose tolerance test—glucose intolerance (see table 11.1A)
- Sugar in the urine

Table 11.1A. Blood Glucose Levels for Diagnosis of Diabetes

Diagnostic Test	Normal	Pre-diabetes	Diabetes
Fasting blood glucose	<100 mg/dL	100-126 mg/dL	>126 mg/dL
Random blood glucose	<140 mg/dL	140-199 mg/dL	≥200 mg/dL
Oral glucose tolerance (2-hour postprandial)	<140 mg/dL	140-199 mg/dL	≥200 mg/dL

In patients who exhibit symptoms of hyperglycaemia (i.e., thirst, polyuria, weight loss, or itching), a single blood glucose in the diabetic range confirms the diagnosis. In asymptomatic patients, blood glucose in the diabetic range must be recorded at least twice for diagnosis.

Note: Detection of glucose in the urine is not sufficient for diagnosis of diabetes.

Management objectives

- Maintain blood sugar level within acceptable limits
- Obtain optimal weight for height
- Prevent complications both acute (e.g., ketoacidosis, hypoglycaemia, and hyperglycaemia) and chronic (e.g., ischaemic heart disease, peripheral artery disease, poor circulation to the extremities, stroke, deteriorating eye sight, foot ulcers)
- Improve and maintain quality of life
- Manage co-morbid conditions
- Educate and counsel client and relatives on self-management

Note: Advise the patient that he or she must be followed up regularly for the rest of his or her life.

Table 11.1A. Targets for Control in Diabetes and Associated Conditions for Adults

Measurement	Good Result
Blood glucose <ul style="list-style-type: none"> • Fasting • Postprandial 	90–130 mg/dL (5.0–7.2 mmol/L) <180 mg/dL (<10 mmol/L)
HbA1c (glycated Hb)	<6.5%
Total cholesterol	<200 mg/dL (5.2 mmol/L)
HDL cholesterol	>40 mg/dL (>1 mmol/L)
LDL cholesterol	<70 mg/dL (<1.8 mmol/L)
Fasting triglycerides	<150 mg/dL (<1.7 mmol/L)
BP	≤130/80 mmHg
BMI	18.7–25 kg/m ²
Waist circumference <ul style="list-style-type: none"> • Women • Men 	<80 cm (<32 inches) <94 cm (<37 inches)

Management of type 1 DM

Step 1. Use nonpharmacological management.

- Advise the patient to establish a meal plan with a regular meal pattern.
Consult the dietary guidelines in appendix E.
- Advise the patient to exercise at least for 30 minutes, 3 times/week.
- Educate the patient on self-management.
- Instruct the patient on how to self-monitor blood glucose. Monitoring should be done at least 4 times/day, depending on level of control.
- Advise the patient to eat something sweet in case of hypoglycaemia (i.e., palpitations, headache, hunger, nervousness or confusion). The following are appropriate choices:
 - $\frac{1}{2}$ cup orange juice or other fruit juice
 - Soft drink (*not* a sugar-free drink)
 - 1 tablespoon of honey or syrup
 - 1 tablespoon of sugar, candy, or chocolate

Step 2. Use pharmacological management: give insulin. Table 11.1B provides the amounts.

Cautions:

- Type 1 DM patients require insulin to survive.
- Do not give oral diabetic medications.
- Do not use oral hypoglycaemic medicines in children. They are dangerous and ineffective.

Table 11.1B. Insulin Amounts for Type 1 DM Management

Sugar Levels	Insulin
250–300 mg/dL	20/10
300–400 mg/dL	25/15
400–500 mg/dL	35/15 and titrate up to 70/30

Note: If glucometer is in mmol, multiply by 18 to convert to mg/dL.

Management of type 2 DM**Step 1.** Use nonpharmacological management.

- Advise the patient to establish a meal plan with a regular meal pattern. Consult the dietary guidelines in appendix G.
- Encourage patients to maintain a healthy body weight (BMI 18–24.9).
- Encourage the patient to—
 - Have regular meals but smaller portions
 - Eat foods that are rich in fibre, such as whole grains, vegetables, whole wheat flour, ground provision (potatoes, eddoes, cassava, yams, tannia)
 - Avoid added sugar in juices
- Encourage regular exercise (e.g., brisk walking, jogging, swimming, cycling) for at least 30 minutes 3 times/week
- Assess the smoking status if patient is smoking, then advise to stop (appendix D). If the patient does not smoke, then congratulate him or her and encourage not to start smoking.
- Advise on moderation of alcohol (i.e., 2 oz/day for males and 1 oz/day for females). It should be 2 drinks per day for men and 1 for women. (See table 6.3D for drink equivalent.)
- Advise self-monitoring of blood glucose (at least once a day).

Step 2. Use oral pharmacological management.

- Give metformin (500 mg tablets).
 - Recommended for obese patients
 - Adults: Start at 500 mg daily and increase if blood glucose not controlled, not to exceed 2,500 mg daily. (See table 11.1C.)
 - Increase to 500 mg 3 times/day **OR** 1,000 mg in the morning and 500 mg at night, then to maximum of 1,000 mg 2 times/day

Table 11.1C. Suggested Regimen of Metformin

Blood Glucose Level	Dosage
150-200 mg/dL	500 mg (1 tablet) daily in the morning
>225 mg/dL	500 mg (1 tablet) twice/day, morning and afternoon

Caution: Metformin is contraindicated in pregnancy, cardiovascular diseases, renal diseases, and liver diseases.

OR

- Give gliclazide (30 mg, 80 mg tablets).
 - Recommended for non-obese patients.
 - Start at 80 mg/day and increase to 80 mg 2 times/day, then 160 mg in morning and 80 mg at night, and finally to 160 mg 2 times/day, not to exceed 320 mg/day.

OR

- Give glibenclamide (5 mg tablet) 2.5–15.0 mg ($\frac{1}{2}$ –3 tablets) daily in 1–3 divided doses. Increase to 10 mg in the morning or 5 mg 2 times/day, and then to a maximum of 10 mg in the morning and 5 mg at night.

Step 3. If patient does not respond to the regimen in step 2, try a combination of metformin and gliclazide (same dosage as above).

Step 4. If the patient does not respond to the regimen in step 3, start him or her on insulin injections (table 11.1D). Total daily dose is usually based on weight.

Give $\frac{1}{2}$ of the total dose in the morning and $\frac{1}{3}$ in the evening. Starting doses are—

- Slim adults: 0.35–0.5 units/kg of body weight
- Obese adults: approximately 1 unit/kg of body weight
- Children: 0.25 unit/kg of body weight

Table 11.1D. Guidelines for Insulin Regimen

Starting Dose	Incremental Increase	Maximum Daily Dose
See above for amounts. <ul style="list-style-type: none"> Inject $\frac{2}{3}$ daily dose 30 minutes before breakfast Inject $\frac{1}{3}$ daily dose 30 minutes before dinner 	Two units daily— <ul style="list-style-type: none"> First increment is added to the morning dose Second increment is added to the afternoon dose Following increments to follow same pattern 	<ul style="list-style-type: none"> 40 units Refer the patient for specialist care if >40 units are needed.

Management of insulin for type 2 DM in children

For insulin treatment in children, follow these steps:

- In severe DM—
 - Give short-acting insulin 20% before each meal (breakfast, lunch, dinner).
 - Give intermediate-acting insulin (lente) 40% at 9:00 or 10:00 p.m.
- In controlled DM, give $\frac{2}{3}$ in morning (30 minutes before breakfast) and $\frac{1}{3}$ in evening (30 minutes before dinner).
- Educate the patient and the parent or caregiver on insulin treatment. Education should include the following:
 - Types of insulin
 - Injection techniques and sites
 - Insulin storage
 - Glucose monitoring
 - Meal frequency and amount
 - Recognition and treatment of complications
 - Screen for and manage complications, associated conditions, or both (table 11.1A).

Monitoring and investigations

- Tests at every clinic visit—
 - Weight, BMI, and BP
 - Urine testing: glucose, protein, blood, ketone
 - Random blood glucose
 - Always check feet (pulses and sensation)
- Advise on—
 - Diet

- Exercise
- Smoking and alcohol
- Adherence with treatment
- Every 3–6 months, check glycated haemoglobin (HbA1c).
- Annual tests—
 - Cholesterol and blood lipids
 - Blood urea and creatinine
 - ECG
 - Eye examination—visual acuity and fundoscopy
 - Waist circumference
 - Oral health

Referral

- All patients who have suspected or confirmed type 1 DM, for confirmation of diagnosis, initiation and stabilization of therapy, and long-term control
- Symptoms of hypoglycaemia—nervousness, sweating, confusion, palpitations, tremor. Give something sweet before transferring.
- Signs of hyperglycaemia, excessive thirst and passage of urine
- Weight loss
- Serious infection
- Sudden deterioration of vision

References—1, 3, 141, 142, 143

11.2 Thyroid Gland Disorders

11.2.1 Goitre

Description

Goitre refers to an enlarged thyroid gland. Nodules may be present.

Causes and risk factors

- Iodine deficiency affects thyroid hormone synthesis, which stimulates thyroid growth.
- Autoimmune disease may be present.
 - Hyperthyroidism (overproduction of thyroid hormone)—Grave's disease
 - Hypothyroidism (inadequate production of thyroid hormone)—Hashimoto's disease

- In thyroid cancer the swelling is usually confined to one side.
- Thyroiditis—*inflammation of the gland*—may cause a goitre.
- Women are more prone to develop goitres.
- Goitres are more likely to occur during pregnancy and menopause.
- Chances of developing a goitre increase with age.

Classification

- *Simple goitre*—diffuse swelling with no nodules
- *Colloid goitre*—presence of uniform follicles filled with colloid

Signs and symptoms

Not all goitres cause signs and symptoms. When present they may include the following:

- Visible neck swelling on both sides of the midline. Swelling may—
 - Be smooth or nodular
 - Move upward on swallowing
 - Be painless and not pulsate
- Difficulty with swallowing
- Difficulty with breathing; snoring

Diagnosis

- Made on physical examination
- Thyroid function test

Nonpharmacological management

At the health centre—

- Ensure that the patient has an adequate intake of iodine.
- Advise on diet. Diet should include iodised salt. Advise the patient to eat seafood (especially shrimp and other shellfish) about twice a week.

Referral

- Swelling nodular
- Trouble breathing
- Size of thyroid gland suddenly increases
- Eye becomes more prominent and pulse rate increases
- Hyperthyroidism

References—1, 3, 148

11.2.2 Hypothyroidism

Hypothyroidism, or underactive thyroid, can be managed at the health centre level if a doctor is available.

Signs and symptoms

Signs and symptoms vary, depending on the severity of the hormone deficiency, but in general, they include the following:

- Tiredness and weakness
- Increased sensitivity to cold
- Constipation
- Weight gain with poor appetite
- Hoarseness
- Dyspnoea
- Menorrhagia (later oligomenorrhoea or amenorrhoea)
- Muscle weakness
- Muscle aches, tenderness, and stiffness
- Pain, stiffness, or swelling of joints
- Depression
- Difficulty concentrating and impaired memory
- Dry, coarse skin
- Thinning hair
- Puffy face, hands, and feet
- Slowed heart rate (i.e., bradycardia)

Diagnosis

- Based on signs and symptoms
- Based on blood test—elevated thyroid stimulating hormone (TSH)

Pharmacological management

Hormone replacement with levothyroxine (0.5 mg tablet) 100–150 mcg daily

References—1, 3

12. Nutritional Disorders

12.1 Anaemia

Definition

Anaemia may be defined as a haemoglobin level below that of the reference ranges for the age and gender of the individual, as shown in table 12.1.

Table 12.1. Haemoglobin Reference Ranges

Age or Gender	Haemoglobin (g/dL)
Adults (>13 years)	
Males	14.3–18.3
Females	12.1–16.3
Infants and children	
Birth	18.0–27.0
1 day to 1 week	16.0–25.5
1 week to 1 month	12.0–21.8
1 month to 6 months	10.0–15.0
6 months to 2 years	10.5–13.7
2 to 3 years	10.8–12.2
3 to 5 years	11.1–14.7
5 to 8 years	10.7–15.1
8 to 13 years	10.3–15.5

Causes

- Increased loss of red blood cells from—
 - Acute blood loss: trauma, surgery, or obstetric blood loss
 - Chronic blood loss: usually from gastrointestinal (e.g., parasitic infestation, malignancy), urinary (e.g., malignancy), or reproductive tract (e.g., malignancy, menorrhagia)
- Decreased production of normal red blood cells from—
 - Nutritional deficiencies: iron, vitamin B12, folate
 - Bone marrow failure: leukaemia, malignant metastases to bone marrow
 - Chronic illness (e.g., cancer, HIV, TB)

- Increased destruction of red blood cells from—
 - Infections: viral, parasitic (e.g., malaria)
 - Medicines: sulphonamides, methyldopa, chemotherapy, antiretrovirals
 - Genetic: sickle cell disease (see chapter 13)

Signs and symptoms

- Tiredness, weakness especially after exercising
- Pale palms of hands and mucous membranes
- Dizziness, faintness, headaches

Diagnosis

Investigations include the following:

- Red cell morphology: MCV (high MCV indicates enlarged RBC, which may be due to a vitamin B12 deficiency), MCH
- Malaria smear
- Stool for occult blood

Management objectives

- Determine the cause of the anaemia
- Treat as appropriate

12.1.1 Iron-Deficiency Anaemia

Description

As the name implies, iron-deficiency anaemia is due to insufficient iron to make haemoglobin. Anaemia occurs when the haemoglobin (Hb) concentration in the blood falls below normal values, as defined by healthy populations, resulting in the reduction of the oxygen-carrying capacity of red blood cells. (See table 12.1.1 for the accepted levels in Guyana.) Iron-deficiency anaemia is common among young children, pregnant women, and the elderly.

In Guyana, anaemia is often a reflection of iron deficiency, although there are other causes as indicated in section 12.1. Iron is necessary for the formation of haemoglobin, and a deficiency of iron in the diet or poor absorption of the iron in the diet can result in reduced intake of iron into the body. Anaemia may also result from other nutritional deficiencies as well as malaria, worm infestation, and sickle cell disease. Other nutrients that are implicated in anaemia include folic acid and vitamin B12, which are needed for the normal production of red blood cells.

Table 12.1.1. Classification of Anaemia in Infants, Children, Adults, and Pregnant Women

Age or Gender	Anaemia Measured by Haemoglobin (g/dL)				Anaemia Measured by Haematocrit (%)—All Anaemia
	All Anaemia	Mild Anaemia	Moderate Anaemia	Severe Anaemia	
Children 6 months to 4 years	<11.0	10.0–10.9	1.0–9.9	<7.0	<33
Children 5–11 years	11.5	10.0–11.4	7.0–9.9	<7.0	<34
Children 12–14 years	12.0	10.0–11.9	7.0–9.9	<7.0	<36
Nonpregnant women >15 years	12.0	10.0–11.9	7.0–9.9	<7.0	<36
Pregnant women	11.0	10.0–10.9	7.0–9.9	<7.0	<33
Men >15 years	13.0	12.0–12.9	9.0–11.9	<9.0	<39

Source: Guyana Ministry of Health. 2004. *Protocol for the Detection, Prevention and Treatment of Iron Deficiency Anaemia for Use in Maternal and Child Health Clinics in Guyana*. Georgetown: CFNI/MOH.

Signs and symptoms

- Signs of anaemia include pallor of the conjunctivae, tongue, palms, and nail beds
- In severe anaemia, the patient may present with—
 - A feeling of listlessness or fatigue
 - Breathlessness
 - Increased heart rate
 - Low BP and urine output
 - Hepatosplenomegaly
 - Swelling of the lower limbs

Diagnosis

- Clinical examination can sometimes indicate if anaemia might be present.
- Test Hb level, peripheral blood smear, and microcytosis.

- During pregnancy, test the haemoglobin level of all women at the first visit. Testing should be repeated every 4 weeks or at least at weeks 28, 32, and 36.
- Check for worm infestation.
- Do a sickle cell test if warranted by family history.
- Check for malaria in malaria endemic areas (i.e., regions 1, 7, 8, 9, and parts of regions 2 and 10).

Management objectives

- Identify and treat the cause
- Replace the iron

Nonpharmacological management

Advise the patient to eat foods that are rich in iron, for example—

- Meats—beef, pork, liver, and other organ meats
- Poultry—chicken, duck, turkey (especially dark meat)
- Fish—shellfish, sardines
- Leafy greens of the cabbage family—callaloo, pak choi, spinach
- Legumes—green peas, dry beans and peas, black-eyed peas, and canned baked beans

See appendix H, “Guidelines for Iron Supplementation.” For more details, see also Appendix D in *Protocol for the Detection, Prevention and Treatment of Iron Deficiency Anaemia for Use in Maternal and Child Health Clinics in Guyana*.

Pharmacological management

- Give iron supplementation (elemental iron)
 - Children: (ferrous gluconate syrup mg 40 mg/5 mL) iron, oral, 2 mg/kg elemental iron per dose 3 times/day with meals
 - ◆ 3–6 kg (0–3 months): 1.5 mL
 - ◆ 6–10 kg (3–12 months): 2.5 mL
 - ◆ 10–18 kg (1–5 years): 5 mL
 - ◆ 18–25 kg (5–8 years): 7.5 mL
 - ◆ 25–50 kg 8–14years: 10 mL
 - Adults: ferrous sulphate, oral, 200 mg 3 times/day

Note: Advise the patient that iron supplementation should be taken between meals preferably with fruit juice (e.g., lime, orange, cherry, guava). Do not take with milk or other dairy products, tea (including bush tea), coffee, or antacids.

- Follow up at monthly intervals.
- Continue supplementation for 3–4 months after Hb is normal to replenish body iron stores.
- Treat or manage the underlying cause. Check for—
 - Worm infestation (see section 7.6, “Parasitic Infestations”)
 - Malaria (see section 14.6, “Malaria”)
 - Sickle cell disease (see chapter 13, “Haemoglobinopathy—Sickle Cell Disease”)

Referral

Signs of severe anaemia; patient may need a blood transfusion

References—3, 8, 145, 146

12.1.2 Iron Deficiency in Pregnancy

Description

Iron deficiency in pregnancy is defined as a haemoglobin count <10 g/dL. It is a common problem and can be prevented.

Nonpharmacological management

- Educate the patient on what constitutes a proper diet. Recommended dietary changes should be practical, and consideration should be given to cultural, religious, and philosophical circumstances.
- Instruct the patient to use medications as prescribed.
- Inform the patient about the side effects of medication (e.g., constipation and black stools with iron medication).
- Advise the patient that the following alterations in meal patterns can enhance iron absorption. Ask the patient to—
 - Increase the amount of iron-rich foods in her diet. (See appendix D of *Protocol for the Detection, Prevention and Treatment of Iron Deficiency Anaemia for Use in Maternal and Child Health Clinics in Guyana*.)
 - Abstain from drinking green tea, bush tea, or coffee; from using milk, cheese, or dairy products; or from taking antacids in combination with iron-rich foods because doing so can inhibit iron absorption.
 - Include foods or juices rich in vitamin C in each meal (e.g., oranges, grapefruit, garden cherries, carrots, sweet peppers, pak choi).

Pharmacological management

- Educate the patient on the correct use of iron supplements and how to reduce their side effects. Instruct her to take the supplements, preferably with fruit juice, between meals or before going to bed.
- Add sprinkles to the woman's food. Sprinkles are an iron supplement that can be added to the food of pregnant women who have mild to moderate iron-deficiency anaemia. Mix one sachet of sprinkles with an amount of food that the woman can consume at a single meal.
- Instruct the patient on the correct use of sprinkles. Tell her to—
 - Tear open the top of the package.
 - Pour the entire contents of the package into any semi-liquid food after the food has been cooked and is at a temperature acceptable to eat.
 - Mix sprinkles with an amount of food that she can consume at a single meal.
 - Mix the food well after adding the package of sprinkles.
 - Use no more than one full package per day at any mealtime.
 - Refrain from sharing the food to which sprinkles were added with other household members since the amount of minerals and vitamins in a single package of sprinkles is just the right amount for the pregnant woman.
 - Eat the food mixed with sprinkles within 30 minutes because the vitamins and minerals in the sprinkles will cause the food to noticeably darken.

Caution: Sprinkles must *not* be used in combination with other iron supplements.

- Pregnant women who have mild to moderate iron-deficiency anaemia can be treated with either iron tablets and folic tablets or with sprinkles but not with both. If the choice of treatment is to use iron and folic acid tablets, then the dosage guidelines in table 12.1.2 should be followed.
- Pregnant women who have severe anaemia should be managed with iron and folic acid tablets (table 12.1.2).

Referral

- Nonresponse of Hb to oral iron supplementation
- Hb <7.0 g/dL

References—145, 146, 147, 148

Table 12.1.2. Guidelines for Iron and Folic Acid Supplementation of Pregnant Women

Category	Other Criteria	Dosage
Normal: Hb ≥ 11.0 g/dL	None	Standard supplementation: Ferrous sulphate/folic acid tablets (60 mg elemental iron/250 mcg folic acid daily)
Mild to moderate anaemia: Hb 7.0-10.9 g/dL	None	Standard supplementation: Ferrous sulphate/folic acid tablets (60 mg elemental iron/ 250 mcg folic acid daily)
Severe anaemia: Hb <7.0 g/dL	Less than 28 weeks pregnant and asymptomatic	120 mg iron daily (ferrous sulphate tablets, 2/day)
	28-34 weeks pregnant and asymptomatic	120 mg iron daily (ferrous sulphate tablets, 2/day) OR IM iron (dextran iron 50 mg/mL)
	>34 weeks pregnant	IM or IV iron (at the district hospital level or higher)
Hb 4.0-6.9 g/dL	Symptomatic	Admit to hospital
Hb <4.0 g/dL	Symptomatic	Admit to hospital

12.1.3 Iron Deficiency in Children 6–24 Months

Diagnosis

Clinical examination can sometimes indicate if anaemia might be present.

- Look for signs of anaemia: pallor of the conjunctivae, tongue, palms, and nail beds.
- Check Hb level and do a blood film.
- Check for worm infestation.
- Do a sickle cell test if warranted by family history.
- Check for malaria in malaria endemic areas (i.e., regions 1, 7, 8, 9, and parts of regions 2 and 10).

Nonpharmacological management

Advise parents or caregivers on the use of iron-rich foods (see appendix D *Protocol for the Detection, Prevention and Treatment of Iron Deficiency Anaemia for Use in Maternal and Child Health Clinics in Guyana*) and foods fortified with iron in the child's diet.

Pharmacological management

- Advise the parents or caregivers to add sprinkles, an iron supplement, to the child's food. Mix one sachet of sprinkles with an amount of food that the child can consume at a single meal.
- Educate the parents or caregivers on the correct use of sprinkles. Tell them to—
 - Tear open the top of the package.
 - Pour the entire contents of the package into any semi-liquid food after the food has been cooked and is at a temperature acceptable to eat.
 - Mix sprinkles with an amount of food that the child can consume at a single meal.
 - Mix the food well after adding the package of sprinkles.
 - Give no more than one full package per day at any mealtime.
 - Do not share the food to which sprinkles were added with other household members since the amount of minerals and vitamins in a single package of sprinkles is just right amount for one child.
 - The food mixed with sprinkles should be eaten within 30 minutes because the vitamins and minerals in the sprinkles will cause the food to noticeably darken.

Caution: Sprinkles must not be used in combination with other iron supplements.

- Children who have mild to moderate iron-deficiency anaemia can be treated with either iron and folic tablets or with sprinkles but not with both. If the choice of treatment is to use iron *and* folic acid tablets, then the dosage guidelines in table 12.1.3 should be followed.
- For children who have severe anaemia, use iron and folic acid tablets (table 12.1.3).

Table 12.1.3. Guidelines for Iron and Folic Acid Supplementation to Treat Iron-Deficiency Anaemia in Children 6 Months to 5 Years

Category of Anaemia	Age	Dosage
Mild to moderate anaemia	6-24 months	Standard supplementation: 12.5 mg iron daily 50 mcg folic acid daily
	2-5 years	Standard supplementation: 25 mg iron daily 200 mcg folic acid daily
Severe anaemia	6-12 months	25 mg iron daily 100 mcg folic acid daily
	2-5 years	60 mg iron daily 400 mcg folic acid daily

Source: Guyana Ministry of Health. 2004. *Protocol for the Detection, Prevention and Treatment of Iron Deficiency Anaemia for Use in Maternal and Child Health Clinics in Guyana*. Georgetown: CFNI/MOH.

Referral

- Nonresponse of Hb to oral iron supplementation
- Hb <7.0 g/dL

Reference—146, 148

12.2 Malnutrition

12.2.1 Undernutrition

Description

Undernutrition is a condition in which the patient's physical state is impaired to the point that his or her body can no longer maintain adequate bodily performance. It is manifested by weight loss and occurs when there is a significant imbalance between nutritional intake and individual needs or inability to absorb and use nutrients. It can also be the result of excessive energy expenditure due to a disease processes such as TB, AIDS, cancer, trypanosomiasis, or visceral leishmaniasis.

Signs and symptoms

- Growth retardation in children
- Sudden unintentional weight loss
- Muscle wasting
- Pallor of the conjunctiva (anaemia)
- Bilateral lower limb oedema
- Dry, flaky skin of the lower extremities
- Hyperpigmentation of exposed skin
- Diarrhoea in children
- Angular stomatitis
- Smooth red tongue

Diagnosis

Based on history and physical examination

- Loss of subcutaneous fat
- Abnormal anthropometric measurements
 - In children, weight-for-height measurements will establish the severity of the malnutrition. In children ≤ 5 years, use the MOH Child Health Record Card (weight/height).
 - In adolescents and adults, use BMI [weight (kg) divided by height (m^2)] <19.9 **OR** for adults, use mid upper arm circumference (MUAC) <16 cm irrespective of clinical status or MUAC <18.5 PLUS one of the clinical signs for the elderly.

- In the elderly, use MUAC <15 cm or MUAC <17.5 cm PLUS one of the following clinical signs:
 - ◆ Oedema of lower limbs
 - ◆ Inability to stay standing
 - ◆ Visible dehydration
- Check for underlying or associated problems
 - Hb and serum albumin
 - Stool test for ova cysts and parasites
 - Blood smear for malaria in malaria endemic areas
 - TB (in patients who have a history of chronic cough)
 - HIV

Management objectives

- Treat underlying and associated disease(s)
- Restore metabolic function
- Restore normal weight

Nonpharmacological management

- Restore metabolic function. (This should be done in a hospital setting.)
 - Recovery of normal nutritional status is progressive and not aggressive.
 - Give the patient many small meals over 24 hours to reduce the risk of hypoglycaemia, hypothermia, diarrhoea, vomiting, and heart failure linked with electrolyte imbalance.
 - ◆ Adults including the elderly: 40 kcal/kg/day
 - ◆ Adolescents: 55 kcal/kg/day (e.g., high-energy milk)
 - The patient can be discharged and followed up as an outpatient, when 50% of weight/height² (BMI) has been achieved. (See Table 12.2.2.)
- Provide nutritional rehabilitation. The objective is to recover normal weight by eating an enriched diet high in energy and balanced in protein.
 - Adults including the elderly: 80 kcal/kg/day
 - Adolescents: 100 kcal/kg/day

Pharmacological management

- For intestinal parasites, on the seventh day, treat the patient with an anthelminthic: albendazole PO 400 mg as a single dose.

Caution: Albendazole is contraindicated in the first trimester of pregnancy.

- Give elemental iron only from the 14th day for all patients, with or without anaemia.
 - Adults: 120 mg/day in 2 divided doses for about 2 weeks (2 tablets of 200 mg of ferrous sulphate/day). Then follow protocol for iron-deficiency anaemia, in anaemic patients (see section 12.1.1).
 - Adolescents: 3 mg/kg once daily for about 2 weeks

Referral

- Patients who have severe malnutrition
- Patients who are unable to eat or retain food given orally
- Patients who have underlying conditions needing specialist attention

References—1, 10, 146, 148, 149, 150

12.2.2 Overweight and Obesity

Description

Obesity is excess fat (i.e., adipose tissue) that is deposited in the body and presents a risk to health. Although not a direct measure of adiposity, the most widely used measure of obesity is the BMI, which is equal to weight/height² (in kg/m²). (See table 12.2.2.) The consequences of obesity include the following:

- Hypertension
- Type 2 DM
- Hyperlipidaemia
- MI
- Increased risk of osteoarthritis and gout
- Gallstones
- Cancer
- Reproductive disorders
- Sleep apnoea
- Increased mortality

Table 12.2.2. Classifying BMIs

Classification	Criteria
Underweight	BMI <18 (Guyana uses 19.9)
Healthy body weight	BMI 18–25 (Guyana uses 20–24.9) Waist circumference <80 cm (females) and <94 (males)
Overweight	BMI 25–30 OR Waist circumference >88 cm (females) and >102 (males)
Obese	BMI 31–39 OR Waist circumference >88 cm (females) or >102 (males)
Morbidly obese	BMI >40

Causes

- Genetic
- First-degree relative—families tend to share diets and lifestyles
- Excessive calorie intake—eating too much and eating a lot of fatty foods
- Emotional—overeating because of depression, hopelessness, anger, boredom, and many other reasons that have nothing to do with hunger
- Sedentary lifestyle—no exercise or limited activity
- Gender—obesity is more prevalent in females

Signs and symptoms

- BMI >25
- Difficult breathing and history of sleep apnoea
- Joint damage
- Low fertility
- Depression possible

Management objectives

Management should be guided by the health risks in any given individual.

- Rule out diseases associated with obesity (e.g., Cushing's syndrome, hypothyroidism)
- Reduce BMI to within normal limits
- Treat associated conditions (e.g., hypertension, diabetes)

Nonpharmacological management

- Advise the patient to reduce his or her caloric intake. To reach this goal, the patient can—
 - Limit intake from total fats and shift fat consumption away from saturated fats to unsaturated fats
 - Increase consumption of fruit and vegetables, as well as legumes, whole grains, and nuts
 - Limit intake of sugars
- Advise the patient to increase calories burnt by gradually increasing his or her physical activity to at least 30 minutes of regular, moderate-intensity activity 3–5 days/week.
- Provide health education.
 - Explain the consequences of obesity (e.g., hypertension, diabetes, MI, joint problems) to the patient.
 - Advise the patient to set a goal (e.g., 10% weight loss per year).
- Follow up.
 - Do monthly checks of weight and BP.
 - Do annual checks of blood glucose level.

Pharmacological management

- Not advised for obesity at health centre and district hospital levels
- Treat associated conditions (e.g., hypertension).

Referral

- Uncontrolled hypertension, DM
- Other conditions needing higher level care (e.g., hypothyroidism)
- To rule out Cushing's syndrome

References—151, 152

13. Haemoglobinopathies— Sickle Cell disease

Description

Sickle cell disease is a hereditary blood disorder that encompasses all genotypes containing at least one sickle gene in which HbS makes up at least half the haemoglobin present. In addition to sickle cell anaemia (HbSS), there are other compound heterozygous conditions: haemoglobin SC, haemoglobin SDPunjab, haemoglobin SE, haemoglobin S/ β thalassaemia (β^+ , $\beta 0$, $\delta\beta$, and Lepore), and haemoglobin SOArab.

HbSS is the most common condition in Guyana. It is characterized by red blood cells that assume an abnormal, rigid, sickle shape, which decreases the cells' flexibility and affects its ability to go through small capillaries resulting in vessel occlusion leading to various complications.

Sickle-cell disease occurs more commonly among people whose ancestors lived in tropical, subtropical, and sub-Saharan regions where malaria is or was common. Where malaria is common, persons carrying a single sickle-cell gene, HbAS (sickle cell trait) show less severe symptoms when infected with malaria.

Life expectancy has improved considerably over the last decades due to improved recognition and better management of acute episodes. Introduction of neonatal screening programmes in parts of the United States dramatically improved health care and childhood mortality; it is a program about to be introduced in Guyana.

Complications of HbSS include the following:

- Loss of the functioning of the spleen by 1½–3 years of age
- Damage to the kidney leading to renal failure in adults
- Aseptic necrosis, particularly of the heads of the femur and humerus
- Chronic arthropathy
- Susceptibility to osteoarthritis
- Infarcts of the digits and dactylitis (i.e., hand-foot syndrome)
- Acute chest syndrome (i.e., sickling within the lung)
- Severe reduction in red blood cell production (i.e., aplastic crisis)

- Priapism—affecting mainly adolescents and adults. Priapism may be classified as—
 - Stuttering (occurring for <3 hours' duration but several times/week)
 - Minor (isolated or infrequent episodes of <3 hours' duration)
 - Major (events usually lasting >3 hours)
 - Delayed onset of sexual maturation
- Oligomenorrhoea or amenorrhoea
- Leg ulcers

Signs and symptoms

Most patients with sickling syndromes suffer from—

- Severe anaemia (haemolytic or aplastic)
- Pallor
 - Fatigue
 - Breathlessness
 - Tachycardia
 - Jaundice
- Acute pain and tenderness almost anywhere in the body (painful crises) lasting from a few hours to months
- Inflammation of an entire finger or toe
- Acute, painful enlargement of the spleen

Diagnosis

- Full blood count revealing Hb level of 6–8 g/dL with high reticulocyte count
- An acute sickle-cell crisis is often precipitated by infection; check for infection
- Cell morphology and haemoglobin electrophoresis

Management objectives

- Treat the anaemia
- Relieve pain
- Prevent or treat intercurrent infection

Nonpharmacological management

Educate parents or caregivers on—

- What to expect and how to identify various crises
- Diet and nutrition

- Using lots of fluids. If child is unwell and needs extra fluids, give the following minimum amounts. For children weighing—
 - <10 kg, give 150 mL for every kg body weight in 24 hours
 - 10–20 kg, give 80 mL for every kg body weight in 24 hours
 - >20 kg, give 40 mL for every kg body weight in 24 hours
- The importance of—
 - Immunising against *H. influenza*, *pneumococcus*, and hepatitis B
 - Avoiding infections
 - Avoiding extremes of heat and cold
- How to manage illnesses at home

Pharmacological management

- Give folic acid.
- Give malaria chemoprophylaxis in malaria endemic areas.
- Give analgesics for pain.
 - Give paracetamol (500 mg tablets; 120 mg/5 mL suspension) at the following dosages, not to exceed 4 doses in 24 hours.
 - ◆ 6–12 months: 60 mg (2.5 mL or ½ tsp) 3–4 times/day
 - ◆ 1–5 years: 120 mg (5 mL or 1 tsp) 3–4 times/day
 - ◆ 5–8 years: 250 mg (10 mL or 2 tsp or ½ tablet) 3 times/day
 - ◆ 8–14 years: 500 mg (1 tablet) 3–4 times/day
 - ◆ >14 years: 1,000 mg (2 tablets) 3–4 times/day

OR

- Give ibuprofen.
 - ◆ 8–12 years: 200 mg every 6–8 hours
 - ◆ >12 years: 400 mg every 6–8 hours
- Give prophylactic antibiotics.
 - Amoxicillin (250 mg and 500 mg tablets; 125 mg/5 mL suspension)
 - ◆ Adults: 500 mg 3 times/day
 - ◆ Children: 100 mg/kg/day in 3 divided doses

OR

- For penicillin-allergic patients, give erythromycin (250 mg and 500 mg tablets; 125 mg/5 mL suspension) at the same dosages as for amoxicillin.
- Manage priapism. Minor attacks of priapism may be aborted by emptying the bladder, taking a warm bath, and using oral analgesics.

Referral

- Acute painful crises
- Severe anaemia requiring transfusion
- Respiratory distress
- Protracted pain in hips or thighs
- Priapism lasting ≥ 2 hours

References—1, 153, 154, 155

14. Infectious Diseases

14.1 Chickenpox

Description

Chickenpox is a mild but extremely contagious viral infection caused by Varicella zoster, occurring mainly during childhood. It is spread by droplet infection. The incubation period is about 2–3 weeks after exposure. Patients are infectious from about 2 days before the appearance of the rash, during the period of formation of the rash (about 6 days), and until all the lesions have crusted. The infection is self-limiting with duration of about 1 week.

Signs and symptoms

- Fever preceding the rash
- Loss of appetite
- Weakness
- Lesions beginning on the trunk and face, later spreading to the arms and legs
- Small, red, itchy spots that turn into blisters and burst to form scabs. These lesions may all be present at the same time. The severity of the lesions varies from person to person.
- Secondary bacterial infection of the skin may appear, a result of bruising of the skin from scratching
- Complications of encephalitis and pneumonia occur rarely and are more likely in adults

Diagnosis

Basically clinical

Management objectives

- Provide symptomatic treatment
- Prevent and manage avoidable complications

Nonpharmacological management

- Isolate the patient from immunocompromised people and pregnant women until all lesions have crusted.

- Ensure adequate hydration.
- Cut the patient's fingernails very short and discourage the patient from scratching.
- Maintain good hygiene and daily cleansing of the skin to prevent secondary infection.
- Use wet compresses on the skin to relieve itching.

Pharmacological management

- For itch, give calamine lotion, applied as needed.
- For pain and fever, give paracetamol (500 mg tablets; 120 mg/5 mL suspension) PO, every 4–6 hours, when required not to exceed 4 doses daily. See table 14.1 for dosages.

Caution: Acetylsalicylic acid (aspirin) is not recommended for children <12 years old because of the risk of Reye's syndrome.

Table 14.1. Paracetamol Dosages by Age and Weight for the Management of Chicken Pox

Age	Weight	Dose(mg)	Quantity	Frequency	Duration
3-12 months	6-10 kg	60	2.5 mL (½ tsp)	3 times/day	5-7 days
1-5 years	10-18 kg	120	5 mL (1 tsp)	3 times/day	5-7 days
5-8 years	18-25 kg	240	10 mL (2 tsp) or ½ tablet	3 times/day	5-7 days
8-14 years	25-50 kg	500	1 tablet	3-4 times/day	5-7 days
>14 years	>50 kg and adults	1,000	2 tablets	3-4 times/day	5-7 days

- If a skin infection is present due to scratching, treat as for bacterial skin infection.

Referral

- If the patient—
 - Seems extremely ill
 - Is difficult to wake up or appears confused
 - Has difficulty walking
 - Has a stiff neck
 - Is vomiting repeatedly

- Has difficulty breathing
- Has a severe cough
- These are suggestive of complications such as—
 - Meningitis
 - Pneumonia
 - Encephalitis
- Also refer—
 - Babies <6 months
 - HIV-infected patients
 - Severely ill adults
 - Pregnant women
 - Recurrent chickenpox

References—1, 34, 156, 157

14.2 Dengue

Description

Dengue is a viral, self-limited, mosquito-borne (*Aedes aegypti*) infection caused by the dengue virus of the family *Flaviviridae*. Four serotypes are responsible for three disease conditions, which vary in severity: dengue fever, dengue hemorrhagic fever, and dengue shock syndrome in humans. The first infection with the virus may be asymptomatic or may result in classic dengue fever. Dengue haemorrhagic fever occurs when a person catches a different type dengue virus after being infected by another one sometime before. Prior immunity to a different dengue virus type plays an important role in this severe disease, which may go on to dengue shock. In Guyana, most of the cases are from the coastal areas of regions 1, 3, and 4 with some cases in the interior region 9.

Signs and symptoms

Signs and symptoms may vary from asymptomatic to complicated.

- Dengue fever
 - Early symptoms include—
 - ◆ A feeling of listlessness
 - ◆ Headache for about 2 days

- Followed by—
 - ◆ Fever (so-call *break bone*)
 - ◆ Severe backache
 - ◆ Generalized muscle and joint pains
 - ◆ Painful red eyes
 - ◆ Palpable lymph nodes
 - ◆ Poor appetite
 - ◆ Nausea and vomiting
 - ◆ Slow heart rate
 - ◆ Prostration and depression
 - ◆ A continuous high fever that breaks on the fourth or fifth day
 - ◆ In some cases, a rash developing gradually on the dorsum of the hands and feet and spreading upwards
- Dengue haemorrhagic fever
 - High fever (39–41°C) of sudden onset lasting about 2–7 days
 - Signs of haemorrhage in the skin (positive tourniquet test)
 - Mucous membranes (bleeding from the nose and gums)
 - Gastrointestinal tract (vomiting blood, dark black stools)
 - Enlarged liver
- Dengue shock syndrome
 - Signs preceding shock are—
 - ◆ Persistent vomiting
 - ◆ Intense abdominal pain
 - ◆ Sudden drop in body temperature
 - Signs of shock are—
 - ◆ Rapid, weak pulse
 - ◆ Cold extremities and profuse sweating
 - ◆ Drop in BP

Diagnosis

- CBC including haematocrit and platelet count
- Serological tests for dengue antibodies—
 - Within 5 days of onset—viral culture
 - After day 7—serology test with both IgM and IgG
 - Repeat tests after day 14 (IgM significantly increased)

Management objectives

- Reduce fever and pain
- Prevent or treat moderate dehydration
- Refer at any sign of developing complication

Nonpharmacological management

- Sponge patient with wet cloths to reduce fever.
- Encourage patient to drink plenty of fluids; give ORS if necessary.

Pharmacological management

For dengue fever, give paracetamol (500 mg tablets; 120 mg/5 mL suspension).

See table 14.2 for dosages.

Caution: Do not give acetylsalicylic acid (aspirin). It can aggravate haemorrhaging.

Table 14.2. Paracetamol Dosages for the Management of Dengue Fever

Age	Weight	Dose(mg)	Quantity	Frequency	Duration
3-12 months	6-10 kg	60	2.5 mL ($\frac{1}{2}$ tsp)	3 times/day	5-7 days
1-5 years	10-18 kg	120	5 mL (1 tsp)	3 times/day	5-7 days
5-8 years	18-25 kg	240	10 mL (2 tsp) or $\frac{1}{2}$ tablet	3 times/day	5-7 days
8-14 years	25-50 kg	500	1 tablet	3-4 times/day	5-7 days
>14 years	>50 kg and adults	1,000	2 tablets	3-4 times/day	5-7 days

Referral

All cases of dengue haemorrhagic fever and developing shock syndrome. Set up infusion of Ringer's lactate before transferring the patient to the hospital.

References—10, 158, 159, 160

14.3 Filaria (Lymphatic Filariasis)

Description

Filaria is an infection of the subcutaneous tissue, lymphatic channels, or lymph nodes by the threadlike adult parasite (*Wuchereria bancrofti*). The adult worms cause permanent damage to the lymphatic system. Transmission occurs by insect vector (mosquitoes).

Signs and symptoms

- Acute
 - Recurrent attacks of fever lasting 7–10 days
 - Localised lymphangitis of the limbs and scrotum
- Chronic
 - Hydrocele
 - Epididymo-orchitis
 - Elephantiasis (particularly of the legs)

Diagnosis

Detection of microfilariae in blood collected between 10:00 p.m. and midnight

Management objectives

Treat current infection and prevent possible transmission of the causative agent of lymphatic filariasis (*W. bancrofti*) to others, through—

- Antiparasitic pharmacological therapy
- Supportive clinical and surgical care
- Patient education and counselling

Nonpharmacological management

- Advise the patient to—
 - Wash the affected parts 2 times/day with soap and clean, cool water; dry carefully
 - Raise the affected limb at night
 - Exercise the limb regularly
 - Keep the nails and spaces between the toes clean
 - Wear comfortable shoes
- Provide patient education and counselling. Psychological counselling is essential to support patients who have filaria-induced disability because they can suffer from acute shame, isolation, sexual dysfunction, and intense chronic pain and suffering.

Pharmacological management

Give—

- Diethylcarbamazine citrate (50 mg, 100 mg tablets) 6 mg/kg in 3 divided doses for 21 days

Caution: Do not use diethylcarbamazine in pregnant or breastfeeding women.

OR

- Albendazole (200 mg, 400 mg tablets) 400 mg 2 times/day for 21 days.

Caution: Albendazole is contraindicated in the first trimester of pregnancy.

Referral

Patients with hydroceles for drainage or corrective surgery

References—1, 10, 161

14.4 Leishmaniasis

Description

The term *leishmaniasis* refers collectively to various clinical syndromes caused by parasites of the genus *Leishmania*, which affects both humans and animals and is transmitted by sand flies. In humans, *leishmaniasis* can be classified as cutaneous, mucosal, or visceral.

Causes and risk factors

- *Leishmania chagasi*
- Malnutrition
- Children are at greater risk than adults in endemic areas.
- Persons with AIDS are at 100–1,000 times greater risk of developing visceral leishmaniasis in certain areas.
- Incomplete therapy of initial disease is a risk factor for recurrence of leishmaniasis.

Signs and symptoms

- Cutaneous (incubation period weeks to months)
 - Development of a small red papule at the site of the sand-fly bite, evolving to nodular to ulcerative
 - The ulcers can be moist, open with seropurulent exudate, or dry with a crusted scab.
 - Sores usually are found on exposed areas of skin (face and extremities).
 - Regionally lymphadenopathy

- Mucocutaneous (incubation period 1–3 months)
 - Similar to cutaneous with spread of lesions to—
 - ◆ Mouth (gingival oedema and periodontitis)
 - ◆ Nose (nasal obstruction and bleeding)
 - ◆ Conjunctiva
 - Lesions gradually become painful and can become infected leading to sepsis.
- Visceral (mainly remains subclinical but can become symptomatic)
 - Fever of any type—persistent, undulating, in peaks
 - Hepatosplenomegaly
 - Weight loss and weakness
 - Darkening of the skin (thus, the name kala azar or black fever).
 - Lymphadenopathies
 - Epistaxis
 - Diarrhoea possible

Patients may die of haemorrhage (secondary to infiltration of the haematopoietic system), severe anaemia, secondary bacterial infections of mucous membranes, bacterial pneumonia, septicaemia, TB, or dysentery.

Diagnosis

Skin scrape for gyms staining and microscopic examination

Management objective

Prevent reinfection

Nonpharmacological management

Practice prevention using—

- Insecticide-treated bed nets
- Vector control and elimination of animal reservoir hosts

Referral

Refer all cases to skin clinic for treatment.

References—1, 10, 162

14.5 Leptospirosis

Description

Leptospirosis is an infectious disease that affects both humans and animals, domestic and wild (principally rats), characterized by a broad spectrum of clinical manifestations varying from mild, which usually has a favourable outcome, to severe, which has a fatal outcome.

Cause and risk factors

- Spirochetes of the genus *Leptospira*
- Persons at risk include—
 - Farmers
 - Sewer workers
 - Veterinarians and animal caretakers
 - People in flooded areas
- Mode of transmission
 - Contact of skin or mucous membranes with urine from infected animals
 - Contact with water, soil, or food contaminated with the urine of infected animals

Signs and symptoms

- The incubation period is about 1–3 weeks.
- The mild form has the following signs and symptoms:
 - Influenza-like illness—fever, chills, headaches (frontal or retro-orbital), nausea, vomiting, and myalgias (especially calf, back, and abdomen)
 - Possible pulmonary signs (e.g., cough and chest pain)
 - Mild jaundice
 - Conjunctival haemorrhage
 - Rash
- The severe form has the following signs and symptoms:
 - Fever and jaundice
 - Oligoanuric renal failure during the second week of illness
 - Diffuse haemorrhagic syndrome (e.g., epistaxis, petechiae, purpura)
 - Cough, dyspnoea, chest pain, and haemoptysis
 - Cardiac signs (i.e., myocarditis, pericarditis)

Diagnosis

Investigations—

- Culture of leptospira from blood or CSF (during first 10 days of illness) or from urine beginning at about 1 week.
- Urinalysis: proteinuria, leucocytes, possible haematuria

Management objectives

- Reduce fever
- Kill the bacteria
- Treat complications

Nonpharmacological management

Advise rest.

Pharmacological management

- Give paracetamol (500 mg tablet; 120 mg/5 mL suspension) for pain and fever. See table 14.5 for dosages.

Table 14.5. Paracetamol Dosages for the Management of Leptospirosis

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3–12 months	6–10 kg	60	2.5 mL (½ tsp)	3 times/day	5–7 days
1–5 years	10–18 kg	120	5 mL (1 tsp)	3 times/day	5–7 days
5–8 years	18–25 kg	240	10 mL (2 tsp) or ½ tablet	3 times/day	5–7 days
8–14 years	25–50 kg	500	1 tablet	3–4 times/day	5–7 days
>14 years	>50 kg and adults	1,000	2 tablets	3–4 times/day	5–7 days

Caution: Do not use acetylsalicylic acid (aspirin) to treat pain and fever because of the risk of haemorrhage.

- Give an antibiotic.
 - For mild leptospirosis, give doxycycline 100 mg PO bid for 7 days.

Caution: Do not give doxycycline to pregnant or breastfeeding women or to children <8 years.

- For moderate leptospirosis, give—
 - ◆ Amoxicillin PO (250 mg, 500 mg tablets; 125 mg/5 mL suspension)
 - Adults: 500 mg PO QID for 7 days
 - Children: 50 mg/kg/day in 2–3 divided doses for 7 days

OR

- ◆ Doxycycline PO (100 mg tablet)
 - Adults: 100 mg 2 times/day for 7 days
 - Children >8 years: 100 mg/day in 2 divided doses for 7 days

Caution: Do not give doxycycline to pregnant or breastfeeding women or to children <8 years.

OR

- ◆ Erythromycin PO (250 mg, 500 mg tablets; 125 mg/5 mL suspension)
 - Adults: 1 g 2–3 times/day for 7 days
 - Children: 50 mg/kg/day in 2–3 divided doses for 7 days
- For severe leptospirosis, give—
 - ◆ Ampicillin IV (powder for injection 500 mg, 1 g)
 - Adults: 4–6 g/day in 3–4 divided doses for 7 days
 - Children: 100 mg/kg/day in 3 divided doses
 - ◆ Switch to the oral route as soon as possible with amoxicillin to complete the 7 days
- For penicillin allergic patients, give—
 - ◆ Erythromycin (250 mg and 500 mg tablets, 125 mg/5 mL susp)
 - Adults: 500 mg 4 times/day for 7 days
 - Children:
 - <1 year: 125 mg (5 mL or 1 tsp) 2 times/day for 7 days
 - 1–5 years: 250 mg (10 mL or 2 tsp) 2 times/day for 7 days
 - 6–12 years: 250 mg tab 4 times/day for 7 days

Referral

Patients—

- Who are not responding to treatment
- Who have severe leptospirosis
- Who are penicillin-allergic

References—1, 10, 163

14.6 Malaria

Description

Malaria is a protozoan disease transmitted by an infected female anopheles mosquito. Anopheles darlingi, a primary vector, is both effective and efficient in malaria transmission. Malaria is a major public health problem in Guyana, notably in regions 1, 7, 8, 9, and parts of regions 2 and 10.

Cause and risk factors

Four species of protozoa of the genus Plasmodium cause nearly all malarial infections in humans:

- *P. falciparum* (the most common and the cause of almost all deaths)
- *P. vivax* (the next most common)
- *P. malariae*
- *P. ovale* (This species is not a problem in Guyana.)

The incubation period is 7–12 days for falciparum and >15 days for the others.

The following groups are at the highest risk of contracting malaria:

- The elderly
- Severely malnourished individuals
- Immunocompromised people
- People who have uncontrolled DM

Signs and symptoms

For uncomplicated malaria, the symptoms are nonspecific:

- Fever (usually high)
- Chills
- Sweating
- Headache
- Muscle ache
- Arthralgia (i.e., joint pain)
- Anorexia irregular at first, but may occur every 2–3 days
- Nausea and vomiting
- Anaemia common among children living in endemic areas

Classically, symptoms are cyclical with occurrence of sudden coldness followed by rigor and then fever and sweating lasting 4–6 hours, occurring every 2 days

in *P. vivax* and *P. ovale* infections and every 3 days in *P. malariae*. *P. falciparum* can have recurrent fever every 1½–2 days or a less pronounced and almost continuous fever.

Diagnosis

The diagnosis of malaria is based on—

- Clinical suspicion. Always consider malaria in a febrile patient living in or returning from an area where the disease is endemic.
- Detection of parasites in the peripheral blood (confirmed case)

Investigations (at health centre level) include—

- Rapid malaria diagnostic test (RDT)
- Thin and thick blood films (microscopy)
- FBC and white cell differential
- Blood glucose especially in unconscious patients

Management objectives

- Reduce fever
- Kill the infectious agent
- Treat complications
- Reduce transmission of the infection to others

Management

The treatment policy recommendation in Guyana requires parasitological confirmation of the diagnosis of malaria before administration of antimalarial medicine. It is also vital to differentiate between the different species of *Plasmodia* to allow for the correct treatment. Parasitological confirmation should be provided by microscopy or, where not available, RDTs.

Note: A negative RDT or a negative blood smear does *not* exclude malaria, and treatment can be initiated on clinical grounds.

Nonpharmacological management

- Exclude other causes of fever.
- Give the patient plenty of fluids to drink.
- Advise the patient on the use of insecticide-treated bed nets and mosquito repellents and coils.

- Advise the patient to wear appropriate clothing (e.g., long sleeves especially in the evenings and night).
- Advise the patient to cover exposed skin with insect repellent.

Pharmacological management

Pharmacological management depends on the type of malaria and patient. Each is discussed in detail in the following sections.

14.6.1 Falciparum Infections

14.6.1.1 Mild to Moderate Falciparum Infection

- For first-line treatment, give—
 - Artemether-lumefantrine (Coartem®) (20 mg/120 mg tablet). See table 14.6.1A for dosages.

PLUS

- Primaquine as a single dose. See table 14.6.1B for dosages.

- Consider second-line treatment under these conditions:
 - The patient experiences treatment failure or has a reoccurrence of symptoms, parasites, or both at rechecks within 28 days of the onset of first-line treatment.
 - The patient is allergic to or has an inability to tolerate first-line medicines.
 - The first line treatment is unavailable.

- For second-line treatment, give—

- Artesunate for 3 days. See table 14.6.1C for dosages.

PLUS

- Mefloquine for 2 days. See table 14.6.1C for dosages.

PLUS

- Primaquine as a single dose. See table 14.6.1B for dosages.

- For second-line treatment (alternative A), give—

- Quinine sulphate (300 mg tablet) for 7 days. See table 14.6.1D for dosages.

PLUS

- Tetracycline 4 mg/kg 4 times/day for 7 days

OR

Table 14.6.1.1A. Artemether-Lumefantrine Dosage for Falciparum Cases (First Line)

Age (in Years)	Number of Tablets at Approximate Timing of Dosing						Body Weight (kg)
	0 h	8 h	24 h	36 h	48 h	60 h	
<3	1	1	1	1	1	1	5-14
3-8	2	2	2	2	2	2	14-24
9-14	3	3	3	3	3	3	25-34
>14	4	4	4	4	4	4	>34

Table 14.6.1.1B. Primaquine (7.5 mg and 15 mg) Dosage for Falciparum Cases (First and Second Line)

Age	Daily Dose (15 mg Tablets)	Daily Dose (7.5 mg Tablets)	Weight (kg)
	Number of Tablets		
<6 months	0	0	6-10
6-11 months	½	1	11-14
1-2 years	½	1	15-24
3-6 years	1	2	25-34
7-11 years	2	4	35-49
12-14 years	3	4	35-49
≥15 years	3	6	>50

Table 14.6.1.1C. Artesunate and Mefloquine Dosage for Falciparum Cases (Second Line)

Age	Dose (in mg) (Number of Tablets)					
	Artesunate (50 mg tablets)			Mefloquine (250 mg tablet)		
	Day 1	Day 2	Day 3	Day 1	Day 2	Day 3
≥5-11 months	25 (½)	25 (½)	25 (½)	—	125 (½)	—
≥1-6 years	50 (1)	50 (1)	50 (1)	—	250 (1)	—
≥7-13 years	100 (2)	100 (2)	100 (2)	—	500 (2)	250 (1)
>13 years	200 (4)	200	200	—	1,000 (4)	500 (2)

- Doxycycline 3.5 mg/kg once a day for 7 days

OR

- Clindamycin 10 mg/kg 3 times/day for 7 days

PLUS

- Stat dose of primaquine (0.75/kg body weight) as a single dose on day 1.
See table 14.6.1E for dosages.

- For second-line treatment (alternative B), give—

- Artesunate (50 mg tablet). See table 14.6.1.F for dosages.

PLUS

- Clindamycin 10 mg/kg 3 times/day.

Table 14.6.1.D. Quinine Sulphate Dosage for Falciparum Cases (Second Line, Alternative A)

Age	Morning	Midday	Afternoon
<1 year	¼ tablet (75 mg)	¼ tablet (75 mg)	¼ tablet (75 mg)
1-2 years	½ tablet (150 mg)	½ tablet (150 mg)	½ tablet (150 mg)
3-6 years	½ tablet (150 mg)	1 tablet (300 mg)	½ tablet (150 mg)
7-11 years	1 tablet (300 mg)	1 tablet (300 mg)	1 tablet (300 mg)
10-14 years	1 tablet (300 mg)	2 tablets (600 mg)	1 tablet (300 mg)
>15 years	2 tablets (600 mg)	2 tablets (600 mg)	2 tablets (600 mg)

Table 14.6.1.E. Stat Dose of Primaquine for Falciparum Cases (Second Line, Alternative A)

Age	Dose	Weight
<6 months	0	6-10 kg
6-11 months	½ tablet (7.5 mg)	11-14 kg
1-2 years	½ tablet (7.5 mg)	15-24 kg
3-6 years	1 tablet (15 mg)	25-34 kg
7-11 years	2 tablets (30 mg)	35-49 kg
12-14 years	3 tablets (45 mg)	35-49 kg
≥15 years	3 tablets (45 mg)	≥50 kg

Table 14.6.1.1F. Artesunate Dosage for Falciparum Cases (Second Line, Alternative B)

Age	Dose (in mg) (Number of Tablets)		
	Day 1	Day 2	Day 3
≥5–11 months	25 (½)	25 (½)	25 (½)
≥1–6 years	50 (1)	50 (1)	50 (1)
≥7–13 years	100 (2)	100 (2)	100 (2)
>13 years	200 (4)	200 (4)	200 (4)

14.6.1.2 Severe Falciparum Malaria

Description

Severe falciparum malaria is acute falciparum malaria with signs of severity, evidence of vital organ dysfunction, or both. It usually occurs as a result of delay in treating an uncomplicated attack of falciparum malaria. Sometimes, however, especially in children, severe malaria may occur very rapidly. Recognizing and promptly treating uncomplicated *P. falciparum* malaria is therefore of vital importance. If severe falciparum malaria is left untreated, mortality is 100%.

For severe malaria (caused only by falciparum), the symptoms are—

- High fever
- Neurological signs (indicating cerebral malaria)
- Impaired consciousness (prostration, drowsiness, delirium, disorientation, coma)
- Seizures
- Abnormal posturing and cognitive impairment in children
- Severe anaemia (especially in children)
- Renal dysfunction (rare in children): oliguria, anuria, in the absence of signs of dehydration or after adequate rehydration
- Hypoglycaemia (frequent in children and pregnant women)
- Pulmonary oedema (particularly in adults)
- Respiratory distress: dyspnoea (i.e., slow, deep breathing)
- Haematuria or very dark red urine
- Jaundice (check mucosa of mouth, conjunctiva, and palms)
- Circulatory collapse: cold extremities, weak pulse, slow skin recolouration time, cyanosis

Diagnosis

Diagnosis of severe falciparum malaria is based on the following clinical and laboratory findings.

Clinical findings—

- Impaired consciousness or coma; hallucinations with disorientation in time, place, or person
- Prostration (i.e., unable to stand, walk, or sit without assistance)
- Unable to swallow
- Convulsions, >2 episodes in 24 hours
- Respiratory distress (acidotic breathing)
- Circulatory collapse (systolic BP <70 mmHg in adults; <50 mmHg in children)
- Clinical jaundice plus evidence of other vital organ dysfunction
- Haemoglobinuria (as distinct from haematuria)
- Blood-shot eyes or subcutaneous bleeding
- Pulmonary oedema

Laboratory findings (in addition to identification of the parasite)—

- Hypoglycaemia (blood glucose <40 mg/dL)
- Severe normocytic anaemia ($Hb < 7 \text{ g/dL}$, PCV <15%)
- Haemoglobinuria
- Serum creatinine >265 $\mu\text{mol/L}$

Referral

- Refer any patient with severe falciparum malaria to the hospital immediately.
- Give the patient the first dose of one of the following before referral (unless the referral time is <6 hours):
 - Quinine IM
 - OR**
 - Artemether IM
- In young children (<5 years), the use of rectal artesunate (10 mg/kg) has been shown to reduce the risk of death and permanent disability.
- For more detailed information, consult National Treatment Guidelines for Malaria (Guyana Ministry of Health 2013).

14.6.2 *P. vivax* Infection

- For first-line treatment, give—
 - Chloroquine (150 mg base/tablet) at a dose of 25 mg/kg (base) for 3 days. See table 14.6.2A for dosages.
- PLUS**
- Primaquine at a dose of 0.25 mg/kg daily for 14 days. See table 14.6.2B for dosages.

Table 14.6.2A. Dosage Regimen for Chloroquine for *P. vivax* Infection (First Line)

Age	Weight (in kg)	Number of Tablets		
		Day 1	Day 2	Day 3
<6 months	<6	¼	¼	¼
6–11 months	6–10	½	½	½
1–2 years	11–14	1	½	½
3–6 years	15–24	1	1	1
7–11 years	25–34	2	1½	1½
12–14 years	35–49	3	2	2
>15	>50	4	3	3

Table 14.6.2B. Daily Dosing for Primaquine for *P. vivax* Infection (First and Second Line)

Age	Daily Dose (15 mg tablets)	Daily Dose (7.5 mg tablets)
<6 months	0	0
6–11 months	¼	⅓
1–2 years	¼	⅓
3–6 years	½	⅔
7–11 years	1	1⅓
12–14 years	1	1½
≥15 years	1	2

- For second-line treatment, give—
 - Artemether-lumefantrine for 3 days. See table 14.6.2C for dosages.
- PLUS**
- Primaquine for 14 days as per prescribed guidelines only.

Table 14.6.2C. Artemether-Lumefantrine Dosage for *P. vivax* Infection (Second Line)

Age (in years)	Number of Tablets at Approximate Timing of Dosing						Body Weight (kg)
	0 h	8 h	24 h	36 h	48 h	60 h	
<3	1	1	1	1	1	1	5-14
≥3-8	2	2	2	2	2	2	15-24
≥9-14	3	3	3	3	3	3	25-34
>14	4	4	4	4	4	4	>34

14.6.3 *P. malariae* Infection

The recommended treatment for *P. malariae* is—

- The standard regimen of chloroquine at 25 mg/kg (base) divided over 3 days. See table 14.6.2A for dosages.
- PLUS**
- Primaquine for 7 days as per the prescribed guidelines only.

14.6.4 Mixed Infections

Table 14.6.4. Treatment of Mixed Infections

To review the doses of each medicine used for the treatment of mixed infections, see tables above	Table Number
Falciparum + malariae: artemether-lumefantrine + chloroquine (3 days) + primaquine (7 days)	14.6.1A, 14.6.2A, 14.6.2B
Vivax + malariae: chloroquine (3 days) + primaquine (14 days)	14.6.2A, 14.6.2B
Falciparum + vivax + malariae: artemether-lumefantrine + chloroquine (3 days)+ primaquine (14 days)	14.1.1A, 14.6.2A, 14.6.2B
Falciparum + vivax: artemether-lumefantrine + chloroquine (3 days) + primaquine (14 days)	14.6.1A, 14.6.2A, 14.6.2B

13.6.5 Malaria in Pregnancy

Description

Malaria in pregnancy is associated with low birth weight, foetal death, premature labour, anaemia, and increased risk of severe malaria. Therefore, *all* pregnant women living in malaria endemic areas should have a malaria smear at each prenatal check-up and, if positive, should start treatment with antimalarials promptly. Monitor with smears on days 1, 3, 6, and 14.

In addition, *all* pregnant women who present with a fever or who are from or have visited a malaria endemic area require a malaria smear and treatment if the smear is positive.

If the woman first presents at a health post, the community health worker should commence oral therapy immediately and refer her to the health centre where she can be seen by a Medex or doctor. After assessment, and recommended observation, the doctor or Medex can seek expert obstetric advice. If severe malaria is suspected, the pregnant woman should start treatment with parenteral antimalarials and be transferred to Georgetown Public Hospital immediately.

Pharmacological management of uncomplicated *P. falciparum* malaria

- If the woman is in the first trimester of her pregnancy, give—
 - Quinine (300 mg tablet) 600 mg PO, 3 times/day (or 450 mg if the patient weighs <50 kg)

PLUS

 - Clindamycin (150 mg, 300 mg tablet) 450 mg PO3 times/day (or 300 mg if the patient weighs <50 kg) for 7 days
- If the woman is in the second or third trimester of her pregnancy, give Coartem (20 mg artemether + 120 mg lumefantrine) as shown in table 14.6.5.

Table 14.6.5. Coartem Dosage in Pregnancy

Age (years)	Number of Tablets and Approximate Timing of Dosing						Body weight (kg)
	0 h	8 h	24 h	36 h	48 h	60 h	
9-14	3	3	3	3	3	3	25-34
≥15	4	4	4	4	4	4	>34

Referral

- Persons with HIV stage 3 or 4
- Patient with excessive vomiting
- Patients showing no improvement
- All cases of severe malaria

References—1, 164

See also—information on malaria in Guyana at http://www2.paho.org/hq/dmdocuments/2011/PAHO_ENG_Malaria_LR.pdf (pg 156-166)

14.7 Mumps

Description

Mumps is an acute viral infection that usually spreads through saliva and can infect many parts of the body, especially the parotid salivary glands. Involvement of other salivary glands and the gonads is also common. Patient is infectious from 3 days before parotid swelling to 7 days after it started.

Signs and symptoms

The signs and symptoms of mumps appear 2–3 weeks after exposure and include—

- Fever
- Pain on opening the mouth, swallowing, or eating
- Loss of appetite
- Body aches

Both the left and right parotid glands may be affected, with one side swelling a few days before the other, or only one side may swell. The tender swelling appears below the ears at the angle of the jaw and starts about 2 days after the onset of the initial symptoms. The swelling disappears in about 7–10 days.

Among post-pubertal males, the testes may become infected. Usually one testicle becomes swollen and painful about 7–10 days after the parotids swell and is accompanied by—

- A high fever
- Shaking chills
- Headache

- Nausea and vomiting
- Abdominal pain that can sometimes be mistaken for appendicitis if the right testicle is affected

The testes may become enlarged to several times its normal size (orchitis).

Encephalitis and meningitis are rare complications of mumps.

Management objective

Provide symptomatic treatment

Nonpharmacological management

- Advise bed rest during febrile period.
- Isolate the patient until swelling subsides; application of warm or cold compresses to the swelling may be helpful.
- Advise the patient, parent, or caregiver on oral hygiene.
- Recommend plenty of fluids and soft food during the acute stage.
- For testicular pain, suggest cold compresses and support to the scrotum.
- Children may return to school 1 week after initial swelling.

Pharmacological management

Give paracetamol (500 mg tablets; 120 mg/5 mL suspension) to relieve pain and fever. See table 14.7 for dosages. Do not give aspirin.

Table 14.7. Paracetamol Dosages by Age and Weight for the Management of Mumps

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3-12 months	6-10 kg	60	2.5 mL (½ tsp)	3 times/day	5-7 days
1-5 years	10-18 kg	120	5 mL (1 tsp)	3 times/day	5-7 days
5-8 years	18-25 kg	240	10 mL (2 tsp) or ½ tablet	3 times/day	5-7 days
8-14 years	25-50 kg	500	1 tablet	3-4 times/day	5-7 days
>14 years	>50 kg and adults	1,000	2 tablets	3-4 times/day	5-7 days

Caution: Acetylsalicylic acid (aspirin) is not recommended for children <12 years old because of the risk of Reye's syndrome.

Referral

- High fever
- Severe headache, stiff neck, and drowsiness (suspect meningitis)
- Abdominal pain (suspect pancreatitis)
- Painful testes or orchitis
- Suspected encephalitis

References—1, 8, 165, 166

14.8 Tuberculosis

Description

TB is a potentially fatal contagious disease that can affect almost any part of the body but is mainly an infection of the lungs. Caused by a bacterial microorganism, the tubercle bacillus or *Mycobacterium tuberculosis*, TB is spread by droplet infection from a patient with infectious pulmonary TB through coughing, sneezing, spitting, singing, or speaking. TB can be treated, cured, and prevented if persons at risk take certain medicines. Few diseases have caused so much distressing illness for centuries and claimed so many lives.

Risk factors

The following groups are at risk to contract TB.

- Persons in close, frequent, or prolonged contact with an infected person
- Persons who live or spend time in certain congregated or institutionalized settings such as—
 - Prisons, jails, and correctional facilities
 - Group homes or facilities for the elderly
 - Shelters for homeless persons
 - Acute inpatient and outpatient care facilities
 - Overcrowded habitations
- Persons who live or work in a country that has a high prevalence of TB
- The elderly
- Children <5 years
- HIV-infected persons (21–34 times more likely to become infected)
- Alcoholics
- Intravenous drug abusers

- Smokers
- Persons who have certain medical conditions such as—
 - Silicosis
 - Diabetes mellitus
 - Chronic renal failure or on haemodialysis
- Persons who are underweight or malnourished

Signs and symptoms

- The general symptoms of TB disease (pulmonary or extrapulmonary) include—
 - Fever and night sweats
 - Listlessness, weakness, malaise
 - Loss of appetite
 - Weight loss
- Pulmonary TB in a child presents with—
 - Enlarged painless lymph nodes (especially in the neck)
 - Unexplained fever for >2 weeks
 - Unexplained weight loss or failure to thrive
 - Hepatosplenomegaly or ascites
 - Chronic unremitting cough for >14 days
- Pulmonary TB in an adult presents with a persistent, productive cough for ≥ 2 weeks and sometimes—
 - Haemoptysis (coughing up blood)
 - Chest pains when coughing or breathing
 - Shortness of breath
 - Enlarged lymph nodes in neck for >3 weeks
 - Clubbing of the fingers
- The signs and symptoms of extrapulmonary TB depend on the site or organ affected and include—
 - Lymphadenopathy
 - Pleural effusion (difficulty in breathing and dullness to percussion)
 - Pericarditis (fever and dull retrosternal pain)
 - Dry cough and hepatosplenomegaly (miliary TB)
 - Headache, meningismus, impaired consciousness (TB meningitis)
 - Deformity, bone pain, abscess, osteomyelitis (TB of the spine and bones)

Diagnosis

- Comprehensive history (very important), which should include the patient's—
 - Contacts
 - Medical history
 - Occupation
 - Living environment
- Physical examination
- Tuberculin skin test (TST or Mantoux) (see table 14.8A)
- Chest x-ray
- Sputum microscopy (3 tests: immediate sample, overnight sample, and spot test at return visit). At least one positive sputum smear by microscopy is sufficient to establish the diagnosis of TB and initiate treatment.
- Smear-negative plus clinical evidence, radiological evidence, or both. (CXR is indicated only when there are ≥ 2 AFB, severe haemoptysis, severe illness, or exposure.)
- Sputum culture in cases of—
 - Sputum smear-negative for TB
 - TB defaulters
 - TB treatment failures or relapse
 - Persons exposed to MDR/XDR TB cases
 - Patients who have DM and are HIV positive
 - Medicine sensitivity (in suspected multidrug resistance)
- CXR (pleural effusion may be present)

Management objectives

- Start treatment as soon as possible and effect cure
- Note:** Treatment can be ambulatory or hospital based depending on the patient's condition.
- Ensure compliance with treatment
 - Prevent relapse of TB
 - Decrease risk of transmission to others
 - Prevent the development of acquired resistance to anti-TB medicines
 - Organize DOTS for all patients on treatment
 - Identify and treat the source or index case

Table 14.8A. Interpretation of the Tuberculin Skin Tests

Size of Induration	Interpretation
0 mm	Uninfected Anergy
≥5 mm	Positive in— <ul style="list-style-type: none"> • HIV-infected individuals • Persons with fibrotic changes on chest x-rays consistent with prior TB • Recipients of organ transplants and those on chronic immunosuppressive therapy
≥10 mm	Positive in— <ul style="list-style-type: none"> • Residents and workers of high-risk settings including health care workers, laboratory personnel, and inmates of detention facilities • Illicit drug users • Children <5 years of age • Children, adolescents, and adults exposed to an infectious adult TB case
≥15 mm	Positive in a person with no history of contact

Note: Reactivity in adults due to BCG given in infancy is often <10 mm (ATS/CDC).

Nonpharmacological management

- Screen all contacts for tuberculosis infection.
- Advise patient on rest and diet.
- Provide HIV counselling and testing.

Pharmacological management

Start patient on anti-TB medicines (table 14.8B).

Table 14.8B. Essential Anti-TB Medicines

Medicines	Mode of Action	Recommended Doses (mg/kg)	
		Daily	3 Times/Week
Isoniazid (H)	Bactericidal	5 (4-6)	10 (8-12)
Rifampicin (R)	Bactericidal	10 (8-12)	10 (8-12)
Pyrazinamide (Z)	Bactericidal	25 (20-30)	35 (30-40)
Ethambutol (E)	Bacteriostatic	15 (15-20)	30 (20-35)
Streptomycin (S)	Bactericidal	15 (12-18)	15 (12-18)
New patient:	—	2 HRZE 4 HR 4 H3R3 6HE	
▪ New smear PTB			
▪ New smear with extensive lung involvement			
▪ Severe extrapulmonary TB			

- For new smear-positive and new smear-negative pulmonary TB give—
 - Isoniazid (100 mg, 300 mg tablets) 5 mg/kg daily for 2 months
PLUS
 - Rifampicin (150 mg, 300 mg tablets or capsules) 10 mg/kg daily for 2 months
PLUS
 - Pyrazinamide (500 mg tablet) 25 mg/kg daily for 2 months
PLUS
 - Ethambutol (400 mg tablet) 15 mg/kg daily for 2 months
- If the patient is in a DOTS programme, the following regimen may be used instead (summarized in table 14.8C)—
 - Isoniazid (100 mg, 300 mg tablets) 10 mg/kg 3 times/week for 2 months
PLUS
 - Rifampicin (150 mg, 300 mg tablets or capsules) 20 mg/kg 3 times/week for 2 months
PLUS
 - Pyrazinamide (500 mg tablet) 50 mg/kg 3 times/week for 2 months
PLUS
 - Ethambutol (400 mg tablet) 30 mg/kg 3 times/week for 2 months
FOLLOWED BY

- Isoniazid (100 mg, 300 mg tablets) 5 mg/kg daily for 4 months
OR
 - Isoniazid (100 mg, 300 mg tablets) 10 mg/kg 3 times/week for 4 months
PLUS
 - Rifampicin (150 mg, 300 mg tablets or capsules) 10 mg/kg daily for 4 months
OR
 - Rifampicin (150 mg, 300 mg tablets or capsules) 20 mg/kg 3 times/week for 4 months
- Note:** A 3 times/week regimen must be used with patients in a DOTS programme only.
- Patients with HIV co-infection (see below) must be put on a daily regimen.

Table 14.8C. Fixed-Dose Combinations for Patients on DOTS

Medicine	Strength for Daily Use	Strength for Use on the 3 Times/Week Regime
HRZE	75 + 150 + 400 + 275	—
HRE	75 + 150 + 400 30 + 60 + 150	150 + 150 + 400
HR	75 + 150 150 + 300 30 + 60	150 + 150 60 + 60
HE	150 + 400	—

- Obtain sputum for AFB at the end of the second month.
 - If the sputum is smear-negative and the patient is clinically better, change to the continuation phase.
 - If the sputum is still smear-positive, send the sputum for culture as well as DST, and initiate the continuation phase.
 - Obtain sputum for AFB at the end of the fifth month.
 - If the sputum is smear-negative, continue the second or continuation phase of therapy.
 - If the sputum is smear-positive, stop treatment, start re-treatment therapy, and label as treatment failure. Obtain sputum for AFB culture and DST.

- **Prophylaxis.** TB infection prophylaxis is used in three types of cases:
 - Persons, especially children <5 years, who have close contact with a recently diagnosed smear-positive patient
 - HIV-positive patients (children and adults)
 - Persons who have a positive TST or a positive blood assay for mycobacterium TB.
- **Medicines to treat TB infection.** Isoniazid combined with vitamin B6 is the regimen of choice to treat TB infection (table 14.8D). The vitamin B6 is used to prevent peripheral neuropathy. If INH is not tolerated or if the index case is INH-resistant, rifampicin daily for 4 months is the regimen of choice. INH and rifampicin are both recommended and tolerated during pregnancy and breastfeeding. Some experts recommend, however, delaying INH for pregnant women with a low risk of progression to active TB until after delivery.

Table 14.8D. Treatment of TB Infection

Medicine	Dosage		Duration
	Adults	Children	
Isoniazid (INH)	300 mg daily	5 mg/kg	HIV-negative: 6 months HIV-positive: 9 months
Vitamin B6	25–50 mg daily	10 mg/kg (not to exceed 300 mg)	HIV-negative: 6 months HIV-positive: 9 months
Rifampicin (R) (if INH not tolerated)	600 mg daily	15 mg/kg daily (not to exceed 600 mg)	Adults: 4 months Children and immunosuppressed persons: 6 months

- **Coinfection.** Guidelines for TB-HIV coinfection are addressed in the *National Guidelines for the Management of HIV-Infected and HIV-Exposed Adults and Children* (pp. 82–3).
- **Follow up.**
 - Educate the patient on the following—
 - ◆ What TB is
 - ◆ How TB is spread
 - ◆ What can be done to limit the spread of TB

- ◆ Curability of TB
- ◆ What medications are used and for how long
- ◆ How treatment is to be followed
- ◆ Expected side effects of medications
- Monitor the nutritional status of the patient, especially children.
- Enroll the patient in a DOTS programme to ensure adherence to treatment regimen.
- Stress the need for regular clinic attendance.
- Report all missed appointments to the DOTS supervisor.

▪ ***Monthly case monitoring***

- At each monthly follow-up visit, measure the patient's vital signs (i.e., temperature, respiratory rate, BP, yearly weight and height for adults, and monthly weight and height for children and adolescents).
- Assess the patient's response to treatment (i.e., signs and symptoms, appetite and weight changes), and document them at each visit.
- Determine the patient's adherence to treatment.
- Assess the patient for any adverse effects of the medication.

Referral

- At the health centre level, all persons newly diagnosed with TB, for confirmation
- All HIV-positive patients, to an HIV care centre
- All smear-negative cases with severe pulmonary involvement or suspected extrapulmonary TB

References—1, 3, 10, 167, 168

14.9 Typhoid (Enteric Fever) and Salmonella Infections

Description

Typhoid is an acute life-threatening systemic disease characterized by persistent high-grade fever ($>38^{\circ}\text{C}$) and abdominal pain.

Causes and risk factors

- *Salmonella typhi* causes typhoid. The bacteria survives only in humans.
- More than 95% of all transmission occurs through food, especially eggs.
- Water contaminated by faeces from an infected person carries the disease.
- Symptoms are most severe in the elderly, infants, and those who have an existing illness.
- AIDS patients are frequently affected and have recurrences.

Signs and symptoms

- Initial signs and symptoms:
 - Prolonged or high fever ($38.8\text{--}40.5^{\circ}\text{C}$), with profuse sweating, in a previously healthy individual, lasting >1 week; the person may become delirious
 - A slower pulse rate than expected with the level of fever
 - Headache and possible convulsions
 - Malaise and anorexia
 - Abdominal pain possible
 - In the first week, constipation
 - Diarrhoea possible later in the illness; may be accompanied by frank bleeding
- Signs of complications
 - Intestinal perforation—abdominal tenderness, with sudden increase in pulse rate and hypotension
 - Altered mental status
 - Deafness

Diagnosis

Confirmation is only by stool culture or blood tests (Widal). Repeat the test 4–6 weeks after the start of treatment to certify that the patient is *S. typhi* free.

Management objectives

- Reduce the fever
- Prevent dehydration
- Prevent the spread of the disease in the community

Nonpharmacological management

- Encourage the use of fluids. Give ORS, if necessary, or initiate IV infusion.
- Ensure appropriate nutrition.
- Bathe the patient with tepid water, or sponge him or her with a cool cloth to reduce the fever.
- Discuss the importance of good personal hygiene with the patient. Advise the patient to wash his or her hands thoroughly—
 - After using the toilet
 - Before eating
- Keep the patient isolated for the duration of the illness.
- Disinfect the patient's clothing.
- Institute the following control measures:
 - Educate the patient and the family on hand washing, safe sewage disposal, safe drinking water, and food safety.
 - Urge the patient and the family to control flies by reducing and eliminating breeding sites and to protect food or food utensils from contact with flies.
 - Identify and treat all carriers

Pharmacological management

- For fever and pain, give paracetamol (500 mg tablets; 120 mg/5 mL suspension). See table 14.9 for dosages. Do not give aspirin.
- Caution:** Acetylsalicylic acid (aspirin) is not recommended for children <12 years old because of the risk of Reye's syndrome.
-
- Give an antibiotic: ciprofloxacin (200 mg, 500 mg tablets; 2 mg/5 mL injection)
 - Adults: PO (500 mg tablets) one tablet 2 times/day for 3 weeks
 - Children: 30 mg/kg/day in 2 divided doses for 5–7 days
- Caution:** Do not use ciprofloxacin in pregnant or lactating women.
-

Table 14.9. Paracetamol Dosages by Age and Weight for the Management of Fever and Pain in Typhoid

Age	Weight	Dose (mg)	Quantity	Frequency	Duration
3–12 months	6–10 kg	60	2.5 mL ($\frac{1}{2}$ tsp)	3 times/day	5–7 days
1–5 years	10–18 kg	120	5 mL (1 tsp)	3 times/day	5–7 days
5–8 years	18–25 kg	240	10 mL (2 tsp) or $\frac{1}{2}$ tablet	3 times/day	5–7 days
8–14 years	25–50 kg	500	1 tablet	3–4 times/day	5–7 days
>14 years	>50 kg and adults	1,000	2 tablets	3–4 times/day	5–7 days

Referral

- All known or suspected cases. Initiate treatment in remote areas while waiting to arrange transfer.
- Patients who have a high fever and altered state of consciousness
- Patients who have signs of intestinal bleeding or perforation

References—1, 10, 169, 170, 171

15. Gynaecology

15.1 Dysmenorrhoea

Description

Dysmenorrhoea is severe or incapacitating uterine cramping just before or during menstruation. It typically occurs in the first few years after menarche.

Classification

- Primary—in the absence of disorders of the pelvis
- Secondary—if associated with diseases of the pelvis

Causes and risk factors

Causes of secondary dysmenorrhoea

- Infections of the pelvic organs (e.g., PID, see section 15.4)
- Intrauterine contraceptive device (IUD)
- Endometriosis
- Fibroids
- Malignancy
- Malnutrition and anaemia

Risk factors

- Early age at menarche
- Long menstrual periods
- Heavy menstrual flow
- Smoking
- Positive family history

Signs and symptoms

Primary dysmenorrhoea

- Cramping or labour-like pain (lower abdominal pain)
- Usual duration of 48–72 hours (often starting several hours before or just after the menstrual flow)
- Sometimes abdominal distension
- Nausea and vomiting

- Diarrhoea
- Headache

Suspect secondary dysmenorrhoea if—

- Dysmenorrhea began after the age of 25.
- Pelvic abnormality is found with physical examination. Consider endometriosis, pelvic inflammatory disease, pelvic adhesions, and adenomyosis.
- The patient has little or no response to therapy with NSAIDs, oral contraceptives, or both

Management objective

Provide symptomatic relief

Nonpharmacological management

Explain to the patient—

- Dysmenorrhoea will occur with every period but could disappear with time and age.
- She will need to use medicines as prescribed.

Pharmacological management

- Give NSAIDs: diclofenac OR ibuprofen.
- Consider oral contraceptives if these fail.

References—1, 3, 10, 178

15.2 Abnormal Vaginal Discharge

Description

Normal vaginal discharge is clear, odourless, and related to normal cycle changes. When the patient reports a change in the amount, consistency, colour, and odour of the discharge, it is considered to be abnormal. It may be accompanied by pain, itching, or burning.

Causes

- *Trichomonas vaginalis* (an STI)
- *Candida albicans* (a fungal infection)
- Bacterial vaginosis

- *Neisseria gonorrhoea* (an STI)
- *Chlamydia trachomatis* (an STI)

Signs and symptoms

- Often asymptomatic
- Vaginal discharge
- Itching
- Dysuria
- Thick white plaques

Diagnosis

See table 15.2 for diagnostic information.

Table 15.2. Diagnosing Abnormal Vaginal Discharge

Feature	Vulvo-Vaginal Candidiasis	<i>T. vaginalis</i>	Bacterial Vaginosis
Aetiology	<i>C. albicans</i>	<i>T. vaginalis</i>	Associated with <i>Gardnerella vaginalis</i> , various anaerobic bacteria, and mycoplasmas
Typical symptoms	Vulvar itching, irritation, or both	Profuse purulent discharge; vulvar itching	Malodorous, slightly increased discharge
Inflammation of vulvar or vaginal epithelium	Erythema of vaginal epithelium, introitus; vulvar dermatitis common	Erythema of vaginal and vulvar epithelium; colpitis macularis	None
Discharge			
Amount	Scant	Often profuse	Moderate
Colour	White	White or yellow	White or grey
Consistency	Clumped; adherent plaques	Homogeneous	Homogeneous, low viscosity; uniformly coats vaginal wall

Nonpharmacological management

Advise the patient:

- Do not douche.
- Use mild soap and water to cleanse vaginal area.
- Do not use talcum powder and vaginal deodorants.
- Use cotton underwear rather than synthetics.

Pharmacological management

All women who have abnormal vaginal discharge should receive systemic treatment with metronidazole to cover *T. vaginalis* and bacterial vaginosis.

- For *T. vaginalis*, give—
 - Metronidazole (250 mg tablet) 2 g as a single dose
 - In the event of treatment failure, give metronidazole 500 mg BID for 7 days.
- For bacterial vaginosis, give metronidazole (250 mg tablet) 500 mg BID for 7 days.
- For *C. albicans*, give clotrimazole pessaries (100 mg) once daily for 7 days (per Harrison's).

References—1, 3, 172

15.3 Abnormal Vaginal Bleeding

Description

Abnormal vaginal bleeding is any vaginal bleeding unrelated to normal menstruation. It is characterized by increased vaginal blood flow in volume, duration, or frequency. This type of bleeding may range from spotting of small amounts of blood between periods—often seen on toilet tissue after wiping—to heavy periods enough to soak a pad an hour for several hours. Bleeding that lasts for weeks at a time is also considered abnormal. The blood loss typically arises from the lining of the uterus but may arise from uterine or cervical lesions, the vagina, or rarely from the fallopian tube.

Causes

Bleeding before the expected time of menarche could be a sign of precocious puberty.

- Other possible causes include—
 - The presence of a foreign body in the vagina
 - Molestation
 - Vaginal infection and vaginitis
 - Rarely, a tumour
- During pregnancy, it is usually, but not always, related to the pregnancy itself. Abnormal vaginal bleeding can signal gynaecologic conditions and other medical problems.
- In premenopausal women, it may be due to disorders of menstruation, hormonal imbalance, fibroids, infection, or cancer of cervix or uterus.
- Postmenopausal bleeding may result from—
 - Replacement hormonal treatment
 - Endometritis
 - Polyps
 - Uterine or cervical cancer

Signs and symptoms

- Bleeding from the vagina at an unexpected time or in an abnormal quantity
- Lower abdominal pain possible

Diagnosis

The diagnosis can often be made on the basis of the patient's time of life, her bleeding history, a physical examination, and other medical tests as appropriate, typically—

- A pregnancy test and additional hormonal tests
- VIA—should be offered to all women >30 years
- Transvaginal ultrasound
- CBC to check for anaemia—if bleeding was excessive or prolonged
- Hysteroscopy with a biopsy or a dilation and curettage to investigate abnormal endometrium

Management objectives

- Determine and treat the cause
- Treat anaemia if present
- Replace blood if indicated

Management

Management is dependent on the cause, most of which cannot be handled at the primary health care level.

Nonpharmacological management

For premenopausal bleeding—

- Assess current contraceptives used
- Exclude pregnancy complication or an organic disease (e.g., fibroids)

Pharmacological management

- Give a combined oral contraceptive pill. A fixed-ratio oestrogen plus progesterone is available.
 - Give ibuprofen PO 200–400 mg every 8 hours with or after food PRN for 2–3 days. Ibuprofen may reduce blood loss in menorrhagia associated with—
 - An intrauterine contraceptive device (IUD)
 - Menstruation following puberty when no ova are produced (i.e., anovulatory cycles)
- If blood loss has been severe or the patient has signs of anaemia, give ferrous sulphate PO 200 mg 3 times/day after food for 1 month.

Referral

- Girls <12 years who have vaginal bleeding before the development of their secondary sexual characteristics for investigation of other causes such as—
 - Sexual abuse
 - Foreign bodies
 - Tumours of the genital tract
- Severe anaemia
- Bleeding during pregnancy
- Any postmenopausal bleeding

References—8, 174, 175

15.4 Pelvic Inflammatory Disease

Description

Pelvic inflammatory disease (PID) refers to infection that ascends from the cervix or vagina to involve the endometrium, the fallopian tubes, the ovaries, or any combination of the three. It can lead to pelvic peritonitis, generalized peritonitis, and pelvic abscess. Intrauterine infection can be primary (usually sexually transmitted, usually chlamydia or gonorrhoea) or secondary to invasive intrauterine surgical procedures, postpartum, or postabortion.

Signs and symptoms

Symptoms may be minimal to nonexistent. Symptoms suggestive of PID are—

- Lower abdominal and pelvic pain
- Fever
- Painful intercourse
- Vaginal discharge
- Sometimes painful urination
- Painful menstrual periods and abnormal vaginal bleeding
- Sometimes nausea and vomiting

Diagnosis

Based on history and physical findings—

- History of recent intercourse or of recent delivery, miscarriage, or abortion
- Tenderness in adnexa
- Abdominal rebound tenderness
- Pain on movement of the cervix

Management objectives

- Rule out conditions needing surgical intervention such as appendicitis, ectopic pregnancy, or ovarian cyst
- Start treatment as early as possible

Nonpharmacological management

- Advise the patient to—
 - Get bed rest
 - Avoid sexual intercourse
- Treat partner if sexual transmission suspected.

Pharmacological management

Give—

- Ceftriaxone IM (125 mg) 125 mg as a single dose (to be dispensed on the advice of a physician)

PLUS

- Doxycycline PO (100 mg tablet) 1 tablet, 2 times/day for 14 days

PLUS

- Metronidazole PO (500 mg) 1 tablet, 2 times/day for 14 days

Referral

- Patient who has fever and chills, foul-smelling vaginal discharge, or history of recent delivery, miscarriage, or abortion (suggestive of puerperal sepsis)
- Very ill patient
- Patient who has a history of immunodeficiency
- Pregnant patient
- Surgical emergency
- Uncertain diagnosis
- Patient who is unable to follow outpatient treatment or unable to tolerate oral medication
- Patient who fails to respond after 72 hours of outpatient treatment

References—1, 10, 176

15.5 Vulvo-Vaginal Candidiasis

Description

Vulvo-vaginal candidiasis is an infection of the vulvo-vaginal mucous membrane with *C. albicans*. It causes a smelly, thick, white-yellow discharge that might be accompanied by itching, burning, and swelling. It can also make walking, urinating or sex very painful. Women with uncontrolled DM, immuno-compromised, pregnant or debilitated are more prone to contract the disease. See section 8.3.4 for details and management.

16. Neuropsychiatric Disorders

Mental disorders are common in medical practice and may present as a primary disorder or as a co-morbid condition. Changes in health care delivery underscore the need for primary care physicians and other health workers at the primary care level to be able to recognize mental disorders and assume responsibility for the initial diagnosis and treatment of the most common of these disorders. Prompt diagnosis is essential to ensure that patients have access to appropriate medical services and to maximize clinical outcome.

Patients should be referred on suspicion of diagnosis, and treatment should be continued at primary level, if appropriate, after a definitive diagnosis has been made and a treatment regimen has been instituted.

16.1 Anxiety Disorders

Description

Anxiety disorder is the most prevalent psychiatric illness in the general population. The average age of onset is 12 years. It can indicate a primary psychiatric condition or can be a component of, or reaction to, a primary medical disease. It is associated with an increased risk of suicide, with rates of attempts being 10 times higher than that in the general population.

Although it is normal to feel anxious from time to time, especially in stressful situations, severe ongoing anxiety that interferes with day-to-day activities may be a sign of generalised anxiety disorder. It may develop in childhood or adulthood and needs to be distinguished from panic disorder, obsessive compulsive disorder, and other anxiety disorders.

Classification

Anxiety disorders are classified according to their duration and course and to the existence and nature of the things that precipitate the attack:

- Generalised anxiety disorder
- Obsessive-compulsive disorder
- Panic disorder
- Phobias

- Post-traumatic stress disorder
- Separation anxiety
- Childhood anxiety disorder

Causes and risk factors

Causes are not fully understood but may involve naturally occurring brain chemicals (i.e., neurotransmitters), such as serotonin, dopamine, and norepinephrine. It is likely that the condition has several causes that may include genetics, life experiences, and stress.

Risk factors include—

- ***Being female.*** More than twice as many women as men are diagnosed with generalized anxiety disorder.
- ***Experiencing a stressful life event.*** Children who endured abuse or trauma, including witnessing traumatic events, are at higher risk of developing generalized anxiety disorder at some point in life.
- ***Illness.*** Having a chronic health condition or serious illness, such as cancer, can lead to constant worry about the future.
- ***Stress.*** A big event or a number of smaller stressful life situations may trigger excessive anxiety.
- ***Personality.*** People who have some personality types (e.g., extreme shyness) are more prone to anxiety disorders than are others.
- ***Genetics.*** Family history of anxiety or mental illness may be a risk factor.
- ***Substance abuse.*** Drug or alcohol abuse can worsen generalised anxiety disorder. Caffeine and nicotine also may increase anxiety.

16.1.1 Generalised Anxiety Disorder

Signs and symptoms

Generalised anxiety disorder is a persistent, excessive, or unrealistic worry about small or large concerns, occurring more days than not for at least 6 months, associated with three or more of the following:

- Muscle tension or muscle aches
- Difficulty controlling the worry
- Difficulty concentrating or mind going blank
- Restlessness or feeling keyed up or on edge
- Being easily fatigued

- Irritability
- Difficulty falling or staying asleep or having restless or unsatisfying sleep, leading to significant distress or impairment in social, occupational, or other important areas of functioning

Diagnosis

Based on clinical grounds. Use the following screening questions:

- Do you find yourself worrying a lot about several things in all areas of your life?
- Has anyone ever told you that you worry too much?
- Do you have difficulty controlling worry?
 - Does it keep you from sleeping?
 - Does it keep you from working?
 - Does it cause any physical symptoms, such as headache, sweating, increased heart rate, or muscle spasm?

Management objective

Prevent anxiety where possible

Nonpharmacological management

- Advise the patient to seek cognitive behavioural therapy.
- Recommend elimination of caffeine from diet.

Referral

All patients

References—177, 178

16.1.2 Obsessive-Compulsive Disorder

Description

Obsessive-compulsive disorder (OCD) is an anxiety disorder characterized by persistent intrusive ideas, thoughts, impulses, or images (obsessions) that often result in compulsive behaviour or performing rituals over and over again and that impair everyday functioning. Typical compulsions are hand washing (fear of germs), checking (e.g., lock checking), arranging things, and counting. These actions give individuals with OCD, only temporary relief from their anxiety.

Even though many persons with OCD know that their compulsions are excessive

they feel compelled to complete them. With early diagnosis and the right treatment, people can avoid the suffering that comes with OCD.

OCD is equally likely to occur in both males and females, and the median age of onset is 19 years. (According to *Harrison's Principles of Internal Medicine*, it is more common in males and first-born children.) There are four types of OCD:

- Obsessions that are aggressive, sexual, religious, or harm-related combined with checking compulsions
- Obsessions about symmetry that are accompanied by arranging or repeating compulsions
- Obsessions of contamination that are associated with cleaning compulsions
- Symptoms of hoarding

Causes

The cause of OCD is thought to be genetic and is often associated with depression, other anxiety disorders, and eating disorders.

Diagnosis

Based on clinical findings. Use the following screening questions:

- Do you experience recurrent disturbing thoughts, images, or urges?
- Do you ever have to perform a behaviour or repeat an action that you don't want to do in order to feel less anxious (e.g., washing hands over and over)?

Management objective

Reduce the compulsive behaviour

Nonpharmacological management

Cognitive behaviour therapy is used to treat OCD.

- Gradual exposure to stressful situations
- Maintenance of a diary to clarify stressors
- Substitution of new activities for compulsive behaviours

Referral

Refer all patients with suspected disorder.

References—1, 177, 179, 180

16.1.3 Panic Disorder

Description

Panic disorder is an anxiety disorder characterized by recurrent and unpredictable panic attacks—episodes of intense fear and discomfort associated with a variety of physical symptoms.

Causes and risk factors

The causes are unknown, but appear to involve—

- Genetic predisposition
- Social learning
- Major stress
- Temperament that is more susceptible to stress
- Body's natural fight-or-flight response to danger, in the absence of obvious danger

Symptoms of panic disorder often start in the late teens or early adulthood and affect more women than men. Factors that may increase the risk of developing panic attacks or panic disorder include—

- Family history of panic attacks or panic disorder
- Significant stress
- Death or serious illness of a loved one
- Major changes in life, such as the addition of a baby
- History of childhood physical or sexual abuse
- Experiencing a traumatic event, such as an accident or sexual assault

Signs and symptoms

A panic attack is a period of intense fear or discomfort in which at least four of the following develop and reach a peak within 10 minutes.

- Palpitations, pounding heart, or increased heart rate
- Sweating
- Trembling or shaking
- Shortness of breath
- Feeling of choking
- Chest pain or discomfort
- Nausea or abdominal distress
- Feeling dizzy, unsteady, light-headed, or faint
- Fear of losing control or going crazy

- Fear of impending death
- Numbness or tingling sensations
- Chills or hot flashes

Diagnosis

Based on—

- Recurrent unexpected panic attacks that are sudden, develop within 10 minutes, and resolve over the period of 1 hour
- Worry about the occurrence of these symptoms for at least 1 month after the attack and—
 - Persistent concern of having additional attacks
 - Worry about the implications of the attack or its consequences
 - A significant change in behaviour related to them

The frequency and severity of the panic attacks vary, ranging from once a week to clusters of attacks separated by months of well-being.

Use the following screening questions:

- Are there times when you experience a sudden rush of physical feelings such as racing heart, feeling dizzy, or sick to your stomach?
- If so, do you feel panicked or scared during these times?
- Do the feelings come out of the blue, or are they related to something?
- Do you avoid places or situations in which a panic attack might occur?

Check for and rule out cardiovascular, respiratory, endocrine, and neurological conditions.

Management objective

Eliminate all panic attack symptoms

Nonpharmacological management

- Cognitive behavioural therapy
- Participation in a support group
- Avoidance of caffeine, alcohol, and illegal drugs
- Practicing stress management and relaxation exercises
- Participating in regular physical activity
- Getting sufficient sleep so as not to feel drowsy next day

Referral

- All patients with suspected diagnosis
- Treatment must be continued until avoidance behaviour is overcome.
Typically therapy should be continued 8–12 months.

References—1, 177, 181, 182

16.1.4 Phobias

Description

A phobia is a marked and persistent irrational fear of an object, activity, or situation, exposure to which results in an immediate anxiety reaction. Panic attacks may be triggered by the phobia. Unlike with other anxiety disorders, individuals with phobias usually experience anxiety only in specific situations. If left untreated, a phobia may worsen until the person's life is seriously affected, both by the phobia itself and by the attempts to avoid or conceal it.

Types of phobias include—

- Social anxiety disorder—for example, fear of public speaking or performing, of meeting new people, or of other social situations
- Agoraphobia—being in situations in which escape may be difficult (e.g., being in elevators, tunnels, public transport, or going to a restaurant)
- Specific phobias—fear of particular items or situations such as—
 - Insects or animals
 - Heights
 - Flying
 - Enclosed spaces (claustrophobia)
 - Blood or needles

Causes and risk factors

Causes are unknown but are thought to be—

- Familial
- Cultural (i.e., type of upbringing [overly protected])

Risk factors include the following—

- Women are four times more likely to suffer from agoraphobia than men.
- Persons with a family history of a phobia are three times more likely to have a phobia.

- Alcoholics can be up to 10 times more likely to suffer from a phobia than those who are not alcoholics.

Signs and symptoms

Similar to that of having a panic attack

Diagnosis

Based on clinical history. Attack occurs in relation to a specific activity or situation or in the presence of a particular object. Use the following screening questions:

- Are there specific objects or situations that make you fearful and trigger an attack?
- What are those objects or situations?
- Do you try to avoid these objects or situations?
- Does having to avoid these objects or situations cause interference with your normal functioning?

Management objective

Control the response to the phobia

Nonpharmacological management

- Cognitive behavioural therapy
- Desensitisation to the triggering factors

Referral

All suspected cases

References—1, 177, 182

16.1.5 Post-Traumatic Stress Disorder

Description

A stress disorder is one in which a person may develop anxiety after exposure to extreme traumatic events such as the threat of personal death or injury, witnessing someone else's life being put in danger, the death of a loved one, or sexual or physical abuse. The reaction may occur shortly after the trauma (acute stress disorder) or be delayed and become recurrent (post-traumatic stress disorder [PTSD]).

Causes and risk factors

The causes are unknown but may be associated with—

- Inherited mental health risks, such as an increased risk of anxiety and depression
- Life experiences, including the amount and severity of trauma experienced since early childhood
- The inherited aspects of personality (i.e., temperament)

Risk factors include—

- Past psychiatric history
- Personality characteristics of high neuroticism and extroversion
- Genetics (i.e., having a first-degree relative who has mental health problems or depression)
- Experiencing intense or long-lasting trauma such as combat exposure or residence in a conflict area
- History of sexual molestation or rape

Signs and symptoms

PTSD symptoms typically start within 3 months of a traumatic event and may include—

- Intrusive memory
 - Reliving the experience for minutes or even days at a time
 - Upsetting dreams about the traumatic event
- Avoidance and emotional numbing
 - Trying to avoid thinking or talking about the traumatic event
 - Feeling emotionally numb
 - Avoiding activities once enjoyed
 - Hopelessness about the future
 - Memory problems
 - Trouble concentrating
 - Difficulty maintaining close relationships
- Anxiety and increased emotional arousal
 - Irritability or anger
 - Overwhelming guilt or shame
 - Self-destructive behaviour, such as drinking too much
 - Trouble sleeping

- Being easily startled or frightened
- Hearing or seeing things that are not there

Diagnosis

- The person has been exposed to a traumatic event in which both of the following were present:
 - The person felt that his or her life was in danger or witnessed someone else's life put in danger
 - The person experienced extreme fear, helplessness, and horror
- The traumatic event is persistently re-experienced in ≥ 1 of the following ways
 - Recurrent, intrusive, and distressing recollections of the event
 - Recurrent, distressing dreams or nightmares
 - Reliving the event, which causes psychological distress
- Avoidance of things associated with the event, including ≥ 3 of the following:
 - Efforts to avoid thoughts, feelings, or conversations associated with the trauma
 - Efforts to avoid activities, places, or people that cause recollection of the trauma
 - Inability to recall aspects of the trauma
 - Decreased interest or participation in significant activities
 - Feeling detached or estranged from others
 - Restricted range of affect (e.g., unable to have loving feelings)
 - Sense of foreshortened future (e.g., does not expect to have a career, marriage, children, or a normal life span)
- Persistent symptoms of increased arousal (not present before the trauma) including ≥ 2 of the following:
 - Difficulty falling or staying asleep
 - Irritability or outbursts of anger
 - Difficulty concentrating
 - Hypervigilance
 - Exaggerated startle response
- Duration of symptoms >1 month
- The severity of the symptoms causes marked distress and impairment in daily functioning

Screening question: Are you bothered by memories or thoughts of a very upsetting event that happened to you?

Management objectives

- Help the patient gain control over his or her life
- Help the patient feel better about him- or herself
- Teach the patient ways to cope if symptoms arise

Nonpharmacological management

Cognitive behavioural therapy, including education, exposure, and cognitive approaches

Referral

All suspected cases

References—1, 177

16.1.6 Childhood Anxiety Disorders

The same range of anxiety disorders experienced in adulthood can be experienced during childhood and adolescence.

16.1.6.1 Generalized Anxiety Disorder

In addition to the general symptoms (see section 16.1.1), children and adolescents may have excessive worries about—

- Performance at school or sporting events
- Being on time (punctuality)

A child with the disorder may also—

- Feel overly anxious to fit in and worry about his or her relationship with peers
- Be a perfectionist
- Lack confidence
- Strive for approval
- Require a lot of assurance and reassurance from others about performance

16.1.6.2 Obsessive-Compulsive Disorder

Most children with OCD are diagnosed around age 10, although the disorder can strike children as young as 2 or 3 years of age. Boys are more likely to develop OCD before puberty; girls tend to develop it during adolescence.

OCD in children is characterized by—

- Unwanted and intrusive thoughts (obsessions)
- Feeling compelled to repeatedly perform rituals and routines (compulsions)
- Feeling compelled to redo tasks because they aren't perfect the first time

16.1.6.3 Panic Disorder

Panic disorder is diagnosed if the child suffers at least two unexpected panic or anxiety attacks followed by at least 1 month of concern over having another attack and losing control or a sense of “going crazy.”

16.1.6.4 Post-traumatic Stress Disorder

Children most at risk for PTSD are those who—

- Directly witnessed a traumatic or life-threatening event
- Suffered directly (such as injury or the death of a parent)
- Had mental health problems before the event
- Lack a strong support network
- Live with violence in the home

Children with PTSD may—

- Have intense fear and anxiety
- Become emotionally numb or easily irritable
- Avoid places, people, or activities

Not every child who experiences or hears about a traumatic event will develop PTSD. It is normal to be fearful, sad, or apprehensive after such events, and many children will recover from these feelings in a short time.

16.1.6.5 Separation Anxiety

Description

Many children experience separation anxiety between 18 months and 3 years, when it is normal to feel some anxiety when a parent leaves the room or goes

out of sight. Separation anxiety disorder, however, is a mental health disorder occurring during childhood and is characterized by worrying that is out of proportion to the situation of temporarily leaving home or otherwise separating from loved ones. Approximately 4%–5% of children and adolescents suffer from separation anxiety disorder, which is most common in children ages 7–9. Usually children can be distracted from these feelings.

Causes and risk factors

Separation anxiety disorder (as with most mental health conditions) is likely caused by a combination of genetic and environmental vulnerabilities rather than by any one thing. Risk factors include:

- Family histories of anxiety
- Mothers who were stressed during pregnancy
- Overprotective or intrusive parenting behaviours

Signs and symptoms

- Has inability to leave parent or another family member
- Takes longer to calm down than other children in these circumstances
- Cries when first being left at day-care or preschool
- Refuses to go to school, camp, or a sleepover
- Has extreme homesickness and feelings of misery at not being with loved ones
- Demands that someone stay with him or her at bedtime
- Worries about bad things happening to his or her parents or caregivers
- May have a vague sense of something terrible occurring while they are apart

Diagnosis

Based on clinical history and observed behaviour of the child

Management objective

Start treatment early to avoid risk of developing depression and anxiety problems, as well as personality disorders in later life.

Nonpharmacological management

Counselling, rather than medication, is the treatment of choice for separation anxiety disorder that is mild in severity.

Reference—184

16.2 Depression

Description

Depression is a medical illness resulting from a reduction in vitality and spirits that affects the way one feels, thinks, and acts on a daily basis. It may occur in association with, or part of, the presentation of many medical conditions such as hormonal disease, autoimmune disorders, serious infections, and cancers, and it may reflect the psychological stress of coping with the disease. It may be caused by the disease process itself or by the medications used to treat it. According to WHO, it is one of the top five major causes of disability in the world.

Classification

- Major depressive disorder
- Dysthymic disorder
- Depressive disorder not otherwise specified

Causes and risk factors

The causes are not fully understood, but several factors are known to play a role in its development.

- Genetics—it can run in families and can be associated with a family history of depression, alcohol abuse, or sociopathy
- Gender—women are twice as likely to be affected
- Age—Although depression is seen in children and adolescents, in the Caribbean the age of onset is often in the late 20s. Biochemistry—related to abnormalities of serotonin and norepinephrine in the brain
- Personality—persons who have decreased self-esteem or who are pessimistic or overwhelmed by stress
- Environment—living in poverty, violence, neglect, abuse
- Experience of childhood trauma—abuse or abandonment
- Living with a chronic medical condition
- Recent stressors—financial, legal, conflicts, death of a loved one, problems at work, loss of employment, retirement, isolation, chronic illness
- Medical conditions—acute physical illness or chronic issues (e.g., brain tumour, vitamin deficiency)
- Bereavement
- Separation from family
- Threats to life both of self and associates

16.2.1 Major Depressive Disorder

Description

Depression is considered to be major when the mood persists for a minimum duration of 2 weeks and five or more of the following signs and symptoms (including one of the first two) are present most of the day or nearly every day.

Signs and symptoms

- Depressed mood (i.e., feels sad or empty or is tearful)
- Markedly diminished interest or pleasure in all or almost all activities
- Sleep changes (i.e., insomnia or hypersomnia)
- Significant weight loss or gain and appetite changes
- Having little energy or feeling of fatigue
- Feeling guilty or worthless
- Emotional numbness or emptiness
- Difficulty concentrating or indecisiveness
- Moving or speaking slower than usual
- Thinking that life is not worth living or having suicidal thoughts
- Decreased ability to cope with stressful situations
- Increased negative thought patterns

16.2.2 Dysthymic Disorder

Description

Dysthymic disorder is a depressed mood for most of the day, for more days than not, for at least 2 years. In children and adolescents, mood can be irritable and duration must be at least 1 year. The symptoms must never have been absent for more than 2 months, and no major depressive episode occurred within the first 2-year period. Two or more of the following signs and symptoms must be present.

Signs and symptoms

- Poor appetite or overeating
- Insomnia or hypersomnia
- Low energy or fatigue
- Low self-esteem
- Poor concentration or indecisiveness
- Feeling of hopelessness.

16.2.3 Depressive Disorders not Otherwise Specified

Diagnosis

Based on clinical findings—

- The feelings start to interfere with the activities of daily living such as work and family relationships.
- Rule out general medical illness or drug abuse

Use the following screening questions:

- In the past month, have you lost interest in the things you normally like to do?
- In the past month, have you felt sad, low, down, depressed, or hopeless?

If the patient answers yes to either of these questions, proceed with further assessment.

Assess the patient's suicide risk by asking the following questions:

- Do you have feelings of hopelessness or feel that life is not worth living?
- Do you have thoughts of committing suicide? If the answer is yes, follow up by asking—
 - How much thought have you put into this?
 - Have you thought about the method you would use?
 - Do you have access to the materials required to commit suicide?
 - Have you said goodbyes, written a note, or started giving things away?
 - What is stopping you from following through with suicide?
- Have you ever attempted suicide?

The patient should be monitored closely and treated if—

- Suicidal thoughts are persistent.
- The patient has a prior history of a suicide attempt or has a current plan.
- The patient has several risk factors for suicide.

Management objectives

- Improve the patient's ability to function normally
- Reduce the risk of suicide, self-neglect, and homicide
- Eliminate all depressive symptoms
- Manage any coexisting or co-morbid medical conditions
- Eventual full remission
- Prevention of recurrence

Nonpharmacological management

- Offer psychotherapy—supportive, cognitive, problem-solving, marital, family, and group.
- Provide education about the condition, and discuss self-management and its goals.
- Include family and friends in management.
- Advise on regular meals and prevention or management of obesity.
- Encourage the consumption of foods rich in tryptophan (e.g., bananas, dates, raisins, and prunes).
- Follow up.
 - See the patient monthly after he or she has started therapy and has been referred back to the health centre.
 - Monitor the patient's response, side effects, and compliance with pharmacological management.

Referral

All patients for confirmation and diagnosis

References—1, 185, 186

16.3 Dementia

Description

Dementia is not a specific disease. It is a descriptive term for a collection of symptoms that can be caused by a number of disorders that affect the brain. It is defined as an acquired decline of cognitive function, presenting initially as loss of memory and a failing of intellect that impairs the successful performance of activities of daily living. Other mental faculties that may be affected are language, visuospatial ability, calculation, judgment, and problem solving. The common forms of dementia are progressive, but some illnesses are static or fluctuate dramatically from day to day.

Causes and risk factors

The most common causes are—

- Unknown (Alzheimer's disease)
- Vascular dementia (small or larger strokes)
- Alcoholism (particularly in association with malnutrition)

- Vascular calcification (DM, high BP, high cholesterol, obesity)
- Parkinson's disease
- HIV and AIDS

Risk factors include—

- Aging—risk increases with each decade >50 (most significant risk factor)
- Family history
- Smoking
- Arteriosclerosis
- Hypertension
- Alcoholism
- Diabetes

Signs and symptoms

- Memory loss (short and long term)
- Decreased concentration
- Loss of orientation to time and place
- Depression, tearfulness
- Withdrawal
- Hallucinations
- Delusion
- Agitation, phobias
- Insomnia or sleep rhythm disturbances
- Purposeless behaviour

Diagnosis

- Based on history, focusing on onset, duration, and rate of progression
 - Persons with two or more of the signs and symptoms above
 - Elderly person with slowly progressive memory loss (likely Alzheimer's disease)
- A physical examination can help rule out treatable causes of dementia and identify signs of stroke or other disorders that can contribute to dementia.
Rule out neurological and vascular problems.
- Check for HIV.

Management objectives

- Determine whether the condition is reversible or irreversible
- Treat reversible causes
- Help alleviate burden on caregivers

Nonpharmacological management

- Suggest intellectually stimulating activities such as crossword puzzles, reading, or Sudoku.
- Advise regular exercise.
- Encourage the patient to avoid alcohol and stop smoking (see appendix 4).
- Recommend following a healthy diet.

Pharmacological management

Continue medications for DM, hypertension, hypercholesterolemia, and HIV.

Referral

Refer all patients to the hospital for definitive diagnosis.

References—1, 3, 187, 188

16.4 Nonpsychiatric Disorders

16.4.1 Migraine

Description

A migraine is a benign and recurring syndrome of headache of varying severity, with sudden onset that lasts 4–72 hours, is often unilateral, and is accompanied by nausea and vomiting. Some migraines are preceded or accompanied by sensory warning symptoms (aura), such as visual disturbance (e.g., flashing light or brief loss of vision). Often the patient wants to be in a dark quiet room.

Causes and risk factors

- Genetic
- Family history (in 99% of cases)
- Age (usually starts in adolescence but before age 40)

Precipitated by—

- Foods—red wine and beer, aged cheeses, chocolate, monosodium glutamate
- Hormonal changes in women—menses, pregnancy, menopause

- Hunger
- Lack of sleep or excessive sleep
- Severe exertion
- Glare

Signs and symptoms

- Unilateral headache, worse with physical activity
- Severe, pulsating
- Photophobia and phonophobia

Management objective

Relieve the headache

Nonpharmacological management

- Order bed rest in a dark quiet area.
- Advise the patient to determine then avoid trigger factors.

Pharmacological management

- For a mild attack (take early in the attack), give—
 - Paracetamol (500 mg tablet), not to exceed 2 tablets per dose and 8 tablets in 24 hours
- OR**
- Paracetamol + codeine (500 mg + 30 mg), not to exceed 2 tablets per dose and 8 tablets in 24 hours
- In moderate attack, give ergotamine + caffeine combination—
 - Take 1 tablet stat (when aura appears or first sign)
- PLUS**
- $\frac{1}{2}$ -1 tablet every 2 hours, not to exceed 4 in 24 hours

Referral

Patients with severe and recurrent attacks

References—1, 3, 189

16.4.2 Meningitis

Description

Meningitis is a disease caused by the inflammation of the protective membranes covering the brain and spinal cord (i.e., the meninges). The inflammation is usually caused by an infection of the fluid surrounding the brain and spinal cord.

Causes and risk factors

The causes of meningitis are—

- Bacteria
 - *Streptococcus pneumonia*
 - *Neisseria meningitidis*
 - *Haemophilus influenza*
 - *Staphylococcus aureus*
 - Gram-negative bacilli (E. coli)
 - TB, especially in HIV infection
- Viruses
 - Enterovirus—Coxsackie
 - Herpes simplex
- Fungi
 - *Cryptococcus neoformans*
 - *Candida*
 - Histoplasma

The risk factors for meningitis are—

- Ear disease, especially in children
- Upper respiratory tract infection
- Skull base fracture
- HIV and AIDS, particularly for *Cryptococcus*

Signs and symptoms

- Children <1 year
 - Classic signs
 - Neck stiffness (Brudzinski's and Kernig's signs)
 - Bulging fontanel
 - Irritability
 - Weak cry

- Hypotonic (i.e., floppy)
- Occasionally convulsions
- Classic signs are often absent. Consider meningitis if the following signs are present.
 - Poor sucking and refusal to eat
 - Fever
 - Diarrhoea and vomiting
 - Drowsiness
 - High-pitched cry
 - Unusual behaviour
 - Gaze turned upwards
 - Limp neck and bulging fontanel when not crying
- Children >1 year and adults
 - Severe headache
 - Neck stiffness (Brudzinski's and Kernig's signs)
 - High fever ($>38^{\circ}\text{C}$) of sudden onset
 - Nausea and vomiting
 - General weakness and malaise
 - Loss of appetite
 - Photophobia
 - Change in behaviour
 - Altered level of consciousness or delirium
- Severe form
 - Convulsions
 - Coma

Diagnosis

- Based on history and clinical findings
- LP-CSF for gram stain, culture, and sensitivity
- If the patient is HIV positive, cryptococcal antigen test of CSF
- In malaria areas, check for malaria.

Management

Prompt treatment will improve the prognosis. If the diagnosis of meningitis is suspected, refer the patient to hospital immediately. If immediate referral is not possible, start presumptive treatment. Treatment will depend on the most common causes. If a doctor is available at a health centre, an LP should be performed before starting treatment. Do not do an LP in children if the patient has—

- Prolonged seizures
- Papillary dilatation
- Abnormal posture or movement
- Papilloedema
- Low pulse, elevated BP, and irregular respiration (i.e., signs of impending brain herniation)

Pharmacological management

- Start on treatment before transfer.
- Give chloramphenicol (250 mg capsules; 125 mg/5 mL suspension)
 - Adults and teenagers: 12.5 mg/kg every 6 hours
 - Children:
 - ◆ <2 weeks old: 6.25 mg/kg every 6 hours
 - ◆ >2 weeks old: 12.5 mg/kg every 6 hours
- Give ceftriaxone injection (500 mg, 1 g)
 - Adults: 2 g IV stat
 - Neonates, infants, and children: 100 mg/kg stat
- In HIV-positive patients, give— fluconazole 400 mg PO twice daily

References—1, 3, 8, 190, 191

17. Signs and Symptoms

17.1 Abdominal Pain

Description

Abdominal pain can be defined as pain occurring anywhere in the abdomen. Because of the many organs in the abdomen the pain can originate in different anatomical systems. It can be acute, dull, or colicky. Any abdominal pain or discomfort must be assessed according to its location, duration, severity, and type. Abdominal pain is a common problem, and usually, the cause is minor, self-limited, or both. More serious causes, however, may require urgent intervention.

Signs and symptoms

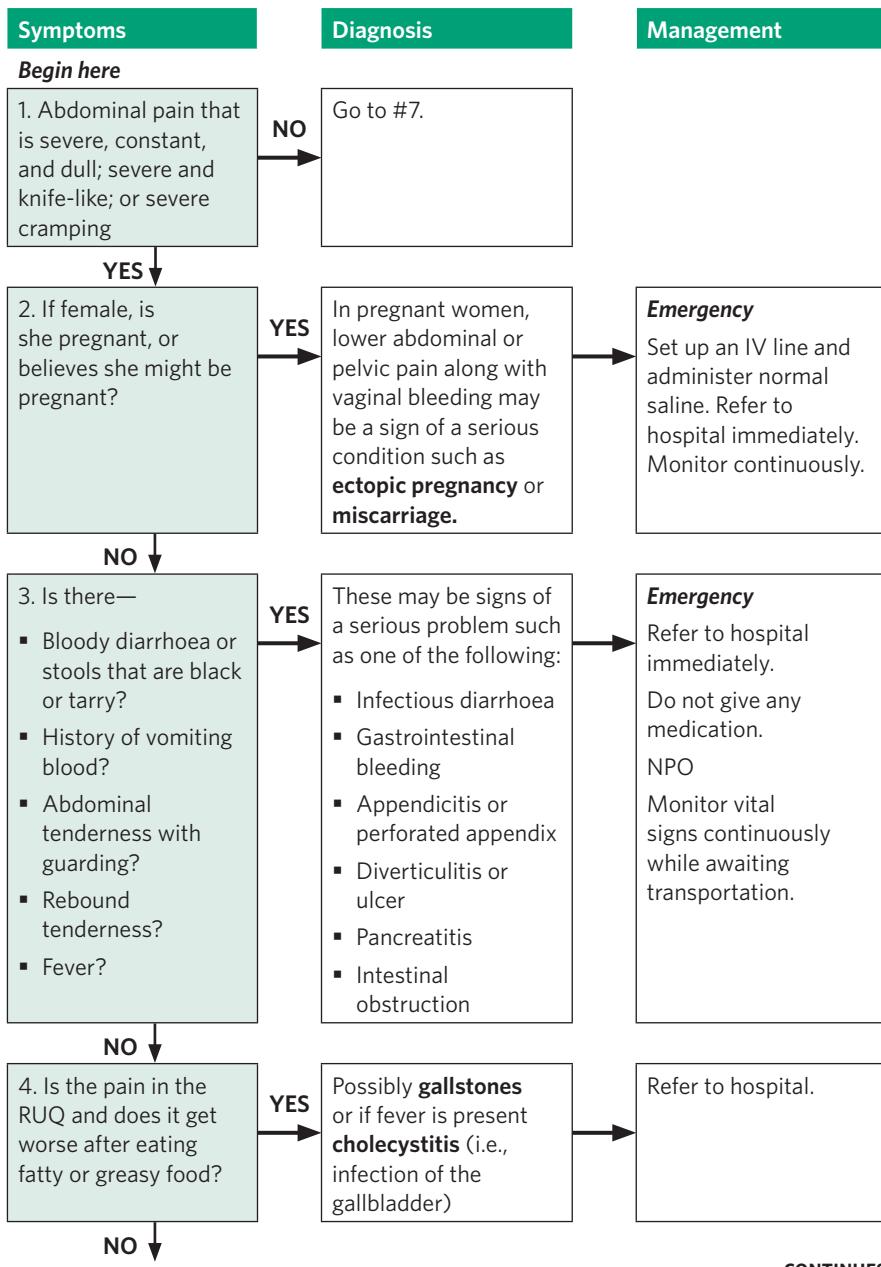
Accompanying clinical features include—

- Nausea
- Vomiting
- Constipation
- Diarrhoea
- Tenderness
- Fever
- Tachycardia
- Distension

References—1, 10, 192, 193

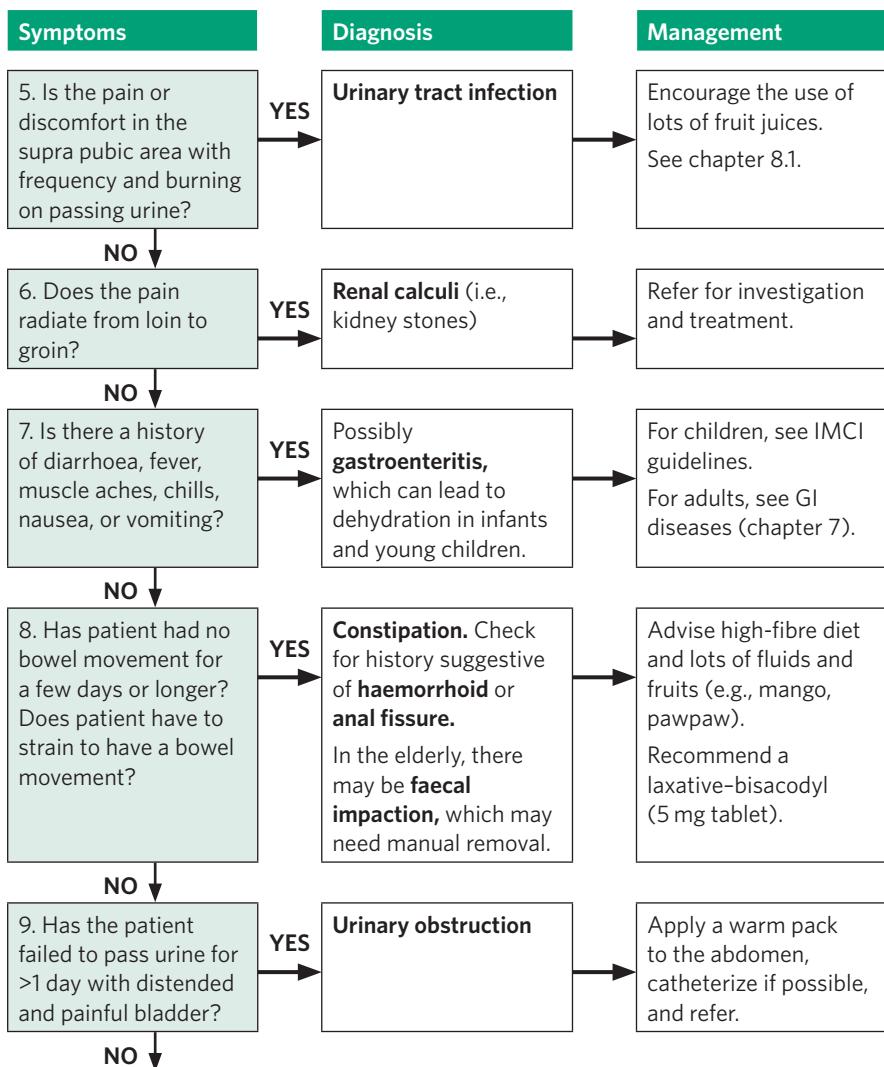
17.1.1 Acute Abdominal Pain

Figure 17.1.1 is an algorithm for the management of acute abdominal pain.

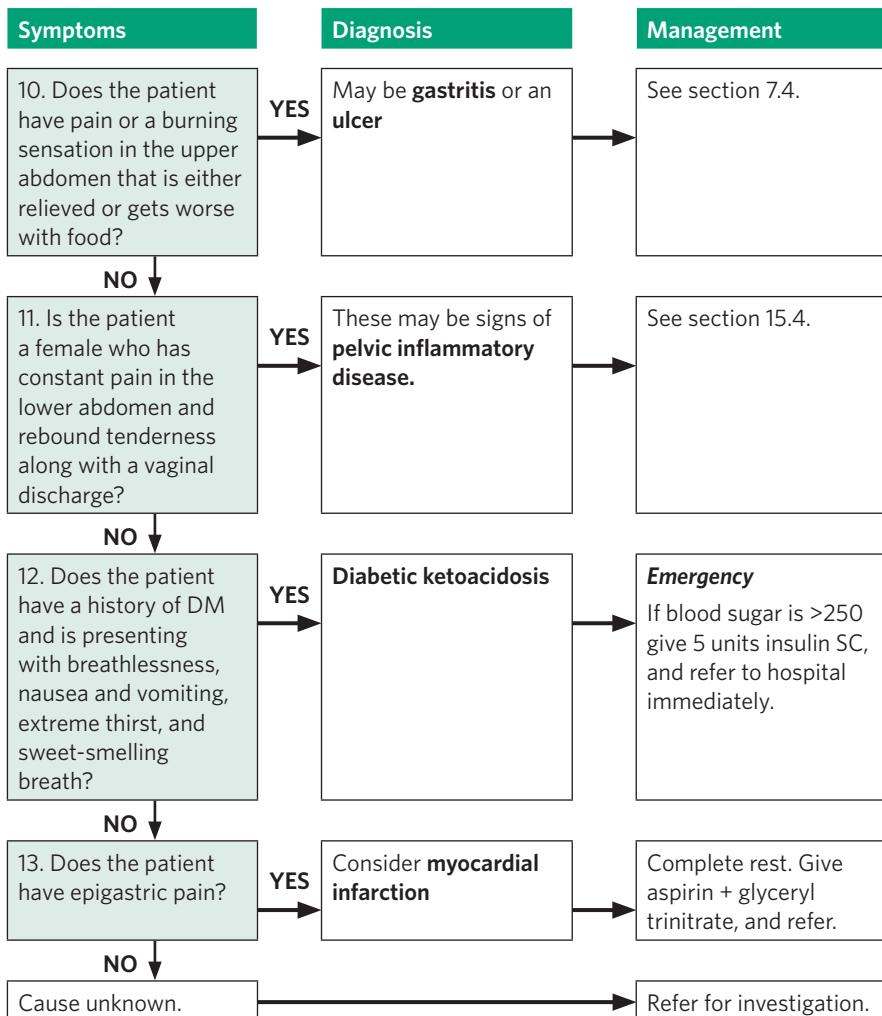
Figure 17.1.1. Algorithm for acute abdominal pain

CONTINUES

Figure 17.1.1. Algorithm for acute abdominal pain (CONTINUED)



CONTINUES

Figure 17.1.1. Algorithm for acute abdominal pain (CONTINUED)

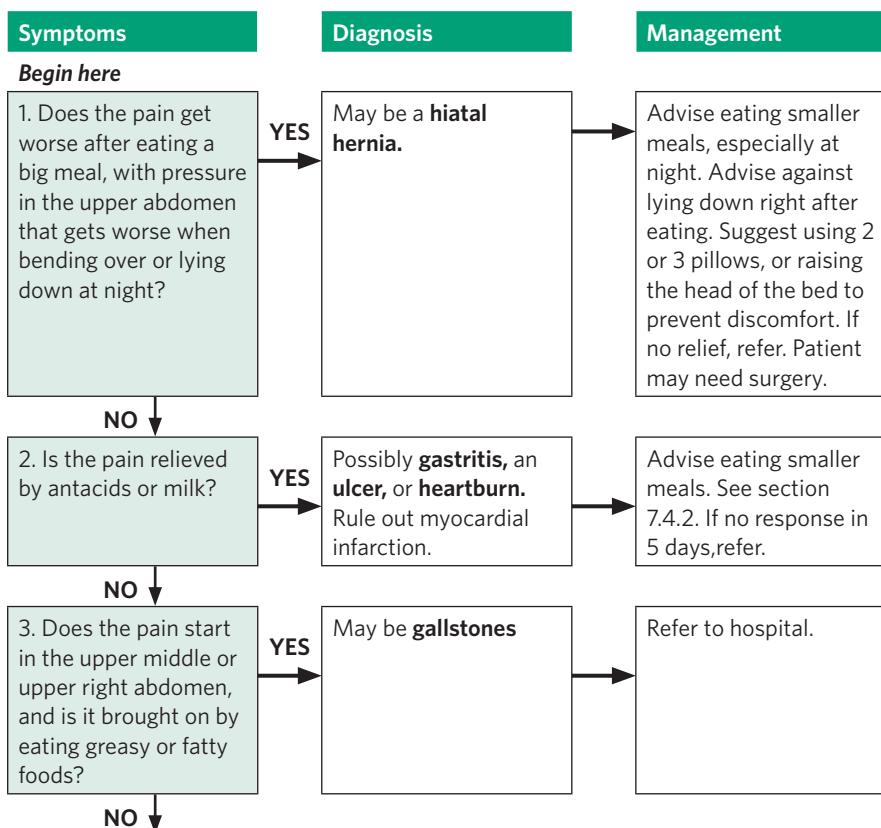
Source and adapted from: American Academy of Family Physicians. 1996. *Family Health and Medical Guide*. Dallas: Word Publishing.

17.1.2 Chronic Abdominal Pain

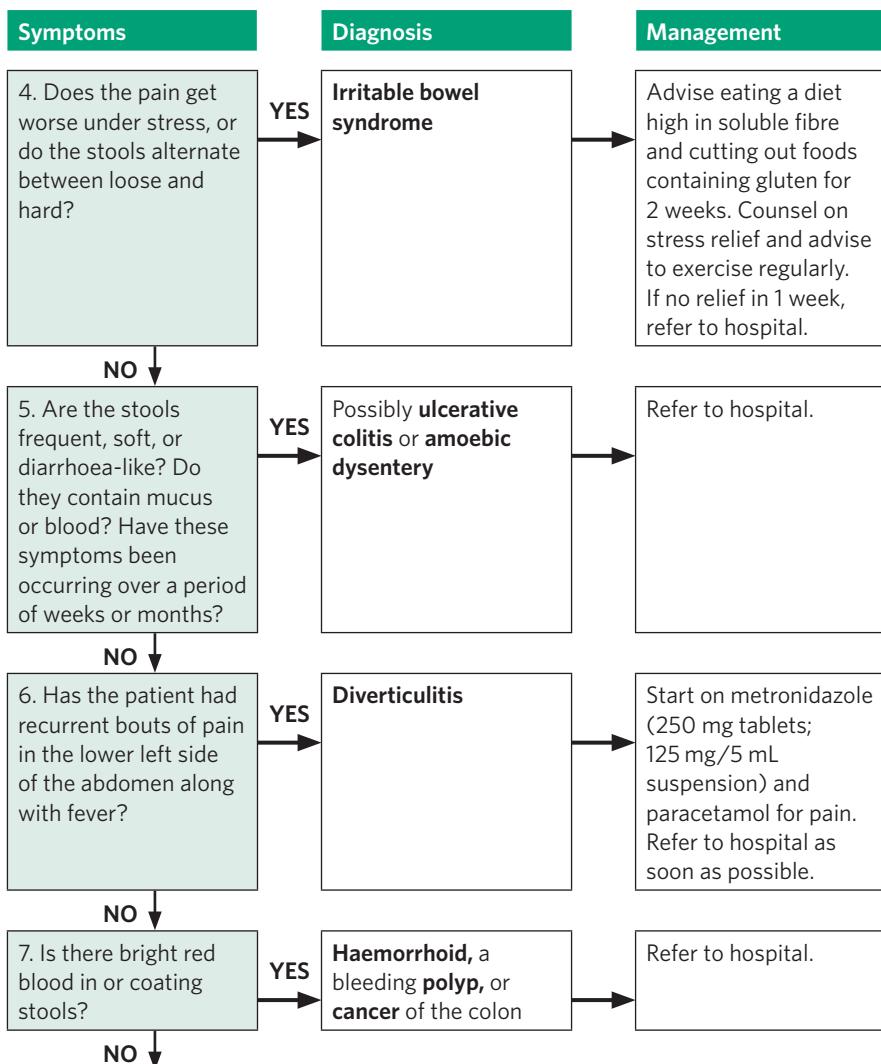
Description

Ongoing or recurrent abdominal pain, also called chronic pain, may be difficult to diagnose, causing frustration for both patient and doctor. Accompanying symptoms may include constipation, abdominal distension, dyspepsia, and tenderness. Figure 17.1.2 is an algorithm for the management of chronic abdominal pain.

Figure 17.1.2. Algorithm for chronic abdominal pain

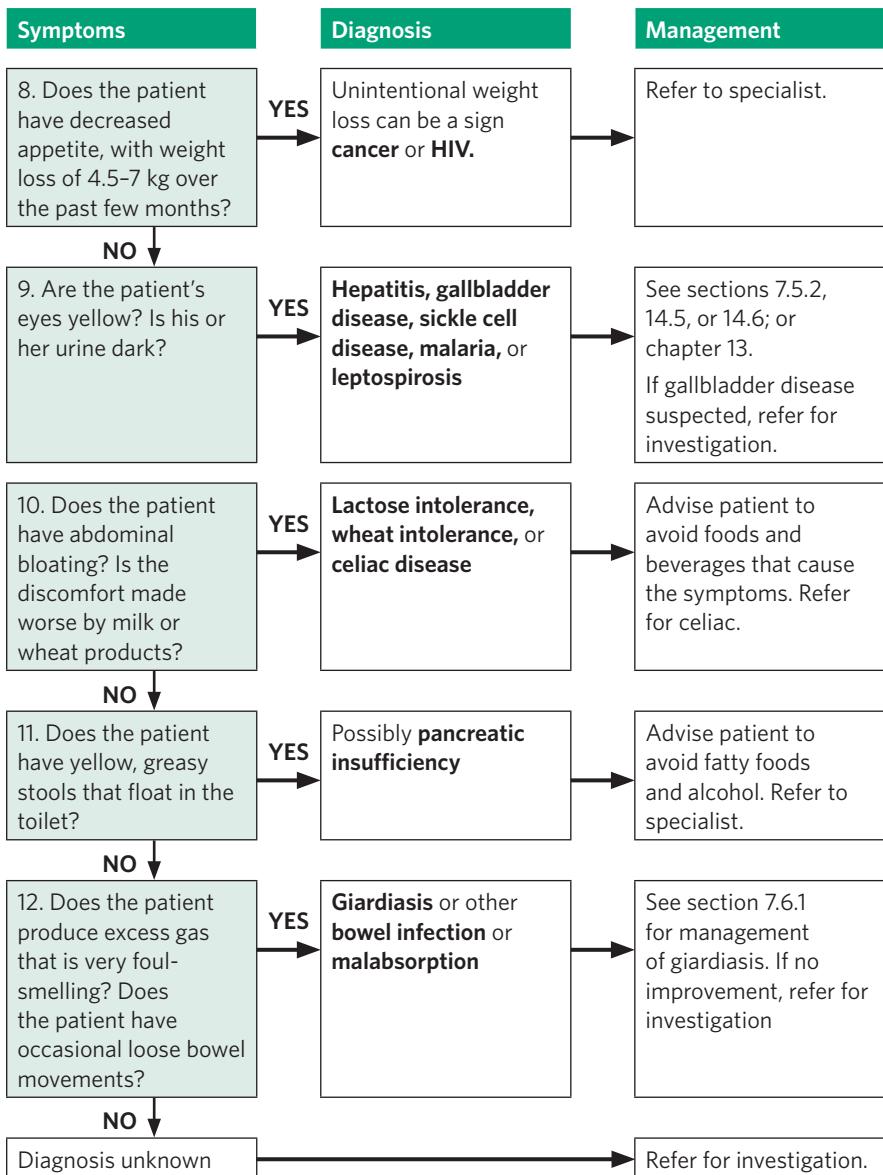


CONTINUES

Figure 17.1.2. Algorithm for chronic abdominal pain (CONTINUED)

CONTINUES

Figure 17.1.2. Algorithm for chronic abdominal pain (CONTINUED)



Source: American Academy of Family Physicians. 1996. *Family Health and Medical Guide*. Dallas: Word Publishing.
 Copyright 2009 American Academy of Family Physicians

17.2 Fever/PUO

Description

Fever is an increase in the internal body temperature above the normal limits of oral 37.5°C and axillary 38°C. Fever can be a symptom of many underlying medical conditions. Minor infections may cause mild or short-term temperature elevations. Temperatures of $\geq 39.5^{\circ}\text{C}$ are considered high and can signal a potentially dangerous infection.

Persistent fever that cannot be explained after repeated routine clinical inquiries is called pyrexia (or fever) of unknown origin (PUO). Figure 17.2 is an algorithm for the management of PUO.

References—1, 10, 192, 194

Figure 17.2. Algorithm for PUO

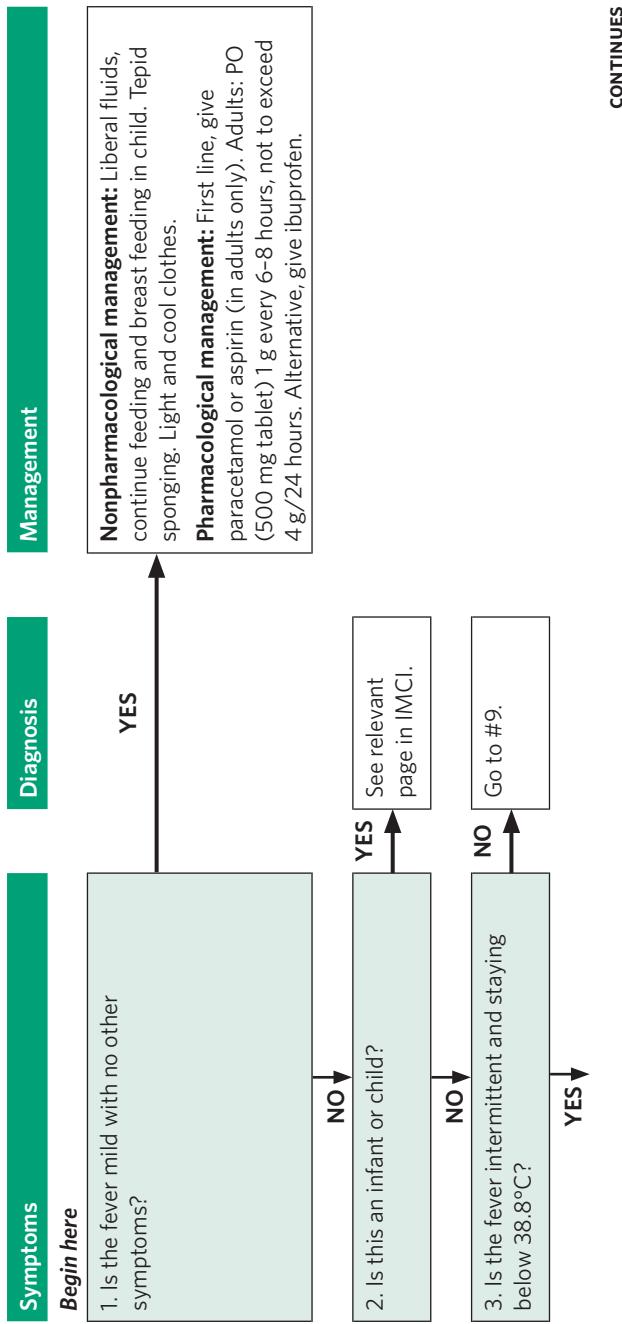


Figure 17.2. Algorithm for PUO (CONTINUED)

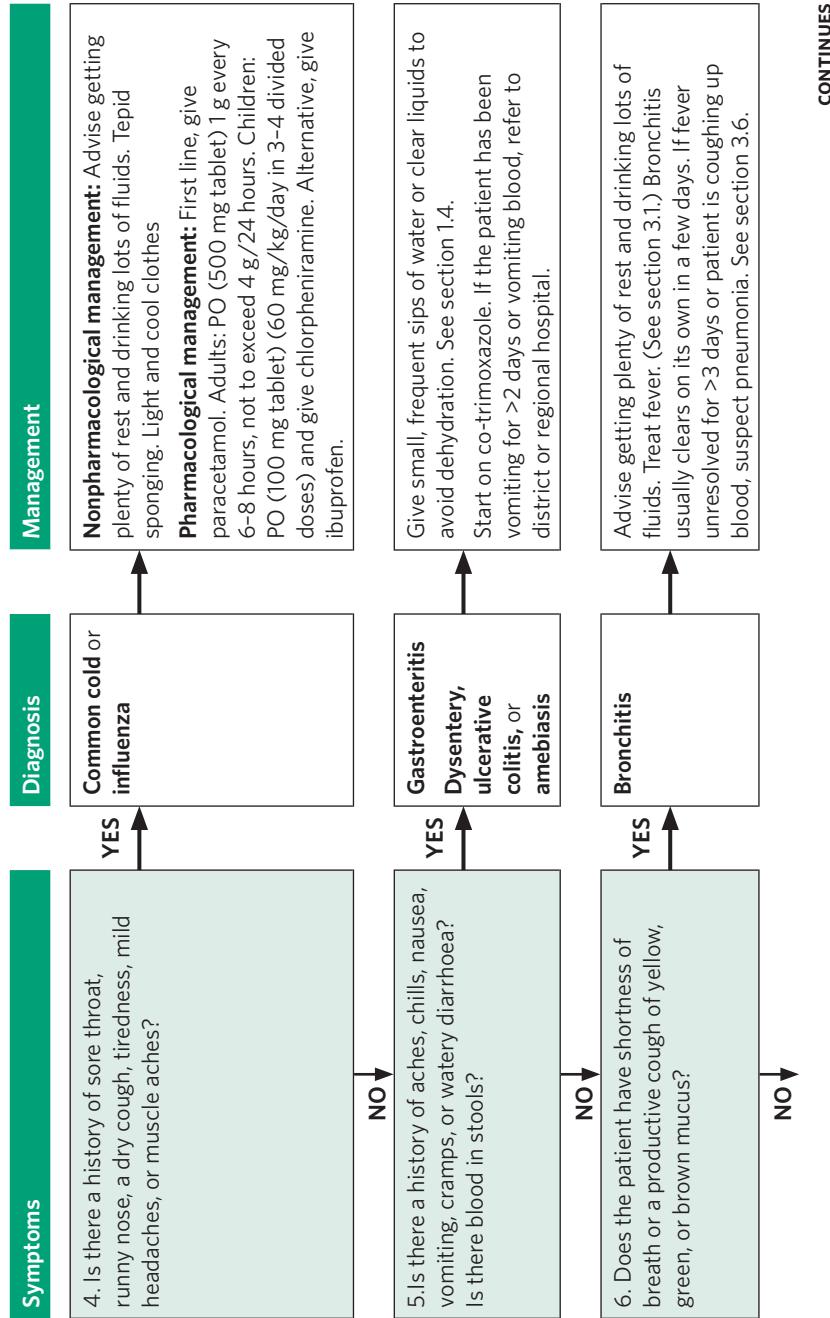


Figure 17.2. Algorithm for PUO (CONTINUED)

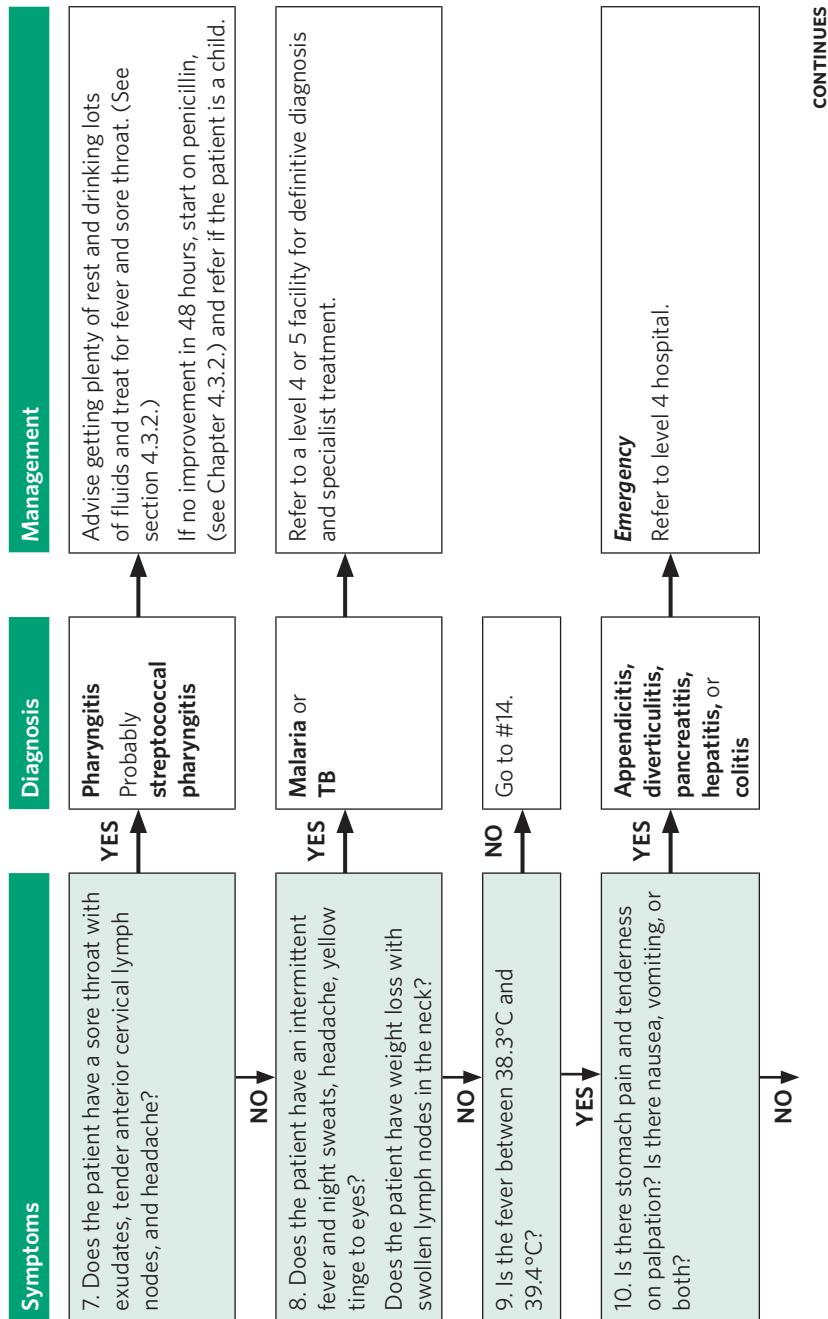


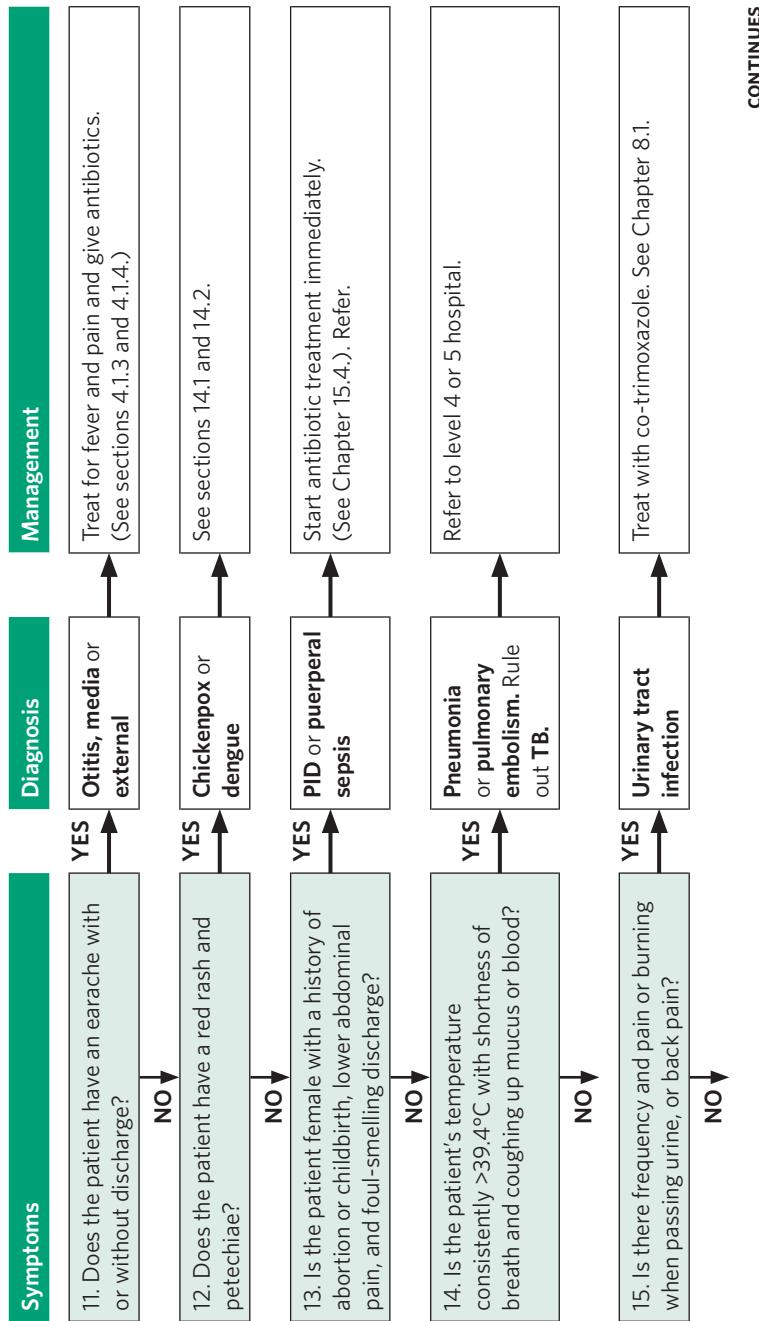
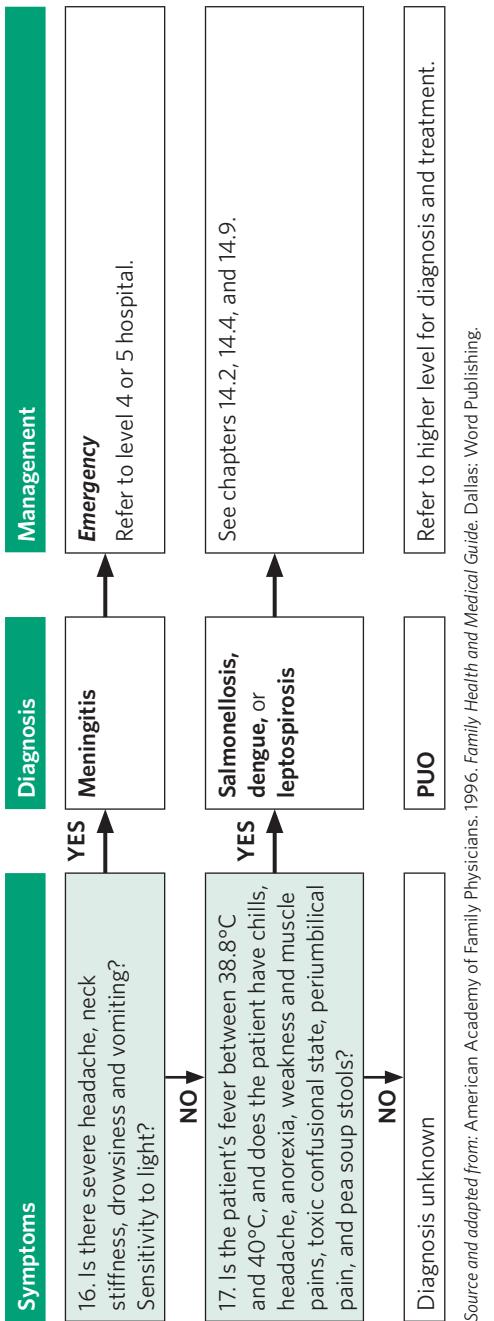
Figure 17.2. Algorithm for PUO (CONTINUED)

Figure 17.2. Algorithm for PUO (CONTINUED)

17.3 Headache

Description

Headache is defined as a pain in the head or upper neck. It is among the most common pain complaints. It is a symptom of a number of different conditions of the head and sometimes neck. Some of the causes are benign; others are medical emergencies.

Headaches can be classified into three categories:

- Primary
- Secondary
- Cranial neuralgias, facial pain, and other headaches

Primary headaches include migraines, tension, or hunger-related headaches. Secondary headaches may result from an underlying condition such as head injury; intracranial haemorrhage or tumour; infection; problems with the eyes, ears, or nose; medication withdrawal; or hangovers. Headaches are, however, most likely to be primary, harmless, and self-limited.

Signs and symptoms

The following signs and symptoms may accompany a headache:

- Fever
- Stiff neck
- Change in behaviour
- Vomiting
- Weakness
- Change in sensation

Figure 17.3 is an algorithm for the management of headache.

References—1, 191

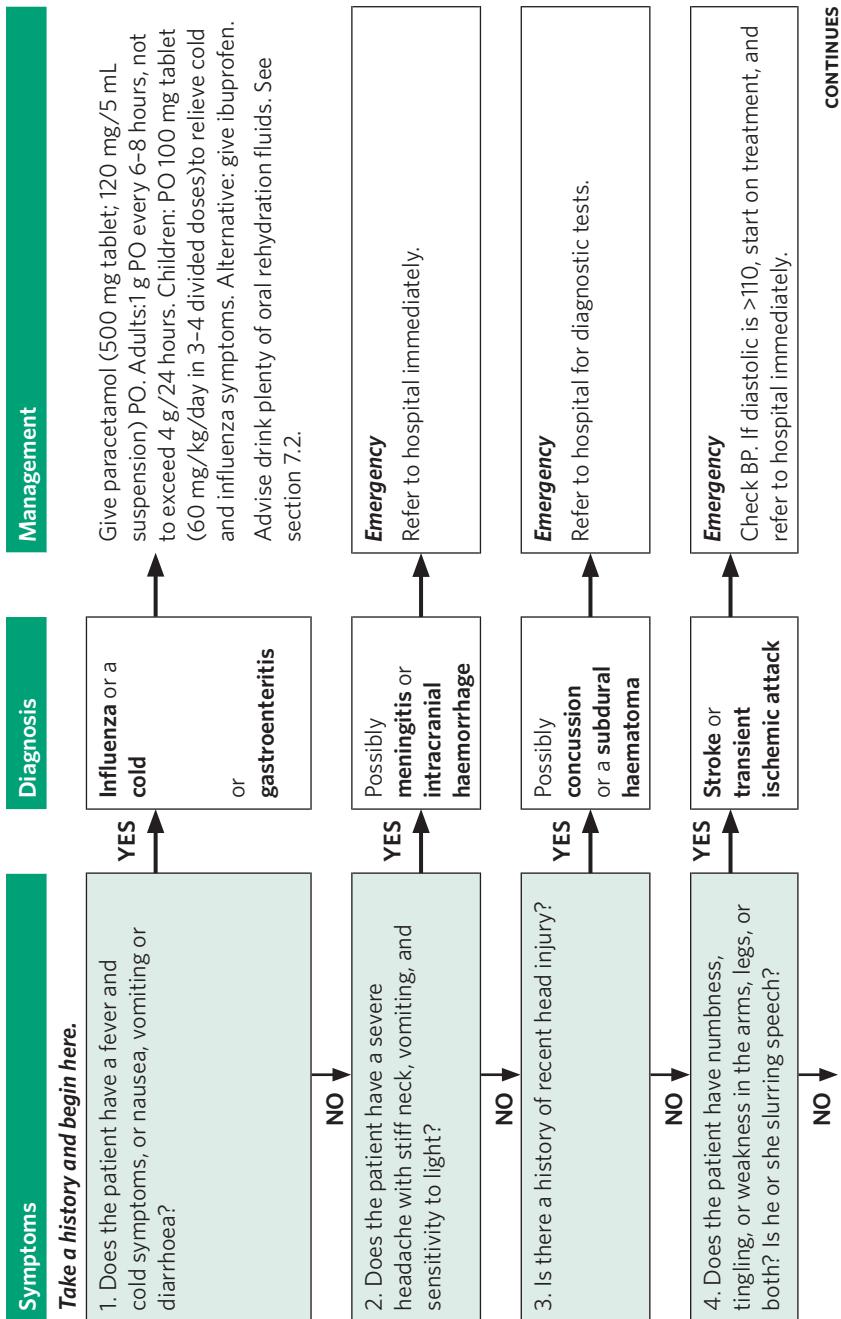
Figure 17.3. Algorithm for headache

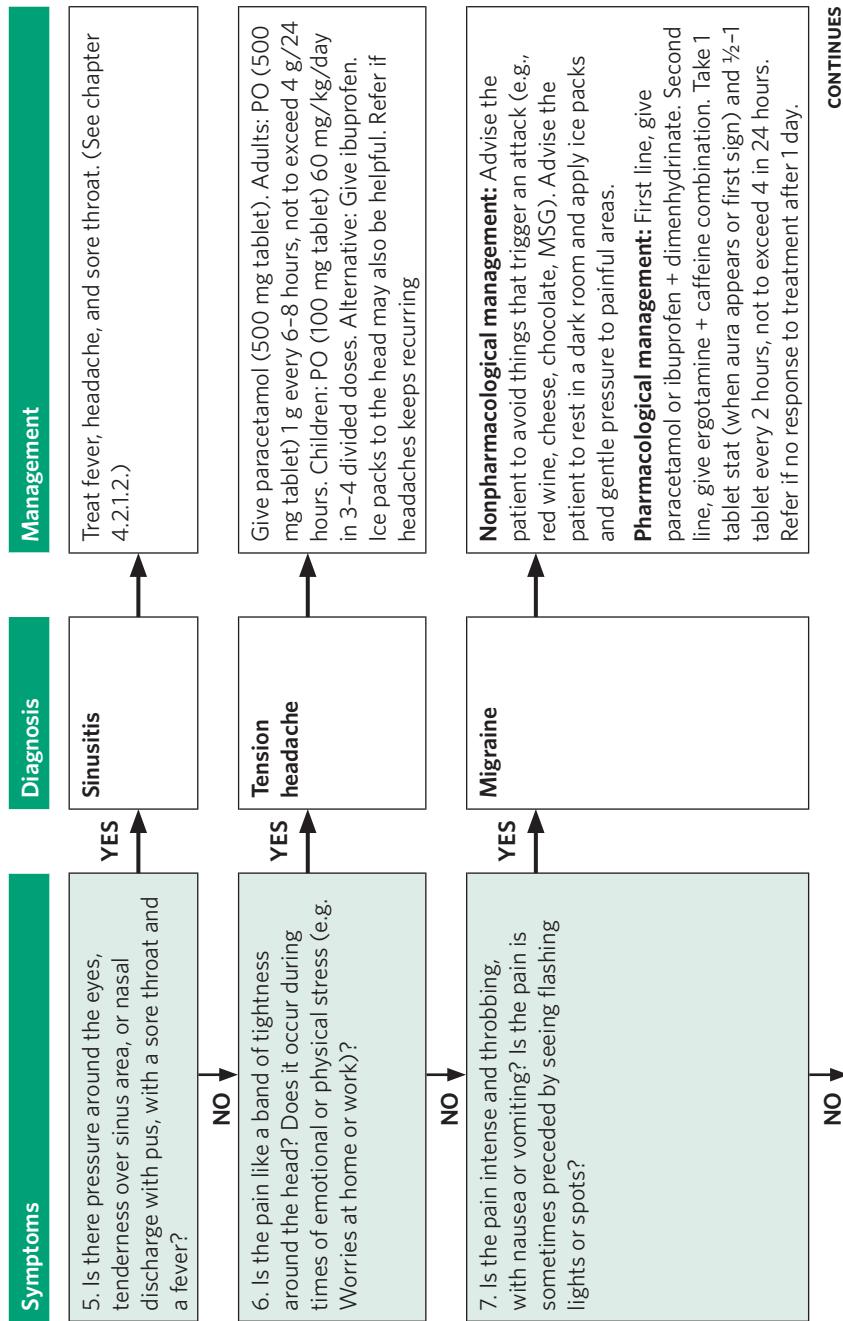
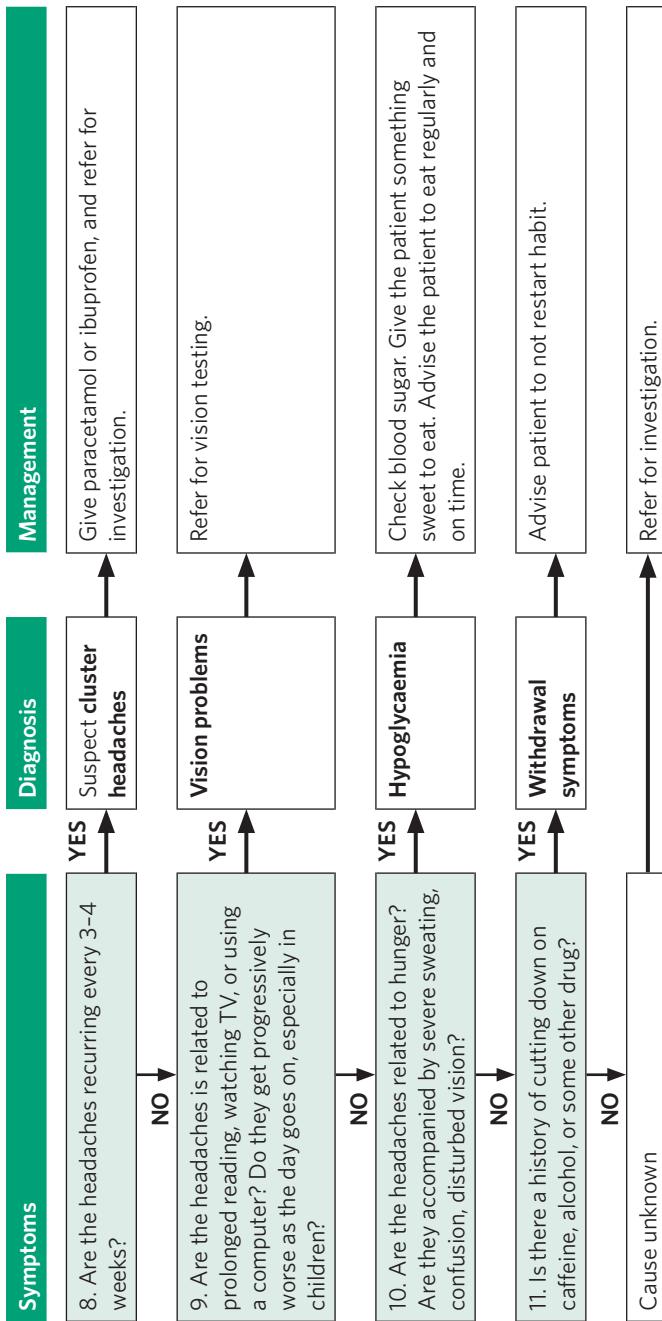
Figure 17.3. Algorithm for headache (CONTINUED)

Figure 17.3. Algorithm for headache (CONTINUED)

Source and adapted from: American Academy of Family Physicians 1996. Headache. *Family Health and Medical Guide*. Dallas: Word Publishing.

17.4 Myalgia (Muscle Pain)

Description

Muscle aches and pains are common and can involve more than one muscle. Muscle pain can also involve ligaments, tendons, and fascia, the soft tissues that connect muscles, bones, and organs. The pain can be temporary or chronic. Muscle pain is most frequently related to tension, overuse, or muscle injury from exercise or physically demanding work. In these situations, the pain tends to involve specific muscles and starts during or just after the activity. It is usually obvious which activity is causing the pain.

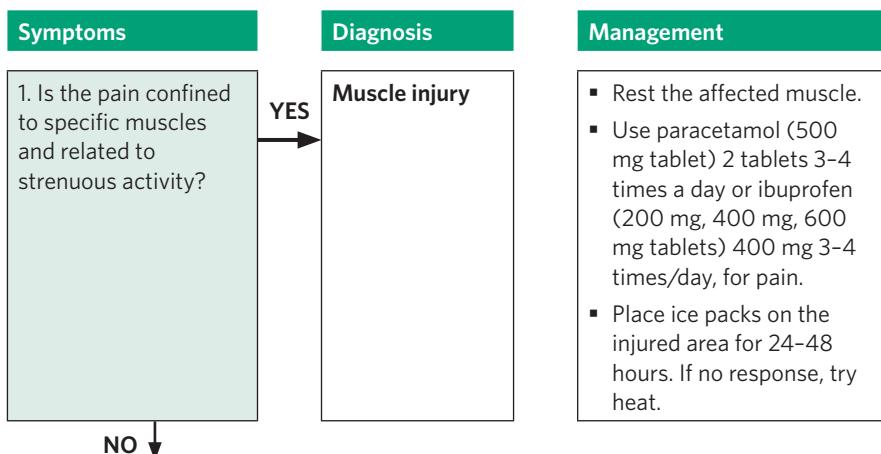
Myalgia without a traumatic history is often due to viral infections. Muscle pain also can be a sign of conditions affecting the whole body, such as some disorders that affect connective tissues throughout the body (e.g., lupus and metabolic disorders).

Accompanying symptoms may be weakness, tenderness to palpation, and swelling.

Figure 17.4 is an algorithm for the management of myalgia.

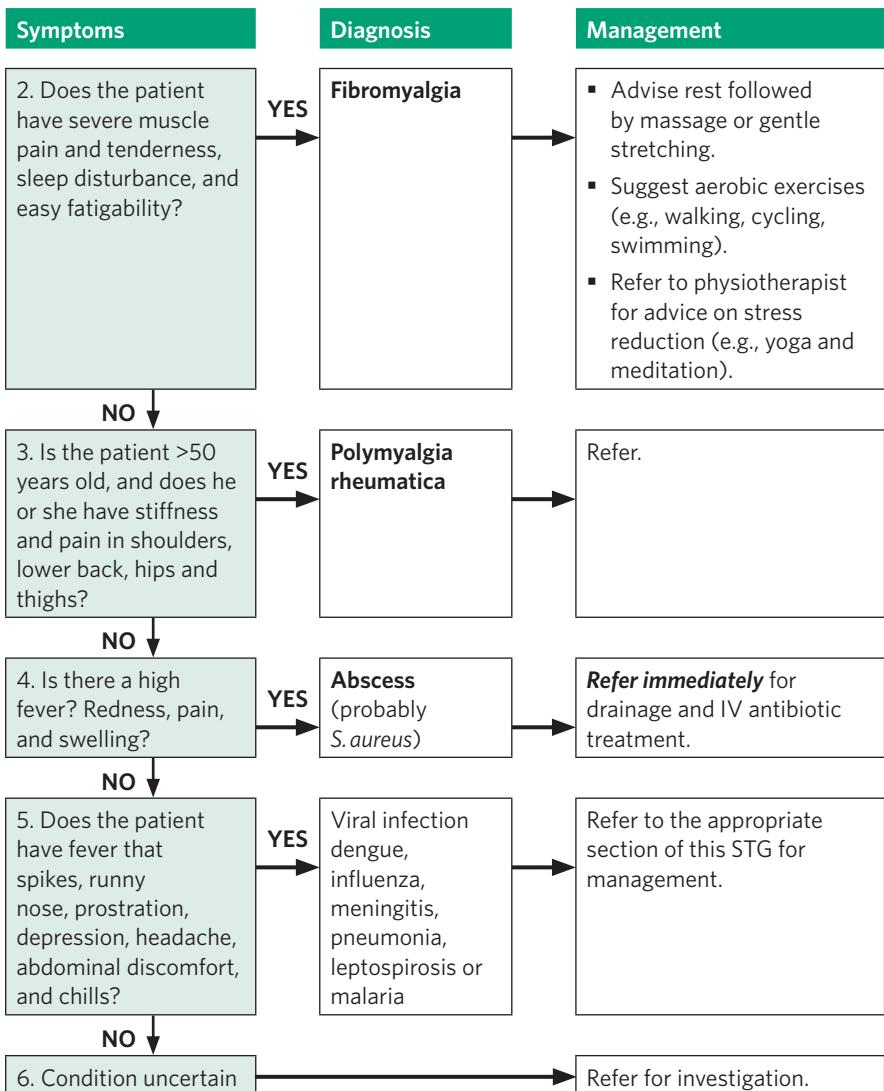
References—195, 196

Figure 17.4. Algorithm for myalgia



CONTINUES

Figure 17.4. Algorithm for myalgia (CONTINUED)



Appendix A. Essential Medicine Concept

WHO describes essential medicines as those that satisfy the priority health care needs of the population. Essential medicines are intended to be available within the health systems at all times in adequate quantities, in the appropriate dosage forms, with assured quality and adequate information, and at a price the individual and the community can afford.

Thus, access to quality medicines and rational use of these medicines remain critical issues of the health sector as it pursues its goal to ensure equity, efficiency, quality, and sustainable financing in achieving its goal of healthy lives for all Guyanese. Meeting this goal involves ensuring the following:

- The availability and accessibility of essential medicines to all citizens
- The safety, efficacy, and quality of medicines
- Good prescribing and dispensing practices
- The rational use of medicines by prescribers, dispensers, and patients

All stakeholders must receive the necessary training, education, and information if Guyana is to meet its health care goals.

The second edition of the *Essential Drug List*, published 2007, is still being used until the publication of the third edition. Apart from aiming at quality care and rational medicines use, the list serves as a basis for the monitoring of the availability of and correct use of medicines and for planning at the national and peripheral level for procurement and distribution of the essential medicines.

(**Note:** The third edition is available only in draft.)

The list presents medicines that meet the needs of Guyana's priority health conditions in agreement with the Package of Publicly Guaranteed Services. Although prepared with the public sector in mind, the private sector is encouraged to use these guidelines and medicines list wherever appropriate.

The criteria for the selection of essential medicines for primary health care in Guyana were based on the WHO guidelines for drawing up a national EML. They include the following:

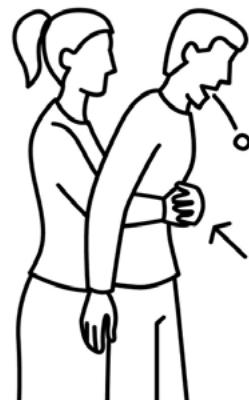
- Any medicine included must meet the needs of the majority of the population.
- Sufficient proven scientific data regarding effectiveness must be available.

- Any medicine included in the EML should have a substantial safety and risk/benefit ratio.
- All products must be of an acceptable quality and must be tested on a continuous basis.
- The aim, as a rule, is to include only products containing single pharmacologically active ingredients.
- Combination products, as an exception, will be included when patient compliance becomes an important factor, or two pharmacologically active ingredients are synergistically active in a product.

Appendix B. The Heimlich Manoeuvre

Choking because of an obstructed airway is a medical emergency. If a choking person is not coughing or is unable to speak, that's your cue to perform the Heimlich manoeuvre immediately.

1. The manoeuvre is best done in a standing position although it can be done with the patient in a sitting position if the patient is too heavy or in a confined space
2. Stand behind the patient with your legs apart, which will help to stabilize the patient should he or she become unconscious.
3. Place your arms around the patient's waist.
4. Make a fist with one hand with the thumb facing inside the fist and place just above his or her navel and under the breast bone.
5. Wrap your other hand around this fist.
6. Deliver five upward squeeze-thrusts into the abdomen. Pull inward and upward, pressing into the patient's abdomen with quick upward thrusts, using good force. Make the motion similar to the letter "J"—in, then up.
7. Make the thrusts quick and forceful, as if you're trying to lift the victim off his or her feet from this position. Repeat until the object is dislodged and expelled. Use less force on a child.
8. Keep a firm grip on the victim, since he or she can lose consciousness and fall to the ground if the Heimlich manoeuvre is not effective.
9. Check to see if normal breathing has returned.



Appendix C. Common Asthma Triggers and Avoidance Strategies

Common Asthma Triggers	Avoidance Strategies
Domestic dust mite allergens	Wash bed linens and blankets once a week in hot water and dry in a hot dryer or sunlight. Encase pillows and mattresses in airtight covers. Remove carpets, especially in sleeping areas. Use vinyl, leather, or plain wooden furniture instead of fabric-covered furniture.
Tobacco smoke	Patients and persons in the home should not smoke. Stay away from tobacco smoke.
Allergens from animals with fur	Remove animals from the home or at least from the sleeping area.
Cockroach allergen	Clean the home thoroughly and often. Make every effort to reduce the availability of food. Use a pesticide spray, but make sure the patient is not at home when spraying occurs. Restrict potential havens by caulking and sealing cracks in the plasterwork and flooring.
Outdoor pollens and mould	Close windows and doors, and remain indoors when pollen and mould counts are high.
Physical activity	Do not avoid physical activity. Symptoms can be prevented by taking a short- or long-acting beta 2 antagonist before strenuous exercise.
Medication	Avoid—or use with caution—aspirin, NSAIDs, beta blockers (oral or intra ocular). Close supervision is essential.
Viral upper respiratory tract infections	For the child who has recurrent severe asthma exacerbations related to viral URTIs, consider limiting exposure to viral infections. Advise influenza vaccines for children who have persistent asthma and who are not allergic to eggs.
Occupational—farming, factory, municipal	Avoid exposure to isocyanates, ^a allergens from grain, and smoke from wood.
Emotions	Avoid emotional and psychological stress.
Foods	Avoid foods known to trigger allergies (e.g., peanuts, eggs, food additives such as MSG, metabisulphites).

a Isocyanates are a family of highly reactive, low-molecular-weight chemicals. They are widely used in the manufacture of flexible and rigid foams, fibres, coatings such as paints and varnishes, and elastomers, and are increasingly used in the automobile industry, autobody repair, and building insulation materials.

Appendix D. Tobacco Cessation

Ask all patients about their tobacco (e.g., “Have you used any form of tobacco in the past 6 months?”). Document tobacco use status (e.g., non-smoker, smoker, ex-smoker).

How to help patients stop smoking

- The most important step in addressing tobacco use and dependence is screening for tobacco use and offering minimal smoking cessation intervention messages to all persons who smoke, at every opportunity.
- Use of a cueing system for the chart (e.g., labelling each client’s smoking status clearly and visibly with stickers, stamps or on a flow sheet) prompts health care providers to constantly and effectively integrate smoking cessation into their care.
- Provide information and support for the use of pharmacological and nonpharmacological aids for persons who smoke and who want to quit.

Nonpharmacological management

Use the minimal smoking cessation intervention (lasting 1–3 minutes)—

- Advise every tobacco user of the importance of quitting, in a nonjudgmental and unambiguous manner.
- Assist by providing minimal intervention.
- Offer support and self-help resources, such as brochures.
- Inform the patient about, or refer him or her to, a community stop-smoking clinic or service.
- Refer the patient to another health care provider.
- Arrange follow up or referral.

Appendix E. The DASH (Dietary Approaches to Stop Hypertension) Plan

Table E.1. The DASH Eating Plan

Food Group	Servings	Examples	Significance
Whole grain products	7–8/day	Whole wheat bread, cereals, oatmeal	Major source of fibre
Vegetables	4–5/day	Tomatoes, carrots, beans, spinach, cabbage, broccoli	Rich in potassium, magnesium, and fibre
Fruits	4–5/day	Bananas, oranges, melons, apples	Rich in potassium, magnesium, and fibre
Low-fat and nonfat dairy foods	2–3/day	Skimmed milk, low-fat yogurt, nonfat cheese	Major source of calcium and protein
Meats, poultry, and fish	≤2/day	Chicken or fish instead of red meat or at least lean cuts of red meat. Avoid frying.	Major source of protein and magnesium
Nuts, seeds, and legumes	4–5/week	Almonds, peanuts, sunflower seeds, kidney beans, lentils	Major source of protein, magnesium, and fibre

Table E.2. The DASH Eating Plan—Serving Sizes, Examples, and Significance

Food Group	Serving Sizes^b	Examples and Notes	Significance of Each Food Group to the DASH Eating Plan
Grains ^a	1 slice bread 1 oz dry cereal ½ cup cooked rice, pasta, or cereal	Whole-wheat bread and rolls, whole-wheat pasta, bagel, cereals, oatmeal, brown rice, unsalted pretzels, and popcorn	Major sources of energy and fibre
Vegetables	1 cup raw leafy vegetable ½ cup cut-up raw or cooked vegetable ½ cup vegetable juice	Broccoli, carrots, green beans, green peas, kale, lima beans, potatoes, spinach, squash, sweet potatoes, tomatoes	Rich sources of potassium, magnesium, and fibre
Fruits	1 medium fruit ¼ cup dried fruit ½ cup fresh, frozen, or canned fruit ½ cup fruit juice	Apples, apricots, bananas, dates, grapes, oranges, grapefruit, grapefruit juice, mangoes, melons, peaches, pineapples, raisins, strawberries, tangerines	Important sources of potassium, magnesium, and fibre
Fat-free or low-fat dairy products ^c	1 cup milk or yogurt 1½ oz cheese	Fat-free milk or buttermilk; fat-free, low-fat, or reduced-fat cheese; fat-free/low-fat regular or frozen yogurt	Major sources of calcium and protein
Lean meats, poultry, and fish	1 oz cooked meats, poultry, or fish 1 egg	Select only lean; trim away visible fats; broil, roast, or poach; remove skin from poultry	Rich sources of protein and magnesium

CONTINUES

Table E.2. The DASH Eating Plan—Serving Sizes, Examples, and Significance (CONTINUED)

Food Group	Serving Sizes^b	Examples and Notes	Significance of Each Food Group to the DASH Eating Plan
Nuts, seeds, and legumes	$\frac{1}{3}$ cup or $1\frac{1}{2}$ oz nuts 2 tbsp peanut butter 2 tbsp or $\frac{1}{2}$ oz seeds $\frac{1}{2}$ cup cooked legumes (dried beans, peas)	Almonds, mixed nuts, peanuts, walnuts, sunflower seeds, peanut butter, kidney beans, lentils, split peas	Rich sources of energy, magnesium, protein, and fibre
Fats and oils ^d	1 tsp soft margarine 1 tsp vegetable oil 1 tbsp mayonnaise 2 tbsp salad dressing	Soft margarine, vegetable oil (canola, corn, olive, safflower), low-fat mayonnaise, light salad dressing	The DASH study had 27% of calories as fat, including fat in or added to foods
Sweets and added sugars	1 tbsp sugar 1 tbsp jelly or jam $\frac{1}{2}$ cup sorbet, gelatin dessert 1 cup lemonade	Fruit-flavored gelatin, fruit punch, hard candy, jelly, maple syrup, sorbet and ices, sugar	Sweets should be low in fat

a Whole grains are recommended for most grain servings as a good source of fibre and nutrients.

b Serving sizes vary between $\frac{1}{2}$ cup and $1\frac{1}{4}$ cups, depending on cereal type. Check the product's nutrition facts label.

c For lactose intolerance, try either lactase enzyme pills with dairy products or lactose-free or lactose-reduced milk.

d Fat content changes the serving amount for fats and oils. For example, 1 tbsp regular salad dressing = one serving; 1 tbsp low-fat dressing = one-half serving; 1 tbsp fat-free dressing = zero servings.

Appendix F. Guidelines for Calcium Supplementation

The US National Institutes of Health Consensus Conference on Osteoporosis recommends the calcium intake amounts shown in table F.1 for all people, with or without osteoporosis.

Table F.1. Recommended Calcium Intake

Population Category	Amount of Calcium
Children 1–10 years of age	800 mg/day
Men, premenopausal women, and postmenopausal women also taking oestrogen	1,000 mg/day
Teenagers and young adults 11–24 years of age	1,200 mg/day
Postmenopausal women not taking oestrogen	1,500 mg/day
Pregnant and nursing mothers	1,200–1,500 mg/day

Note: The total daily intake of calcium should not exceed 2,000 mg.

Daily dietary calcium intake can be calculated using the food values shown in table F.2.

Table F.2. Calcium Content of Foods

Food	Amount of Calcium (mg)
8-ounce glass of milk	300
8 ounces of plain yogurt	450
1 cup of cottage cheese	130
1 ounce of cheddar cheese	200
½ cup of vanilla ice cream	90
8 ounces of calcium-fortified orange juice	300

Nonmilk sources of calcium include beans (white, baked, black-eyed), tofu, pak choi, peas, and okra. Sardines and salmon, canned with the bone, are also extremely high in calcium.

Source: Shiel, W. 2014. "Osteoporosis, Treatment, Medications, Symptoms, Prevention." Accessed at www.medicinenet.com/osteoporosis/article.htm. Last updated August 29, 2014.

Appendix G. Dietary Guidelines for Diabetes

All foods and drinks contain calories but some have more than others.

All fats are high in calories, even so-called good fats

- 1 tsp of fat (4 grams) = 36 calories
- 1 tsp of starch or sugar = 16 calories
- 1 tsp of protein = 16 calories

About half of the day's food should consist of fruits and vegetables. Restrict the use of fats and oils. Always choose low-fat products.

Appendix H. Guidelines for Iron Supplementation

Iron supplementation for pregnant women

Table H.1. Guidelines for Iron Supplementation to Pregnant Women

Prevalence of Anaemia in Pregnancy	Dose	Duration
<40%	60 mg elemental iron + 400 mcg folic acid daily	6 months in pregnancy
>40%	60 mg elemental iron + 400 mcg folic acid daily	6 months in pregnancy and continuing to 3 months postpartum

Note: If 6 months duration cannot be achieved in pregnancy, continue to supplement during the postpartum period for 6 months or increase the dose to 120 mg iron during pregnancy. If iron supplements containing 400 mcg of folic acid are not available, an iron supplement with less folic acid may be used. Supplementation with less folic acid should be used *only* if supplements containing 400 mcg are not available.

Children 6–24 months

Infants need a relatively high iron intake because they are growing rapidly. Infants are normally born with plenty of iron. Beyond 6 months of age, however, iron content of milk is not sufficient to meet many infants' requirements, and complementary foods are usually low in iron. Low-birth-weight infants (<2,500 g) are born with fewer iron stores and are at high risk of deficiency after 2 months. If iron-fortified complementary foods are not widely and regularly consumed by young children, infants should routinely receive iron supplements in the first year of life (see table H.2). When the prevalence of anemia in young children (6–24 months) is ≥40%, supplementation should continue through the second year of life.

Table H.2. Guidelines for Iron Supplementation for Children 6–24 Months

Prevalence of Anaemia	Dosage	Birth Weight Category	Duration
<40%	12.5 mg iron + 50 mcg folic acid daily	Normal	6–12 months
		Low birth weight (<2,500 g)	2–24 months
>40%	12.5 mg iron + 50 mcg folic acid daily	Normal	6–24 months
		Low birth weight (<2,500 g)	2–24 months

Note: If the prevalence of anaemia in children 6–24 months is not known, assume it is similar to the prevalence of anemia in pregnant women in the same population. Iron dosage is based on 2 mg elemental iron/kg body weight/day.

Other population groups

Although pregnant women and young children are at the greatest risk of iron-deficiency anaemia, other population groups frequently suffer its consequences and may benefit from iron supplementation programs. In some contexts, it may be feasible and cost effective to distribute iron supplements to other groups if the prevalence of anaemia is high (table H.3). Complementary parasite control measures for other population groups are given below the table.

Table H.3. Guidelines for Iron Supplementation to Other Population Groups

Group	Dosage
Children 2–5 years	20–30 mg iron
Children 6–11 years	30–60 mg iron
Adolescents and adults	60 mg iron (see notes)

Notes: For children 2–5 years, iron dosage is based on 2 mg elemental iron/kg body weight/day. If the population group includes girls or women of reproductive age, 400 mcg folic acid should be included with the iron supplementation for the prevention of birth defects in those who become pregnant.

Complementary parasite control measures for other population groups

If hookworms are endemic (prevalence $\geq 20\text{--}30\%$), combining iron supplementation with anthelminthic treatment to adults and children >5 years is most effective. Universal anthelminthic treatment, irrespective of infection status, is recommended at least annually. High-risk groups, women, and children should be treated more intensively (2–3 times per year).

The following single-dose treatments are recommended:

- Albendazole 400 mg single dose
- Mebendazole 500 mg single dose
- Levamisole 2.5 mg/kg single dose
- Pyrantel 10 mg/kg single dose

Caution: Anthelminthic treatment can be given to pregnant and lactating women. As a general rule, however, no medicine should be given in the first trimester.

If urinary schistosomiasis is endemic, provide annual treatment for urinary schistosomiasis to school-age children who report having blood in their urine. Give the following treatment: praziquantel 40 mg/kg, single dose.

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