

Chapter 9: Endocrine System

Diabetes mellitus

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Diabetes mellitus**Description**

Diabetes occurs either because of a lack of insulin (type 1) or additionally because of the presence of factors that oppose the action of insulin (type 2). The result is an increase in blood glucose concentration.

Diagnostic criteria

1. Symptoms of diabetes plus a random blood glucose ≥ 11.1 mmol/L.
Random is defined as any time of day without regard to time since last meal. The classic symptoms of diabetes include polyphagia, polyuria and polydypsia, and in type 1 diabetes, unexplained weight loss.
2. Fasting plasma glucose ≥ 7.0 mmol/L, or fasting blood glucose ≥ 6.1 mmol/L.
Fasting is defined as no caloric intake for at least 8 hours.
3. Two hour blood glucose ≥ 11.1 mmol/L during oral glucose tolerance test using a 75 g glucose load.

General measures

- » Achieve and maintain optimum weight.
- » Dietary emphasis should be on fruit, vegetables, and low-fat dairy products on the one hand; and reduced amounts of fat, red meat, sweets, and sugar-containing beverages on the other.
 - a diet high in fruit and vegetables
 - low fat dairy products
 - variety of unsalted nuts
 - fish/skinless chicken in preference to red meat
 - restrict amounts of red meat

Person centred approach to diet therapy

The following issues need to be explored before counselling can be given:

- » weight (and preferably weight history)
- » most recent and previous glycated haemoglobin (HbA_{1c}) results
- » diabetes medication
- » diet assessment
- » lifestyle and physical activity
- » cultural, social and economic issues

Monitoring

- » HbA_{1c} annually in patients who meet treatment goals and 3–6 monthly in patients whose therapy has changed.
- » Blood glucose should ideally be monitored at home in all patients on more than 2 daily doses of insulin.
- » Weight, abdominal circumference (target less than 88 cm in women and 102 cm in men) and blood pressure at every visit.
- » Potassium, creatinine and lipids annually

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- » Fundoscopy annually (following dilation of the pupils)
- » Proteinuria annually – See chapter 8: Kidney and urological disorders

Parameter	Optimal	Acceptable	Additional action suggested
Capillary blood glucose values (finger-prick) fasting (mmol/L)	4–6	6–8	> 8
2-hour post-prandial (mmol/L)	4–8	8–10	> 10
Glycated haemoglobin (HbA _{1c}) (%)	< 7	7–8	> 8
BMI (kg/m ²)	18.5 – 25		> 27

Diabetes mellitus type 1 is always treated with insulin.
In diabetes mellitus type 2, drug treatment is initiated with oral hypoglycaemic agents, insulin may be needed at a later stage.

9.1 Diabetes mellitus type 1, in children

E10.9

Description

Diabetes mellitus type 1, previously known as juvenile onset diabetes mellitus and as insulin-dependent diabetes mellitus (IDDM).

Suspect diabetes in any child presenting with the following symptoms:

- » loss of weight despite a good appetite
- » polyuria
- » polydipsia
- » sweet smell on the breath with a positive test for urine ketones with or without loss or impairment of consciousness
- » tiredness
- » abdominal pain

Diagnosis

A diagnosis can be made when the classic symptoms of polyuria and polydipsia are associated with hyperglycaemia:

- » random blood glucose (RBG) 11.1 mmol/L or higher
- or**
- » fasting blood glucose (FBG) 7 mmol/L or higher

A small proportion of children present with less severe symptoms and may require fasting blood glucose measurement and referral to a specialist centre for assessment. Others may present with features of ketoacidosis.

General measures

- » A regular meal pattern is important.
- » Regular exercise.
- » Lifestyle modification, including self care practices.
- » The patient should be told to carry a disease identification bracelet, necklace or card.
- » Regular self glucose monitoring should be continued and the patients taught to self adjust insulin doses

Drug treatment

- » Oral antidiabetic drugs should not be used to treat patients with type 1 diabetes.
- » Almost all childhood diabetics require several insulin injections per day to control their diabetes.
- » Prefilled insulin syringes should be made available for all children.
- » The regimen is individualised depending on factors such as adherence. If adherence is good, then these patients may be candidates for basal / bolus regimens. Other children may be managed with biphasic insulin given twice daily.
- » Adherence to insulin treatment regimens should be emphasised.

Referral

All children with suspected diabetes mellitus type 1 should be referred to hospital immediately for:

- » confirmation of diagnosis
- » initiation and stabilisation of therapy
- » education
- » long term monitoring of control
- » ideally, management at a hospital with specialised services

9.2 Diabetes mellitus type 2, in adolescents

E11.9

Description

The majority of adolescent diabetics are of type 1. However, an increasing number of adolescents are being diagnosed with type 2 diabetes. These patients may be diagnosed on screening; later presentation includes the classical symptoms of diabetes.

Criteria for screening for type 2 diabetes in children

- » Body mass index is > 85% for age and gender
- » Family history of diabetes
- » Presence of hyperlipidaemia, hypertension or, polycystic ovarian syndrome.

and

- » Physical signs of puberty or age > 10 years

Referral

- » All

9.3 Diabetes mellitus type 1, in adults

E10.9

Description

Diabetes mellitus type 1, previously known as juvenile onset diabetes mellitus and as insulin-dependent diabetes mellitus (IDDM).

Diabetes mellitus type 1 presents with:

- » hunger
- » polyuria
- » ketoacidosis
- » thirst
- » weight loss
- » tiredness

Note:

All patients must be referred on presentation for diagnosis, stabilisation, initiation of treatment and planning.

General measures

- » Dietary control, regular exercise and self care practices are important control factors.
- » Regular home blood glucose monitoring.

Note:

The patient should be advised to carry a disease identification bracelet, necklace or card.

Drug treatment

As diabetes mellitus type 1 usually presents with diabetic ketoacidosis, treatment is usually initiated with insulin and the patient is stabilised at hospital level.

Types of insulins

- Insulin, short acting, SC, three times daily, 30 minutes prior to meals
 - Regular human insulin.
 - Onset of action: 30 minutes.
 - Peak action: 2–5 hours.
 - Duration of action: 5–8 hours.
- Insulin, intermediate acting, SC, once or twice daily usually at night at bedtime, approximately 8 hours before breakfast
 - Neutral Protamine Hagedorn (NPH) insulin.

- Onset of action: 1–3 hours.
- Peak action: 6–12 hours.
- Duration of action: 16–24 hours.

- Insulin, biphasic, SC, once or twice daily
 - Mixtures of regular human insulin and NPH insulin in different proportions, e.g. 30/70 (30% regular insulin and 70% NPH insulin).
 - Onset of action: 30 minutes.
 - Peak action: 2–12 hours.
 - Duration of action: 16–24 hours.

Drawing up insulin from vials

Clean the top of the insulin bottle with an antiseptic swab.

Draw air into the syringe to the number of marks of insulin required and inject this into the bottle; then draw the required dose of insulin into the syringe. Before withdrawing the needle from the insulin bottle, expel the air bubble if one has formed.

- » The skin need not be specially cleaned.
- » Repeated application of antiseptics hardens the skin.
- » Stretching the skin at the injection site is the best way to obtain a painless injection. In thin people it may be necessary to pinch the skin between thumb and forefinger of the left hand.
- » The needle should be inserted briskly at almost 90 degrees to the skin to almost its whole length (needles are usually 0.6cm to 1.2 cm long).
- » Inject the insulin.
- » To avoid insulin leakage, wait 5 –10 seconds before withdrawing the needle.
- » Injection sites need to be rotated to avoid lipohypertrophy.

Referral

- » All patients

9.4 Diabetic emergencies**Description**

Diabetics may present with a decreased level of consciousness due to hyperglycaemia (diabetic ketoacidosis (DKA) or hyperosmolar non-ketotic coma (HONK)) or hypoglycaemia. A blood glucose determination and urine test for ketones are essential to distinguish these conditions, as each one needs urgent management.

In all patients with abnormal levels of consciousness, try to determine if the blood glucose level is high or low.

If a diagnosis cannot be made, treat as hypoglycaemia and refer urgently.

Low blood glucose presents the most immediate danger to life.

Chapter 9**Endocrine System****Diagnostic criteria**

	Hyperglycaemia		Hypoglycaemia
	DKA	HONK	
Blood glucose test	11.1 mmol/L or higher		3.5 mmol/L or lower
Urine test for ketones	Usually positive and > 1+	Negative	usually negative

9.4.1 Hypoglycaemia in diabetics

E16.2

Description

Diabetic patients on therapy may experience hypoglycaemia for reasons such as intercurrent illness (e.g. diarrhoea), missed meals, inadvertent intramuscular injections of insulin or miscalculated doses of insulin, alcohol ingestion, and exercise without appropriate dietary preparation.

Hypoglycaemia in diabetic patients can be graded according to the table below:

Mild hypoglycaemia	Moderate hypoglycaemia	Severe hypoglycaemia
» Capable of self treatment*	» Cannot respond to hypoglycaemia (i.e. cannot self treat)	» Semi-conscious or » Unconscious/comatose
	» Requires help from someone else	» Requires medical help
	» May respond to prompting	
	» Oral treatment is successful	

*Except children less than 6 years

Symptoms (autonomic)	Neurological symptoms (neuroglycopenia)	Neurological signs (neuroglycopenia)
» Tremors, » Palpitations, » Sweating, » Hunger, » Fatigue	» Headache » Mood changes » Low attentiveness	» Depressed level of consciousness/convulsions

***Note:**

Children, particularly under 6 years of age, generally are not capable of self management and are reliant on supervision from an adult.

Patients may fail to recognise that they are hypoglycaemic when neuroglycopenia (impaired thinking, mood changes, irritability, dizziness, tiredness) occurs before autonomic activation.

Diagnosis

- » Blood glucose < 3.5 mmol/L with symptoms in a known diabetic patient
- » Blood glucose levels should be measured with a glucometer to confirm hypoglycaemia.

Hypoglycaemia must be managed as an emergency.
If a diabetic patient presents with an altered level of consciousness and a glucometer is not available, treat as hypoglycaemia.

Treatment**Mild or moderate hypoglycaemia**

Immediate: oral rapidly absorbed simple carbohydrate, e.g.

- » Sugar, oral, 5–15 g (\pm 1–3 teaspoons)
 - Wait 10–15 minutes.
 - If no response, repeat above.

As symptoms improve: the next meal or oral complex carbohydrate should be ingested, e.g. fruit, bread, cereal, milk, etc.

Severe hypoglycaemiaChildren

- Dextrose 10%, IV, 2–5 mL/kg over 5 minutes
 - 10% solution – dilute 1 part dextrose 50% with 4 parts water for injection

or

If the IV route is not easily accessible

- Dextrose 10%, 5 mL/kg via a carefully placed nasogastric tube

Give adequate glucose to maintain normal blood glucose levels.

Adults

See section 21.11 Hypoglycaemia and hypoglycaemic coma

9.4.2 Diabetic ketoacidosis (DKA)

E10.1/E11.1

Description

Clinical features of DKA include:

- » dehydration
- » abdominal pain
- » vomiting
- » deep sighing respiration
- » drowsiness, confusion, coma
- » acetone/fruity smelling breath

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Drug treatment

Note:

Early administration of large amounts of fluid initially is life saving.

Adults

Average deficit 6 L, and may be as much as 12 L.

Be cautious in renal and cardiac disease.

In the absence of renal or cardiac compromise:

- Sodium chloride 0.9%, IV, 15–20 mL/kg in the first hour
 - Subsequent infusion rate varies from 5–15 mL/kg/hour depending on the clinical condition.
 - Correction of estimated deficits should take place over 24 hours.
 - The volume infused in the first 4 hours should not exceed 50 mL/kg.

Refer urgently with drip in place and running at planned rate.

When referral will take more than 2 hours and a diagnosis of diabetes with hyperglycaemia is confirmed:

- Insulin, short acting, IM, 0.1 unit/kg

!CAUTION!

Do not administer IV short-acting insulin if the serum electrolyte status, especially potassium is not known.

Continue with IV fluids but delay giving insulin in these cases in consultation with referral facility as this delay should not negatively influence the patient, but hypokalaemia with resultant cardiac dysrhythmias definitely will.

See section 21.10: Hyperglycaemia and ketoacidosis

Children

If in shock:

- Sodium chloride 0.9%, IV, 20 mL/kg within 1 hour as a bolus
 - If shock not corrected, repeat the bolus

If no shock or after shock is corrected

- Sodium chloride 0.9%, IV

10 – 20 kg	75 mL/hour
20 – 30 kg	110 mL/hour
30 – 40 kg	140 mL/hour
40 – 50 kg	165 mL/hour

Refer urgently with drip in place and running at planned rate.

When referral will take more than 2 hours and a diagnosis of diabetes with hyperglycaemia is confirmed and provided glucose is monitored hourly

- Insulin, short acting, IM, 0.1 units/kg as a bolus
 - When giving insulin IM, do not use insulin needle

9.5 Metabolic syndrome/obesity/dyslipidaemia

E66.9

Description

The metabolic syndrome is a cluster of risk factors:

- » impaired glucose metabolism
- » central obesity
- » dyslipidaemia
- » hypertension.

Diagnostic criteria

There is still some controversy as to whether the metabolic syndrome is a true syndrome or a cluster of risk factors. There are also varying diagnostic criteria around the world.

The more components of the syndrome, the higher the risk.

- » Abdominal obesity, i.e. waist circumference > 102 cm in men, and > 88 cm in women.
- » BMI: determined by $\text{weight in kg} \div (\text{height in m})^2$

BMI (kg/m ²)	
18.5 – 24.9	normal
25.0 – 29.9	overweight
30.0 – 34.9	mildly obese
35.0 – 39.9	moderately obese
> 40	extremely obese

- » Fasting plasma triglycerides > 1.70 mmol/L (HDL cholesterol < 1.04 mmol/L in men, and < 1.30 mmol/L in women)
- » Blood pressure > 130/85 mmHg
- » Fasting blood glucose > 6.10 mmol/L

General measures

A decrease in food intake together with an increase in physical activity is crucial to losing weight.

Drug treatment

Treat the metabolic risk factors, i.e. dyslipidemia, hypertension, and hyperglycemia

Hyperlipidaemia

Dyslipidemia may be successfully treated through lifestyle modifications alone. However, LDL-lowering medications may be indicated to achieve target LDL levels in higher risk patients, and thereby reduce risk for major cardiovascular disease events.

HMGCoA reductase inhibitors (statins) are the first-choice lipid-lowering agents e.g.:

- Simvastatin, oral, 10 mg daily

Hypertension

See section 4.7: Hypertension

Hyperglycaemia

See section 21.10: Hyperglycaemia and ketoacidosis

9.6 Diabetes mellitus type 2, adults

E11

Description

Diabetes mellitus type 2 is a chronic debilitating metabolic disease characterised by an abnormally high blood glucose level with serious acute and chronic complications. It is an important component of the metabolic syndrome (syndrome X).

In adults the condition may only be diagnosed when complications are discovered, e.g.:

- » ischaemic heart disease
- » peripheral artery disease
- » stroke
- » deteriorating eyesight
- » foot ulcers

Symptoms of an abnormally high blood sugar level are:

- » thirst, especially noticed at night
- » polyuria
- » tiredness
- » periodic changes in vision due to fluctuations in the blood glucose level
- » susceptibility to infections, especially of the urinary tract, respiratory tract and skin

Note:

It is important to distinguish diabetes mellitus type 2 from diabetes mellitus type 1.

Treatment targets

Biochemical Index	Optimal	Acceptable	Additional action suggested
Capillary blood glucose values (finger-prick)			
fasting (mmol/L)	4 – 6	6 – 8	> 8
2-hour post-prandial (mmol/L)	4 – 8	8 – 10	> 10
Glycated haemoglobin (HbA _{1c}) (%)	< 7	7–8	> 8
Weight BMI (kg/m ²)	< 25		> 27

- » Control the blood sugar level and HbA_{1c} (value) within acceptable limits (determined by the physician) (glycaemic control)
- » Prevent acute complications, e.g. hyperglycaemic and hypoglycaemic coma
- » Manage chronic conditions associated with diabetes
- » Prevent complications, e.g. foot care to prevent gangrene

General measures**Diet and lifestyle****Lifestyle changes include:**

- » Weight loss
- » Moderate daily exercise and increased physical activity e.g. walking at least half an hour for 3 days a week, clean house, climb stairs, etc.

See ideal weight table on page xxix

Diet rich in fruit and vegetables

- » Eat 4 or 5 portions on a daily basis
 - One portion of which is a good source of vitamin C, e.g. tomato, cabbage family, citrus fruit and guavas
 - One portion, a dark green vegetable e.g. broccoli, green beans, spinach and baby marrow, or
 - One dark yellow/ orange vegetable, e.g. carrots, pumpkin and butternut prepared without butter.
- » Eat only one fruit (fresh) at a time.
 - Fruit must preferably be eaten with a meal or as a snack.
 - When eating dried fruit, limit the portion to the equivalent of a fresh fruit, e.g. 2 dried pear halves = 1 pear
- » Low fat dairy products
 - Adults require 2 cups of milk per day i.e. skimmed milk
 - Limit the intake of cheese to a 30 g portion (a matchbox size or a third cup grated cheese) three times per week.
 - Where possible use low fat cheese.
- » Nuts
- » Fish/chicken in preference to red meat.
 - Chicken without the skin; fish should not be fried but steamed or grilled.
- » Small amounts of red meat (lean portions) not more than three times per

week.

- » Reduce total intake of fat and saturated fat
 - Use healthy types of fat, e.g. avocado pear, nuts, peanut butter, canola oil, canola margarine, olive oil and olives
 - Unhealthy fats include: hard margarine, butter, cheese and any type of oil heated to a high temperature.
 - Soft low fat margarine (in the tub) should preferably be used instead of butter or hard margarine.
 - Never use 2 “fats” on bread e.g. when using a spread containing fat, do not use margarine as well
- » Restrict the intake of food high in cholesterol, e.g. egg yolks, tripe, caviar, fish roe, calamari, prawns and meat
 - A maximum of 1 egg a day is allowed.
- » Increase intake of fibre
- » Avoid refined foods e.g. sweets and sugary foods
 - Use food and drinks containing sugar sparingly and not between meals.
- » Make starchy foods the basis of most meals e.g. whole-wheat or brown bread, rye bread, high fibre porridge (oats or whole wheat cereals),
- » Other recommended foods:
 - Legumes, e.g. dried peas and beans, lentils and soya products
 - Brown rice
 - Samp
 - Whole-wheat pasta
- » Water
 - Women should drink at least 4 glasses (of 250 mL) of water per day
 - Men should drink at least 6 glasses (of 250 mL) of water per day.

Drug treatment

To prevent long-term cardiovascular complications of diabetes:

- » Statin therapy should be added to lifestyle changes for all type 2 diabetic patients, regardless of baseline lipid levels:
 - Simvastatin, oral, 10 mg daily
 - Maximum dose at PHC level: 10 mg daily
 - If higher doses are required, refer patient

Persistent proteinuria

See chapter 9: Kidney and urological disorders.

STEP 1

Lifestyle modification plus metformin

Entry to Step 1	Treatment and duration	Target
» Typical symptoms - thirst, tiredness, polyuria and » Random blood glucose above 11 mmol/L or » Fasting blood glucose level \geq 7 mmol/L	» Lifestyle modification for life » Appropriate diet » Weight loss until at ideal weight » Initiate drug therapy with: • Metformin » Assess monthly » If indicated: • Aspirin • Simvastatin	» Random blood glucose below 10 mmol/L or fasting glucose 6–8 mmol/L and/or » HbA _{1c} 6–7.5%

Biguanide

In overweight patients biguanides should be the first choice unless contraindicated.

Biguanides (metformin)

Contraindicated in:

- » chronic kidney disease, CrCl < 60 mL/min
- » severe hepatic impairment
- » pregnancy
- Metformin, oral, 500 mg daily.
 - Dose increments if the blood glucose is uncontrolled:
 Increase to 500 mg 12 hourly after two weeks
 Increase to 850 mg 12 hourly after another two weeks, if needed
 Maximum dose: 850 mg 8 hourly

STEP 2

Add sulphonylurea

Entry to Step 2	Treatment and duration	Target
» Failed step 1: HbA _{1c} > 8 % or fasting blood glucose above 8 mmol/L despite adherence to treatment plan in step 1 and maximal dose of metformin for 2–3 months or » Random blood glucose above 10 mmol/L despite adherence to treatment plan in step 1 and maximal dose of metformin for 2–3 months	» Lifestyle modification and » Combination oral hypoglycaemic agents, i.e.: <ul style="list-style-type: none"> • Metformin and <ul style="list-style-type: none"> • Sulphonylurea 	» Random blood glucose below 10 mmol/L or » fasting glucose 6 – 8 mmol/L and/or » HbA _{1c} 6 – 7.5%

Sulphonylureas (glibenclamide or gliclazide)

Contraindicated in:

- » chronic kidney disease, CrCl < 60 mL/min
- » severe hepatic impairment
- » pregnancy

Missing meals while taking sulphonylureas may lead to hypoglycaemia.

- Glibenclamide, oral, 2.5 mg in the morning with a meal.
 - Dose increments if the blood glucose is uncontrolled: Increase with 2.5 mg daily at two-weekly intervals. Maximum dose: 15 mg daily. If 7.5 mg daily or more is needed, divide the total daily dose into two, with the larger dose in the morning.
 - Use with caution in the elderly due to an increased risk of hypoglycaemia.
 - Every dose should be taken with a meal.
- or**
- Gliclazide, oral, 40 mg daily in the morning with a meal.
 - Dose increments if the blood glucose is uncontrolled: Increase with 40 mg daily at two-weekly intervals. Maximum dose: 160 mg twice daily. If more than 80 mg daily is needed then divide the total daily dose into two
 - Every dose should be taken with a meal.

STEP 3

Insulin therapy – See section 9.3: Diabetes mellitus type 1 in adults

- » Insulin is indicated when oral combination therapy fails.
- » Continue lifestyle modification.
- » Insulin therapy must be initiated by a doctor
- » Sulphonylurea should be discontinued once insulin therapy is initiated but continue with metformin.

Education on insulin therapy should include:

- » types of insulin
- » injection technique and sites
- » insulin storage
- » glucose monitoring, urine and blood
- » meal frequency as this varies according to the type and frequency of insulin, e.g. patients may need a snack at night about 3–4 hours after the evening meal
- » recognition and treatment of acute complications, e.g. hypoglycaemia and hyperglycaemia

Insulin type	Starting dose	Increment	Maximum daily dose
Add on therapy: <ul style="list-style-type: none"> • Intermediate to long-acting 	10 units in the evening before bedtime	If 10 units not effective, increase gradually to 20 units	20 units
Substitution therapy: <ul style="list-style-type: none"> • Biphasic 	Twice daily Total daily dose: 15 units divided as follows: <ul style="list-style-type: none"> ○ 2/3 of total daily dose, i.e. 10 units, 30 minutes before breakfast ○ 1/3 of total daily dose, i.e. 5 units, 30 minutes before supper 	4 units weekly First increment is added to dose before breakfast Second increment is added to dose before supper.	30 units Refer if more than 30 units are needed

Referral**Urgent – same day**

- » Metabolic complications:
- » Dehydration and hypotension
- » Nausea and vomiting
- » Ketonuria (more than 1+)
- » Keto-acidosis
- » Hyperglycaemia over 25 mmol/L
- » Complications, e.g. infections which may have the following symptoms:
 - slow onset of progressive apathy leading to confusion, stupor, pre-coma and coma
 - gangrene
 - sudden deterioration of vision
 - serious infections

Note:

Before transferring very ill patients, consider IV infusion with sodium chloride 0.9%.

Referral

- » All type 1 diabetics
- » Pregnancy
- » Failure of step 4 to control diabetes

9.7 Microvascular complications of diabetes**9.7.1 Diabetic foot**

E10.5/E11.5

Description

Ulcers develop at the tips of the toes and on the plantar surfaces of the metatarsal heads and are often preceded by callus formation.

If the callus is not removed then haemorrhage and tissue necrosis occurs below the plaque of callus which leads to ulceration. Ulcers can be secondarily infected by staphylococci, streptococci, coliforms, and anaerobic bacteria which can lead to cellulites, abscess formation, and osteomyelitis.

Diagnosis

The three main factors that lead to tissue necrosis in the diabetic foot are:

- » Neuropathy
- » Infection, and
- » Ischaemia.

General measures

- » Removal of excess keratin by a chiropodist with a scalpel blade to expose the floor of the ulcer and allow efficient drainage of the lesion.
- » Cleanse with sodium chloride 0.9% solution daily and apply non-adherent dressing

Drug treatment

- Amoxicillin/clavulanic acid 500/125 mg (625 mg), oral 8 hourly for 10 days

Referral**Urgent**

Threatened limb, i.e. if the ulcer is associated with:

- » Cellulitis
- » Abscess
- » Discolouration of surrounding skin, or
- » Crepitus

9.7.2 Diabetic nephropathy

E10.2/E11.2

Description

Significant proteinuria = spot urine protein creatinine ratio of > 0.1 g/mmol or ACR (albumin-creatinine ratio) > 100 g/mol. Confirm as positive if raised on at least 2 of 3 occasions, in the absence of infection, cardiac failure and menstruation.

General measures**Screening**

- » Check annually for proteinuria in an early morning urine sample using a dipstix
- » If dipstix positive:
 - check for urinary tract infection
 - obtain a laboratory urine protein: creatinine ratio (PCR)
- » If dipstix negative, check urine albumin using laboratory or site-of-care urine albumin:creatinine ratio
- » Measure serum creatinine annually, and calculate GFR
- » If PCR or ACR is raised, repeat within 4 months.
- » Confirm as positive if proteinuria or raised urine albumin on both occasions

Diet and lifestyle

- » Limit protein intake < 0.8 g/kg daily, if proteinuric
- » Advise smoking cessation

Drug treatment**Raised urine albumin or proteinuria or reduced GFR:**

- » Start treatment with an ACE inhibitor and increase gradually to maximal dose if tolerated, e.g.:
- Enalapril, oral, 10 mg 12 hourly
 - Monitor potassium.

Hypertension

Target BP: < 130/80 mm Hg

See section 4.7: Hypertension

Diabetes mellitus

Aim for HbA_{1c} < 7%.

- » Intensify other renal and cardiovascular protection measures (not smoking, aspirin therapy, lipid lowering therapy).

Referral

To nephrologists:

- » When GFR < 60 mL/minute or earlier if symptomatic.

Chapter 10: Infections and related conditions

- 10.1 Fever**
- 10.2 Antiseptics and disinfectants**
- 10.3 Chickenpox**
- 10.4 Cholera**
- 10.5 Dysentery, amoebic**
- 10.6 Dysentery, biliary**
- 10.7 Giardiasis**
- 10.8 Malaria**
 - 10.8.1 Falciparum malaria, severe**
 - 10.8.2 Malaria, prophylaxis (Self provided care)**
- 10.9 Measles**
- 10.10 Meningitis**
- 10.11 Mumps**
- 10.12 Rubella (German measles)**
- 10.13 Schistosomiasis**
- 10.13 Typhoid fever**
- 10.14 Tuberculosis**

Chapter 10

Infections and related conditions

10.1 Fever

R50.9

Description

Fever, i.e. temperature of 38°C or more, is a natural and sometimes useful response to infection, inflammation or infarction.

Fever alone is not a diagnosis.

Fever can cause convulsions in children under 6 years of age.

Heat stroke is a life threatening medical emergency, which is due to failure of heat loss usually following physical exertion in hot, humid environment. The temperature is more than 40.5°C. Treatment is urgent evaporative cooling – See [Treatment](#)

Note:

Temperature above 40°C needs urgent lowering with evaporative cooling. See [Treatment](#).

Fluid losses are increased with fever.

In neonates and the elderly fever is often absent or preceded by other symptoms like confusion, failure to feed.

Malaria must be seriously considered in anyone with fever living in a malaria endemic area or if a malaria area has been visited in the past 12 weeks.

General measures

For patients with heat stroke or fever not responding to paracetamol:

- » place patient in a cool place
- » remove clothing
- » cover patient with a wet sheet or towel – the water should be tepid and not too cold
- » keep the sheet or towel wet with regular sponging
- » fan the patient

Drug treatment

Only some patients with fever need to be treated:

- » children under 6 years of age
- » significant symptoms
- **Paracetamol**, oral, 15 mg/kg/dose 4–6 hourly when required to a maximum of 4 doses per 24 hours
 - In children under 6 months calculate dose by weight

Weight kg	Dose mg	Use one of the following:		Age months/years
		Syrup 120 mg/5mL	Tablet 500 mg	
≥ 3.5–5 kg	48 mg	2 mL	–	≥ 1–3 months
≥ 5–7 kg	60 mg	2.5 mL	–	≥ 3–6 months

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≥ 7–9 kg	96 mg	4 mL	–	≥ 6–12 months
≥ 9–14 kg	120 mg	5 mL		≥ 12 months–3 years
≥ 14–17.5 kg	180 mg	7.5 mL	–	≥ 3–5 years
≥ 17.5–35 kg	240 mg	10 mL	½ tablet	≥ 5–11 years
≥ 35–55 kg	500 mg	–	1 tablet	≥ 11–15 years
≥ 55 kg and above	Up to 1000 mg	–	Up to 2 tablets	≥ 15 years and adults

! CAUTION !

Do not treat undiagnosed fever with antibiotics.
Do not give aspirin to children with fever.

Referral

- » All patients with heat stroke.
- » All children under 60 days of age with any one of the following:
 - axillary temperature > 37.5°C
 - decreased level of consciousness
 - breathing difficulties, i.e. respiratory rate > 60, chest indrawing or apnoea
 - bulging fontanelle
 - pus forming conditions, i.e. umbilical sepsis, skin sepsis, eye discharge associated with swollen eyelids and ear discharge
- » All children in whom a definite and easily managed cause is not found.
- » Fever that lasts for more than 3 days without finding a treatable cause.
- » Fever that recurs.
- » Fever combined with:
 - signs of meningitis
 - coma or confusion
 - toxic-looking patient
 - jaundice
 - convulsion
 - failure to feed

10.2 Antiseptics and disinfectants

Description

Disinfectants are used to kill micro-organisms on working surfaces and instruments, but cannot be relied on to destroy all micro-organisms.

Antiseptics are used for sterilising skin and mucous membranes.

Do not mix products.

Disinfecting surfaces

Guidelines for the use of disinfectants

- » Never use a chemical if other more reliable methods are available.

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Infections and related conditions

Disinfectant	Indications	Directions for application
<ul style="list-style-type: none">• Povidone iodine<ul style="list-style-type: none">○ solution 10%○ ointment 10%○ cream 5%	<ul style="list-style-type: none">» Skin and wound infections Contraindication: iodine allergy	<ul style="list-style-type: none">» Use ointment for skin infection.» Use solution for cleaning skin and wounds.» Avoid using on large wounds because of danger of iodine absorption

Articles and instruments

- » Adhere to the appropriate cleansing and disinfection policy.

10.3 Chickenpox

B01.9

Description

A mild viral infection that presents 2–3 weeks after exposure, with:

- » mild fever preceding the rash
- » 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 stages may all be present at the same time.

Chickenpox is infective for 6 days after the lesions have appeared or until all the lesions have crusted.

The infection is self-limiting with a duration of about 1 week.

Complications of encephalitis and pneumonia occur rarely and are more likely in adults and immunocompromised patients.

General measures

Isolate from immunocompromised people, and pregnant women until all lesions have crusted.

Ensure adequate hydration.

Cut fingernails very short and discourage scratching.

Drug treatment

! CAUTION !

Avoid the use of aspirin in children and adolescents under 16 years because of risk of Reye's syndrome.

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For itch:

- Calamine lotion, applied as needed.

In severe cases

- Chlorpheniramine, oral, 0.1 mg/kg/dose 6–8 hourly

Weight kg	Dose mg	Use one of the following:		Age months/years
		Syrup 2 mg/5mL	Tablet 4 mg	
≥ 9–11 kg	1 mg	2.5 mL	–	≥ 12–18 months
≥ 11–14 kg	1.2 mg	3 mL	–	≥ 18 months–3 years
≥ 14–17.5 kg	1.5 mg	4 mL	–	≥ 3–5 years
≥ 17.5–25 kg	2 mg	5 mL	–	≥ 5–7 years
≥ 25–35 kg	3 mg	7.5 mL	–	≥ 7–11 years
≥ 35kg and above	4 mg	–	1 tablet	≥ 11 years and adults

For pain and fever:

- **Paracetamol**, oral, 15 mg/kg/dose 4–6 hourly when required to a maximum of 4 doses per 24 hours
 - In children under 6 months calculate dose by weight

Weight kg	Dose mg	Use one of the following:		Age months/years
		Syrup 120 mg/5mL	Tablet 500 mg	
≥ 3.5–5 kg	48 mg	2 mL	–	≥ 1–3 months
≥ 5–7 kg	60 mg	2.5 mL	–	≥ 3–6 months
≥ 7–9kg	96 mg	4 mL	–	≥ 6–12 months
≥ 9–14 kg	120 mg	5 mL	–	≥ 12 months–3 years
≥ 14–17.5 kg	180 mg	7.5 mL	–	≥ 3–5 years
≥ 17.5–35 kg	240 mg	10 mL	½ tablet	≥ 5–11 years
≥ 35–55 kg	500 mg	–	1 tablet	≥ 11–15 years
≥ 55kg and above	Up to 1000mg	–	Up to 2 tablets	≥ 15 years and adults

If skin infection is present due to scratching, treat as for bacterial skin infection.

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Immunocompromised patients and all cases with severe chickenpox:

(Best results are achieved if treatment is started within 24 hours of the onset of rash)

- Aciclovir, oral, 6 hourly for 7 days (Doctor initiated)

Weight kg	Dose mg	Use one of the following:			Age months/years
		Susp 200 mg /5 mL	Tablet 200 mg	Tablet 400 mg	
≥ 3.5–5 kg	100 mg	2.5 mL	–	–	≥ 1–3 months
≥ 5–7 kg	140 mg	3.5 mL	–	–	≥ 3–6 months
≥ 7–9 kg	160 mg	4 mL	–	–	≥ 6–12 months
≥ 9–11 kg	200 mg	5 mL	1 tablet	½ tablets	≥ 12–18 months
≥ 11–14 kg	240 mg	6 mL	–	–	≥ 18 months–3 years
≥ 14–25 kg	300 mg	7.5 mL	1½ tablets	–	≥ 3–7 years
≥ 25–35 kg	400 mg	10 mL	2 tablets	1 tablet	≥ 7–11 years
≥ 35–55 kg	600 mg	–	3 tablets	1½ tablets	≥ 11–15 years
≥ 55 kg and above	800 mg	–	4 tablets	2 tablets	≥ 15 years and adults

Referral

- » Complications such as:
 - meningoencephalitis
 - pneumonia
- » Severely ill patients
- » Pregnant women
- » Neonates whose mothers had chicken pox within 7 days of delivery

10.4 Cholera (See Chapter 2 - Gastrointestinal conditions)

10.5 Dysentery, amoebic (See Chapter 2 - Gastrointestinal conditions)

10.6 Dysentery, bacillary (See Chapter 2 - Gastrointestinal conditions)

10.7 Giardiasis (See Chapter 2 - Gastrointestinal conditions)

10.8 Malaria

B54

Note: notifiable condition.**Description**

The most important element in the diagnosis of malaria is a high index of suspicion in both endemic and non-endemic areas. Test any person resident in or returning from a malaria area **and** who presents with fever (usually within 3 months of exposure). The progression to severe falciparum malaria is rapid and early diagnosis and effective treatment is crucial.

Pregnant women and young children up to 5 years of age are at particularly high risk of developing severe malaria.

Clinical features include:

- » severe headache
- » fever above 38°C
- » muscle and joint pains
- » shivering attacks
- » nausea and vomiting
- » flu-like symptoms

Progression to severe malaria may occur and present with the following additional clinical features:

- » sleepiness, unconsciousness or coma, convulsions
- » respiratory distress and/or cyanosis
- » jaundice
- » renal failure
- » shock
- » repeated vomiting
- » hypoglycaemia
- » severe anaemia (Hb < 6 g/dL)

Diagnosis

Microscopic examination of thick and thin blood smears. Thick films are more sensitive than thin films in the detection of malaria parasites.

Where rapid diagnostic tests, e.g. plasma reagent dipsticks are available, these can be used to diagnose malaria within 10–15 minutes.

Note:

If neither microscopy nor rapid tests are available diagnosis should be made on the basis of clinical symptoms.

A blood smear should be made and sent for microscopic examination.

One negative malaria test does not exclude the diagnosis of malaria.

General measures

Provide supportive and symptomatic relief.

Monitor for complications.

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Ensure adequate hydration.

All patients with *Plasmodium falciparum* malaria should be carefully observed for the first 24 hours.

Drug treatment

All first doses of drugs must be given under supervision and patients must be observed for at least an hour as vomiting is common in patients with malaria. Treatment must be repeated if the patient vomits within the first hour. Vomiting oral treatment is one of the commonest reasons for treatment failure.

In endemic areas of RSA where malaria occurs seasonally, it should be treated at PHC level. In other areas, patients should be referred for treatment.

Uncomplicated *P. falciparum* malaria in South Africa

(If unsure of species, treat as for *P. falciparum* malaria)

- Artemether/lumefantrine 20/120 mg, oral, with fat containing food/milk to ensure adequate absorption
 - Give the first dose immediately
 - Follow with second dose 8 hours later
 - Then 12 hourly for another 2 days (total number of doses in 3 days = 6)

Weight kg	Tablet Artemether/lumefantrine 20/120 mg	Age months/years
≥ 10–15 kg	1 tablet	≥ 1–3 years
≥ 15–25 kg	2 tablets	≥ 3–8 years
≥ 25–35 kg	3 tablets	≥ 8–12 years
≥ 35–65 kg	4 tablets	≥ 12 years and adults

For fever:

- **Paracetamol**, oral, 15 mg/kg/dose 4–6 hourly when required to a maximum of 4 doses per 24 hours
 - In children under 6 months calculate dose by weight

Weight kg	Dose mg	Use one of the following:		Age months/years
		Syrup 120 mg/5mL	Tablet 500 mg	
≥3.5–5 kg	48 mg	2 mL	–	≥ 1–3 months
≥ 5–7 kg	60 mg	2.5 mL	–	≥ 3–6 months
≥ 7–9 kg	96 mg	4 mL	–	≥ 6–12 months
≥ 9–14 kg	120 mg	5 mL	–	≥ 12 months–3 years
≥ 14–17.5 kg	180 mg	7.5 mL	–	≥ 3–5 years
≥ 17.5–35 kg	240 mg	10 mL	½ tablet	≥ 5–11 years
≥ 35–55 kg	500 mg	–	1 tablet	≥ 11–15 years
≥55kg and above	Up to 1000mg	–	Up to 2 tablets	≥ 15 years and adults

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Referral

- » All patients in non endemic areas.
- » Patients not responding to oral treatment within 48 hours.
- » Patients with *P. vivax* and *P. ovale* malaria.

10.8.1 Falciparum malaria, severe

B50.0

Description

Any one of the following is associated with a higher mortality and requires urgent referral (give initial quinine dose as below):

- » cerebral malaria (depressed level of consciousness or convulsions)
- » severe anaemia (haemoglobin < 6 g/dL)
- » jaundice
- » vomiting
- » shock
- » spontaneous bleeding
- » hypoglycaemia
- » respiratory distress

Drug treatment

- Quinine dihydrochloride, IV **or** IM, 15–20 mg/kg immediately as a single dose and refer urgently.
 - IM: dilute quinine dihydrochloride in sodium chloride 0.9% (NaCl) to between 60 and 100 mg/mL. Inject half the volume immediately as a single dose in each thigh (anterior lateral) to reduce pain and prevent sterile abscess formation.
 - IV: dilute with 5–10 mL/kg of dextrose 5% and administer **over 4 hours**

Weight kg	Dose mg	Injection 300 mg /mL	Use one of the following:		Age Months/years
			IM volume of NaCl	IV volume of dextrose 5%	
≥ 9– 11 kg	150	0.5 mL	2 mL	75 mL	≥ 12–18 months
≥ 11–14 kg	200	0.7 mL	2.5 mL	100 mL	≥ 18 months–3 years
≥ 14–17.5 kg	250	0.8 mL	3 mL	125 mL	≥ 3–5 years
≥ 17.5–25 kg	350	1.2 mL	4.5 mL	175 mL	≥ 5–7 years
≥ 25–35 kg	500	1.7 mL	7.5 mL	250 mL	≥ 7–11 years
≥ 35–55 kg	700	2.3 mL	10 mL	350 mL	≥ 11–15 years
≥ 55kg and above	900	3 mL	10 mL	450 mL	≥ 15 years and adults

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Due to evolving resistance patterns in South Africa, refer to the most recent Malaria Treatment Guidelines from the Department of Health for the most suitable management in the various endemic areas. As these guidelines are updated regularly, the most recently updated guidelines should be followed.

Referral

Urgent

- » Features of severe malaria.
- » All children less than 1 year.
- » Pregnant women, give dose of medication prior to referral.

10.8.2 Malaria, prophylaxis (Self provided care)

In the high-risk malaria areas from September to May in South Africa, malaria prophylaxis should be used, together with preventive measures against mosquito bites. State facilities do not provide prophylactic therapy. It is recommended that persons intending to travel to high-risk areas take the relevant prophylactic therapy.

Preventative measures against mosquito bites include:

- » use of treated mosquito nets, screens, coils or pads
- » application of insect repellent to exposed skin and clothing
- » wearing long sleeves, long trousers and socks if outside between dusk and dawn, as mosquitoes are most active at this time
- » visiting endemic areas only during the dry season

! CAUTION !

Pregnant women and children under 5 years should avoid visiting malaria-endemic areas, as they are more prone to the serious complications of malaria

Refer to National Malaria Guidelines.

10.9 Measles

B05.9

Note: notifiable condition.

Case definition

- » Fever
- and**
- » Maculopapular (blotchy) rash
- and**
- » Cough or coryza (runny nose) or conjunctivitis

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Inform the local EPI co-ordinator about all cases of suspected measles, (i.e. which fulfil the case definition criteria). Send clotted blood and urine to confirm (or exclude) a diagnosis of measles.

Description

A viral infection that is especially dangerous in malnourished children or in children who have other diseases such as TB or HIV/AIDS.

Initial clinical features occur 7–14 days after contact with an infected individual.

These include:

- » symptoms and signs of a cold or flu
- » fever
- » diarrhoea
- » conjunctivitis which may be purulent
- » cough, bronchitis and otitis media

After 2–3 days a few tiny white spots like salt grains appear in the mouth (Kopliks' spots)

The skin rash appears 1–2 days later and lasts about 5 days and:

- » usually starts behind the ears and on the neck
- » then on the face and body
- » thereafter, on the arms and legs

Secondary bacterial infection (bronchitis, bronchopneumonia, otitis media) may occur, especially in children with poor nutrition or other concomitant conditions.

General measures

- » Isolate the patient to prevent spread.

Drug treatment

All children under five years of age with measles should be given an extra dose of vitamin A unless the last dose received within a month:

- Vitamin A (retinol), oral, as a single dose
 - children 6 – 12 months: 100 000 IU
 - children more than 12 months: 200 000 IU

Give the first dose immediately. If the child is sent home, the caregiver should be given a second dose to take home, which should be given the following day.

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For fever above 38.5°C (axillary), pain, or a history of febrile convulsions:

- **Paracetamol**, oral, 15 mg/kg/dose 4–6 hourly when required to a maximum of 4 doses per 24 hours
 - In children under 6 months calculate dose by weight

Weight kg	Dose mg	Use one of the following:		Age months/years
		Syrup 120 mg/5mL	Tablet 500 mg	
≥3.5–5 kg	48 mg	2 mL	–	≥ 1–3 months
≥ 5–7 kg	60 mg	2.5 mL	–	≥ 3–6 months
≥ 7–9kg	96 mg	4 mL	–	≥ 6–12 months
≥ 9–14 kg	120 mg	5 mL	–	≥ 12 months–3 years
≥ 14–17.5 kg	180 mg	7.5 mL	–	≥ 3–5 years
≥ 17.5–35 kg	240 mg	10 mL	½ tablet	≥ 5–11 years
≥ 35–55 kg	500 mg	–	1 tablet	≥ 11–15 years
≥55kg and above	Up to 1 000mg	–	Up to 2 tablets	≥ 15 years and adults

Children with diarrhoea:

Treat dehydration according to Acute diarrhoea in children (Section 2.8.1)

Children with pneumonia or otitis media:

- Amoxicillin, oral, 25–30 mg/kg/dose 8 hourly for 5 days

Weight kg	Dose mg	Use one of the following:			Age months/ years
		Syrup		Capsule 250 mg	
		125 mg/ 5mL	250 mg/ 5mL		
≥ 2–2.5 kg	62.5 mg	2.5 mL	–	–	–
≥ 2.5–3.5 kg	100 mg	4 mL	2 mL	–	Birth to 1 month
≥ 3.5–5 kg	125 mg	5 mL	2.5 mL	–	≥ 1–3 months
≥ 5–7 kg	175 mg	7 mL	3.5 mL	–	≥ 3–6 months
≥ 7–11 kg	250 mg	10 mL	5 mL	1 capsule	≥ 6–18 months
≥ 11–14 kg	375 mg	15 mL	7.5 mL	–	≥ 18 months–5 years
≥ 14–55 kg	500 mg	–	10 mL	2 capsules	≥ 5–15 years

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Penicillin–allergic patients:

- Erythromycin, oral, 10–15 mg/kg/dose 6 hourly

Weight kg	Dose mg	Use one of the following:		Age months / years
		Syrup 125 mg / 5 mL	Tablet 250 mg	
≥ 2.5–3.5 kg	35 mg	1.4 mL	–	Birth–1 month
≥ 3.5–5 kg	50 mg	2 mL	–	≥ 1–3 months
≥ 5–7 kg	75 mg	3 mL	–	≥ 3–6 months
≥ 7–9 kg	100 mg	4 mL	–	≥ 6–12 months
≥ 9–11 kg	125 mg	5 mL	–	≥ 12–18 months
≥ 11–14 kg	150 mg	6 mL	–	≥ 18 months–3 years
≥ 14–17.5	200 mg	8 mL		≥ 3–5 years
≥ 17.5–25 kg	250 mg	10 mL	1 tablet	≥ 5–7 years
≥ 25–35 kg	375 mg	15 mL	–	≥ 7–11 years
≥ 35 kg and above	500 mg	–	2 tablets	≥ 11 years and adults

Purulent conjunctivitis:

- Chloramphenicol, 1%, ophthalmic ointment 8 hourly into lower conjunctival sac

Referral

- » All adults
- » Children under 6 months
- » Children who are malnourished or immunocompromised, or who have TB
- » Where complications are present. These include:
 - stridor/croup
 - pneumonia
 - dehydration
 - neurological complications
 - severe mouth and eye complications

Provide emergency treatment, if needed, before referral.

10.10 Meningitis

(See Chapter 15 - Central nervous system)

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10.11 Mumps

B26.9

Description

Incubation period: 14–21 days

A viral infection primarily involving the salivary glands.

Signs and symptoms:

- » fever
- » pain on opening the mouth or eating
- » about two days later a tender swelling appears below the ears at the angle of the jaw
- » often first on one side and later on the other
- » the swelling disappears in about 10 days

General measures

- » Bed rest during febrile period.
- » Isolate until swelling subsides.
- » Advise on oral hygiene.
- » Recommend plenty of fluids and soft food during acute stage.
- » Patient is infectious from 3 days before parotid swelling to 7 days after it started. Children may return to school 1 week after initial swelling

Drug treatment

- **Paracetamol**, oral, 15 mg/kg/dose 4–6 hourly when required to a maximum of 4 doses per 24 hours
 - In children under 6 months calculate dose by weight

Weight kg	Dose mg	Use one of the following:		Age months/years
		Syrup 120 mg/5mL	Tablet 500 mg	
≥3.5–5 kg	48 mg	2 mL	–	≥ 1–3 months
≥ 5–7 kg	60 mg	2.5 mL	–	≥ 3–6 months
≥ 7–9kg	96 mg	4 mL	–	≥ 6–12 months
≥ 9–14 kg	120 mg	5 mL	–	≥ 12 months–3 years
≥ 14–17.5 kg	180 mg	7.5 mL	–	≥ 3–5 years
≥ 17.5–35 kg	240 mg	10 mL	½ tablet	≥ 5–11 years
≥ 35–55 kg	500 mg	–	1 tablet	≥ 11–15 years
≥55kg and above	Up to 1 000mg	–	Up to 2 tablets	≥ 15 years and adults

Referral

- » Abdominal pain (to exclude pancreatitis)
- » Painful testes or orchitis
- » Suspected meningo-encephalitis

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10.12 Rubella (German measles)

B06.9

Description

Incubation period: 14–21 days.

A viral infection with skin lesions that is less severe than measles and lasts only 3–4 days.

A maculopapular rash starts on the face spreading to the trunk, arms and legs. It usually fades as it spreads.

Note:

If cough, coryza or conjunctivitis are also present, it is essential to exclude measles – See case definition of measles.

Clinical features include:

- » mild rash
- » swollen and tender lymph nodes behind the ears (suboccipital)
- » in adults, a small joint arthritis may occur

Note:

Infection during the first or second trimester of pregnancy may lead to severe permanent deformities in the baby. Family should be counselled regarding these risks and termination of pregnancy should be offered in all cases.

General measures

Bed rest if needed.

Isolate from pregnant women for seven days after onset of the rash.

Drug treatment

- **Paracetamol**, oral, 15 mg/kg/dose 4–6 hourly when required to a maximum of 4 doses per 24 hours
 - In children under 6 months calculate dose by weight

Weight kg	Dose mg	Use one of the following:		Age months/years
		Syrup 120 mg/5mL	Tablet 500 mg	
≥3.5–5 kg	48 mg	2 mL	–	≥ 1–3 months
≥ 5–7 kg	60 mg	2.5 mL	–	≥ 3–6 months
≥ 7–9kg	96 mg	4 mL	–	≥ 6–12 months
≥ 9–14 kg	120 mg	5 mL	–	≥ 12 months–3 years
≥ 14–17.5 kg	180 mg	7.5 mL	–	≥ 3–5 years
≥ 17.5–35 kg	240 mg	10 mL	½ tablet	≥ 5–11 years
≥ 35–55 kg	500 mg	–	1 tablet	≥ 11–15 years
≥55kg and above	Up to 1 000mg	–	Up to 2 tablets	≥ 15 years and adults

Referral**Urgent**

- » Pregnant women with rubella
- » Pregnant women who have been in contact with a patient with rubella

10.13 Schistosomiasis

B65.9

Description

A parasitic infestation with:

- » *Schistosoma haematobium*: primarily involves the bladder and renal tract, or
- » *Schistosoma mansoni*: primarily involves the intestinal tract.

Infestation occurs during washing, bathing or paddling in water harbouring snails shedding this parasite.

Clinical features vary with the location of the parasite.

Most cases are asymptomatic.

Acute schistosomiasis, consisting of a non-specific febrile illness with marked eosinophilia, may occur in non-immunes several weeks following initial exposure, especially with *Schistosoma mansoni* infection.

Chronic schistosomiasis may present with local or systemic complications due to fibrosis, including urinary tract obstruction with ensuing renal failure, portal hypertension or other organ involvement.

	<i>Schistosoma haematobium</i>	<i>Schistosoma mansoni</i>
Clinical features	<ul style="list-style-type: none"> » blood in the urine » recurrent cystitis » other urinary symptoms 	<ul style="list-style-type: none"> » diarrhoea with blood and mucus in the stools » colicky abdominal pain » enlarged liver and spleen
Diagnosis	<ul style="list-style-type: none"> » eggs in urine or stool on microscopy » rectal biopsy 	

General measures

If bilharzia is endemic, educate the community to avoid contact with contaminated water.

Do not urinate or pass stools near water used for drinking, washing or bathing.

Do not swim in contaminated water.

Collect water from rivers and dams at sunrise when the risk of infestation is lowest.

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Boil all water before use

Drug treatment

In endemic areas patients with haematuria should be treated empirically. Exclude possible glomerulonephritis: raised blood pressure, oedema and shortness of breath. – See section 8.3: Glomerular Diseases (GN)

In non-endemic areas treatment should be given only if eggs of *S. haematobium* or *S. mansoni* are found in the urine/faeces.

- Praziquantel, oral, 40 mg/kg as a single dose

Weight kg	Dose mg	Tablet 600 mg	Age years
≥ 10–17.5 kg	600 mg	1 tablet	≥ 2–5 years
≥ 17.5–25 kg	900 mg	1½ tablets	≥ 5–7 years
≥ 25–35 kg	1 200 mg	2 tablets	≥ 7–11 years
≥ 35–55 kg	1 800 mg	3 tablets	≥ 11–15 years
≥ 55 kg and above	3 000 mg	5 tablets	Adults

Referral

- » Children under 2 years
- » Ongoing urinary tract symptoms
- » Signs of bleeding disorders or glomerulonephritis

10.13 Typhoid fever

(See Chapter 2 - Gastrointestinal conditions)

10.14 Tuberculosis

(See Chapter 17 - Respiratory conditions)

Chapter 11: Human immunodeficiency virus and acquired immunodeficiency syndrome (HIV AND AIDS)

Human immunodeficiency virus infection in adults

- 11.1 Antiretroviral therapy, adults**
- 11.2 Opportunistic infections, prophylaxis in adults**
 - 11.2.1 TB chemoprophylaxis**
- 11.3 Opportunistic infections, treatment in adults**
 - 11.3.1 Aphthous ulcers in HIV infection**
 - 11.3.2 Candidiasis, oral**
 - 11.3.3 Candida oesophagitis**
 - 11.3.4 Diarrhoea, HIV associated**
 - 11.3.5 Eczema, seborrhoeic**
 - 11.3.6 Fungal nail infections**
 - 11.3.7 Fungal skin infections**
 - 11.3.8 Gingivitis, acute, necrotising, ulcerative**
 - 11.3.9 Herpes simplex ulcers, chronic**
 - 11.3.10 Herpes zoster (Shingles)**
 - 11.3.11 Meningitis, cryptococcal**
 - 11.3.12 Papular pruritic eruption**
 - 11.3.13 Pneumonia, bacterial**
 - 11.3.14 Pneumonia, pneumocystis**
 - 11.3.15 Toxoplasmosis**
 - 11.3.16 Tuberculosis (TB)**

Human immunodeficiency virus infection in children

- 11.4 Antiretroviral therapy, children**
- 11.5 Opportunistic infections, prophylaxis in children**
 - 11.5.1 Immunisation**
 - 11.5.2 TB chemoprophylaxis**
- 11.6 Opportunistic infections, treatment in children**
 - 11.6.1 Candidiasis, oral (thrush), recurrent**
 - 11.6.2 Candida oesophageal**
 - 11.6.3 Diarrhoea**
 - 11.6.4 Pneumonia**
 - 11.6.5 Measles and chickenpox**

- 11.6.6 Skin conditions**
- 11.6.7 Tuberculosis (TB)**
- 11.7 Developmental delay or deterioration**
- 11.8 Anaemia**
- 11.9 Supportive care**
- 11.10 HIV and kidney disease**

Chapter 11

Human immunodeficiency virus and acquired immunodeficiency syndrome

Human immunodeficiency virus infection in adults

B33.3

Description

HIV enters lymphocytes and replicates, leading to progressive destruction of the immune system, until the infected person becomes unable to fight infection and develops the syndrome of **A**cquired **I**mmune **D**eficiency **S**yndrome (AIDS).

During the course of the initial HIV infection antibodies are developed to the virus and the person changes from HIV negative to HIV positive. This is known as seroconversion or primary infection and is characterised by:

- » glandular fever type illness
- » maculopapular rash
- » small orogenital ulcers

South African Adapted WHO staging system for HIV infection and disease in adults and adolescents

Clinical stage I

- » Asymptomatic
- » Persistent generalized lymphadenopathy

Clinical stage II

- » Unexplained moderate weight loss (less than 10% of presumed or measured body weight)
- » Recurrent respiratory tract infections (sinusitis, otitis media and pharyngitis)
- » Herpes zoster (shingles)
- » Angular cheilitis
- » Recurrent oral ulceration
- » Papular pruritic eruption
- » Seborrheic dermatitis
- » Fungal nail infections

Clinical stage III*

- » Unexplained severe weight loss (more than 10% of presumed or measured body weight)
- » Unexplained chronic diarrhoea for longer than 1 month
- » Unexplained persistent fever (above 37.5°C intermittent or constant for longer than 1 month)
- » Persistent oral candidiasis (thrush)
- » Oral hairy leukoplakia
- » Tuberculosis (pulmonary and extrapulmonary)
- » Severe recurrent bacterial infections (such as pneumonia, empyema, pyomyositis, bone or joint infection, meningitis or bacteraemia)
- » Acute necrotizing ulcerative stomatitis, gingivitis or periodontitis
- » Unexplained anaemia (< 8 g/dL), neutropaenia (< 0.5 × 10⁹/L) and/or chronic thrombocytopaenia (< 50 × 10⁹/L)

Chapter 11

Human immunodeficiency virus and acquired immunodeficiency syndrome

Clinical stage IV*

- » HIV wasting syndrome
- » Pneumocystis pneumonia
- » Recurrent severe bacterial pneumonia
- » Chronic herpes simplex infection (orolabial, genital or anorectal of more than one months duration or visceral at any site)
- » Oesophageal candidiasis (or candidiasis of trachea, bronchi or lungs)
- » Kaposi's sarcoma
- » Cytomegalovirus infection (retinitis or infection of other organs)
- » Central nervous system toxoplasmosis
- » HIV encephalopathy
- » Extrapulmonary cryptococcosis including meningitis
- » Disseminated non-tuberculous mycobacterial infection
- » Progressive multifocal leukoencephalopathy
- » Chronic cryptosporidiosis
- » Chronic Isosporiasis
- » Disseminated mycosis (extrapulmonary histoplasmosis or coccidiomycosis)
- » Recurrent septicaemia (including non-typhoidal *Salmonella*)
- » Lymphoma (cerebral or B cell non-Hodgkin)
- » Invasive cervical carcinoma
- » Atypical disseminated leishmaniasis
- » Symptomatic HIV-associated nephropathy or symptomatic HIV-associated cardiomyopathy

* Note that TB has been moved to Stage 3 in the South African Adapted WHO Staging

Diagnosis

- » Adequate pre- and post-test counselling must be provided
- » Ensure patient confidentiality
- » HIV in adults must be confirmed with a second test. This can either be two rapid tests, using kits from different manufacturers or with a laboratory test, usually ELISA
- » There is a window period of up to 3 months in which antibodies are not detected by blood tests. This is the time period between becoming infected and the appearance of antibodies, which are detectable by blood tests

General measures

- » Patients and their families must be supported and encouraged to join support or peer groups.
- » Counsel patients on preventive methods of reducing the spread of the disease
 - use condoms during sexual intercourse
 - seek early treatment for sexually transmitted infections
 - safe handling of blood spills

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- Multivitamin, oral, once daily
 - Do not exceed the dose
 - Do not give with vitamin B complex

Proposed content of formulation:

vitamin A: 700–800 mcg,
vitamin D: 200–300 units
vitamin E: 10–15 mg
ascorbic acid: (vitamin C) 70–90 mg
folic acid: 200–400 mcg
thiamine (vitamin B₁): 1.4–1.5 mg
niacin: 10–20 mg
riboflavin (vitamin B₂): 1.4–1.6 mg
vitamin B₆: 1.9mg–2.5 mg
vitamin B₁₂: 1–3 mcg
iron: 4–9 mg
zinc: 5–15 mg
selenium: 55–65 mcg
copper: 1.5–2 mg

11.1 Antiretroviral therapy, adults

Only facilities accredited as CCMT service points may initiate long term ARV therapy.

For detail of criteria for initiation of ART, consult the latest National Clinical Guidelines for the Management of HIV and AIDS in Adults.

What follows in the text below is only a summary, which may not be applicable to patients with complications.

! CAUTION !

Anti-retroviral drugs frequently interact with TB drugs.
Consult the latest National Clinical Guidelines for the management of HIV and AIDS in adults.

All HIV-infected patients must have a CD4 count requested and WHO clinical staging done. The CD4 count should be repeated every 6 months. All eligible patients must be referred to the nearest CCMT service point for antiretroviral therapy. The patients should be counselled about antiretroviral therapy prior to referral.

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Regimen 1

- Stavudine, oral, 30 mg 12 hourly
- or
- For overweight patients with a BMI >28:
- Zidovudine, oral, 300 mg 12 hourly

and

- Lamivudine, oral, 150 mg 12 hourly

plus

- Efavirenz, oral, 600 mg at night
- or
- For women of child-bearing potential:
- Nevirapine, oral, 200 mg daily for the first 2 weeks increasing to 200 mg 12 hourly thereafter

Regimen 2

- Zidovudine, oral, 300 mg 12 hourly
- and
- Didanosine, oral, 400 mg once daily on an empty stomach
 - If < 60 kg: 250 mg once daily

plus

- Lopinavir/ritonavir 400/100 mg, oral, 12 hourly

Patients on long term ARV treatment, who become pregnant, should be referred back to their CCMT site.

Patients with a positive hepatitis B surface antigen:

The combination of tenofovir 300 mg daily and lamivudine 300 mg daily will replace:

- stavudine and lamivudine in regimen 1
- zidovudine and didanosine in regimen 2

Note:

In patients with hepatitis B, do not stop tenofovir and lamivudine as this can cause a severe flare of hepatitis B. Even if patients fail regimen 1 and commence regimen 2, continue with tenofovir and lamivudine, replacing zidovudine and didanosine.

Tenofovir may be substituted for stavudine if lipo-atrophy occurs.

Tenofovir and lamivudine are recommended to substitute for stavudine and lamivudine or zidovudine and didanosine if patients develop symptomatic hyperlactataemia.

11.2 Opportunistic infections, prophylaxis in adults

Z29.2

Primary prophylaxis with cotrimoxazole prevents many infections, e.g.:

- Pneumocystis pneumonia
- toxoplasmosis
- bacterial pneumonia
- bacteraemia
- isosporiasis

Indications for primary prophylaxis:

- » WHO Clinical stage II, III or IV for HIV infection and disease in adults and adolescents
- » CD4 count less than 200 cells/microL

Prophylaxis may be discontinued if the CD4 count increases on antiretroviral therapy to more than 200 cells/microL for at least 6 months.

- Cotrimoxazole, oral, 160/800 daily.

Note:

Cotrimoxazole hypersensitivity is common and usually presents as a maculopapular rash. If there are systemic features or mucosal involvement associated with the use of cotrimoxazole, the drug must be immediately and permanently stopped and the patient referred to hospital.

If a patient is referred back on antiretroviral agents, and the CD4 count has risen to more than 200 cells/microL, prophylaxis with cotrimoxazole can be stopped.

11.2.1 TB chemoprophylaxis

Patients with HIV infection are more susceptible to TB infection than HIV-negative patients.

The indication for preventive therapy is a Mantoux 5 mm or larger or a recent TB contact. Initiate only once active TB is excluded.

- Isoniazid, oral, 300 mg daily for 6 months.
 - Educate patients on the symptoms of hepatotoxicity and the need to be followed up monthly.
 - Instruct patient to present early if these symptoms arise.
- Pyridoxine, oral, 25 mg once daily

Note:

Only some primary care facilities are able to do Mantoux testing and exclude TB reliably. Consult with local TB Programme managers.

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11.3 Opportunistic infections, treatment in adults

11.3.1 Aphthous ulcers in HIV infection

B20.3

Description

Painful ulcers in the oropharynx. Minor ulcers (<1 cm diameter) usually heal within 2 weeks. Major ulcers (>1 cm diameter) are very painful, often very deep and persist. Major ulcers generally resolve rapidly on antiretroviral therapy. Herpes simplex, histoplasmosis and mycobacteria may also present with major mucosal ulcers

Drug treatment

Minor aphthous ulcers:

- Choline salicylate/ cetalkonium chloride 8.7/0.01% oral gel, applied 6 hourly until healed

Referral

- » Major aphthous ulcers for further diagnostic evaluation

11.3.2 Candidiasis, oral

B20.4

See section 1.2: Candidiasis, oral (thrush)

11.3.3 Candida oesophagitis

B20.4

Description

Infection of the oesophagus with candida, a fungus causing oral thrush. Occurs in patients with oral thrush who have pain or difficulty on swallowing. (See section 1.2: Candidiasis, oral (thrush))

General measures

- » Maintain hydration

Drug treatment

- Fluconazole, oral, 200 mg daily for 14 days
Note: Women of child-bearing age should use an effective contraceptive

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Referral

- » Inability to swallow
- » Frequent relapses
- » Poor response to fluconazole
- » For ARV treatment

11.3.4 Diarrhoea, HIV associated

A09

Description

Diarrhoea that persists for longer than 2 weeks. Often associated with wasting. Stool for ova, cysts and parasites should be requested in all cases.

Drug treatment

If stool is negative for parasites or shows *Cryptosporidium*:

- Loperamide, oral, 2 mg as required
 - Maximum 8 mg daily

If stool shows *Isospora belli*:

- Cotrimoxazole, oral, 1920 mg (4 tablets) 12 hourly for 10 days followed by 960 mg (two tablets) daily

Referral

- » Stool contains blood or mucus
- » All cases for consideration for ARV treatment

11.3.5 Eczema, seborrhoeic

L30.9

See section 5.7.3: Dermatitis, seborrhoeic

11.3.6 Fungal nail infections

B37.2

This is common in HIV infected patients and can involve multiple nails. Treatment is not generally recommended because it is mostly of only cosmetic importance and therefore the risk of systemic therapy is not warranted. It generally resolves when patient is on antiretroviral therapy.

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Severe pain can occur after shingles has healed (post-herpetic neuralgia).

Drug treatment

If fresh vesicles are present:

- Aciclovir, oral, 800 mg five times daily (4 hourly missing the middle of the night dose) for 7 days.

If secondary infection is present:

- Erythromycin, oral, 500 mg 6 hourly

For pain relief

- Paracetamol, oral, 1 000 mg 6 hourly when needed

plus

If inadequate pain relief

Add:

- Tramadol, oral, 50 mg 6 hourly (Doctor initiated)

For prolonged pain occurring after shingles has healed (post herpetic neuralgia), or if pain not responding to paracetamol and tramadol:

- Amitriptyline, oral, 25 mg at night.
 - Increase dose to 50 mg after two weeks if needed
 - Increase further to 75 mg after a further two weeks if needed.

Referral

- » Involvement of the eye
- » Disseminated disease (many vesicles extending beyond the main area)
- » Features of meningitis (headache and neck stiffness)
- » Severe post-herpetic neuralgia not responding to amitriptyline

11.3.11 Meningitis, cryptococcal

B45.1

Description

Fungal meningitis occurring in advanced HIV infection.

Presents with headache, often lasting for weeks.

Neck stiffness is often absent.

Decreased level of consciousness, confusion and fever are common.

Drug treatment

All patients should be treated for cryptococcal meningitis at hospital level.

Patients may be down referred for secondary prophylaxis treatment.

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Secondary prophylaxis

After completion of fluconazole 400 mg daily for 8 weeks:

- Fluconazole, oral, 200 mg daily for a minimum of 12 months.
 - Continue with fluconazole if the CD4 count does not increase to >200 cells/microL on antiretroviral therapy.

Referral

- » All patients for initial management in hospital
- » For ARV treatment

11.3.12 Papular pruritic eruption

L30.9

Description

Itchy inflamed papules at different stages of evolution. Healed lesions are often hyperpigmented. The itch is difficult to manage. It may flare after starting antiretroviral therapy, but generally improves as the CD4 count increases. It is essential to exclude scabies.

General measures

- » Minimise exposure to insect bites, e.g. by regularly dipping pets.

Drug treatment

- Chlorpheniramine, oral, 4 mg 8 hourly
- Hydrocortisone acetate 1% cream, applied twice daily for 7 days.
 - Apply sparingly to the face.

11.3.13 Pneumonia, bacterial

J15

See section 17.3: Respiratory infections

11.3.14 Pneumonia, pneumocystis

B20.6

See section 17.3: Respiratory infections

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11.3.15 Toxoplasmosis

B58.9

Initial diagnosis can only be made at hospital level.

- Cotrimoxazole, oral, 320/1 600 mg 12 hourly for 4 weeks,
 - Then 160/ 800 mg 12 hourly for 12 weeks.

Secondary prophylaxis

- Cotrimoxazole, oral 160/ 800 mg daily
 - Continue until the CD4 count has risen to >200 cells/microL on antiretroviral therapy.

Referral

- » For ARV treatment

11.3.16 Tuberculosis (TB)

B20.0

See section 17.3: Respiratory infections.

Human immunodeficiency virus infection in children

B33.3

Description

HIV enters lymphocytes and replicates, leading to progressive destruction of the immune system (CD4 cells). As the disease progresses, the CD4 cells decrease in number and quality making the HIV-infected person at risk of infections and other diseases e.g. cancers. The most advanced stage of disease is Acquired Immunodeficiency Syndrome (AIDS).

WHO staging of HIV and AIDS for children with confirmed HIV infection

Clinical Stage 1

- » Asymptomatic
- » Persistent generalised lymphadenopathy

Clinical Stage 2

- » Unexplained persistent hepatosplenomegaly
- » Papular pruritic eruptions
- » Extensive wart virus infection
- » Extensive molluscum contagiosum
- » Fungal nail infections

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- » Recurrent oral ulcerations
- » Unexplained persistent parotid enlargement
- » Lineal gingival erythema
- » Herpes zoster
- » Recurrent or chronic upper respiratory tract infections (otitis media, otorrhoea, sinusitis, tonsillitis)

Clinical Stage 3

- » Unexplained moderate malnutrition not adequately responding to standard therapy
- » Unexplained persistent diarrhoea (14 days or more)
- » Unexplained persistent fever (above 37.5°C intermittent or constant, for longer than one month)
- » Persistent oral candidiasis (after the first 6 weeks of life)
- » Oral hairy leukoplakia
- » Acute necrotising ulcerative gingivitis or periodontitis
- » Lymph node tuberculosis
- » Pulmonary TB
- » Severe recurrent presumed bacterial pneumonia
- » Symptomatic lymphoid interstitial pneumonitis
- » Chronic HIV-associated lung disease including bronchiectasis
- » Unexplained anaemia (< 8 g/dL), neutropaenia (<0.5x10⁹/L) and/or chronic thrombocytopaenia (< 50x10⁹/L)

Clinical Stage 4

- » Unexplained severe wasting or severe malnutrition not responding to standard therapy
- » Pneumocystis pneumonia
- » Recurrent severe bacterial infections (such as empyema, pyomyositis, bone or joint infection or meningitis but excluding pneumonia)
- » Chronic herpes simplex infection; (orolabial or cutaneous of more than one month's duration)
- » Extrapulmonary tuberculosis
- » Kaposi sarcoma
- » Oesophageal candidiasis (or candida of trachea, bronchi or lungs)
- » Central nervous system toxoplasmosis (after one month of life)
- » HIV encephalopathy
- » Cytomegalovirus infection: retinitis or cytomegalovirus infection affecting another organ with onset at age older than 1 month
- » Extrapulmonary cryptococcosis (including meningitis)
- » Disseminated endemic mycosis (extrapulmonary histoplasmosis, coccidiomycosis)
- » Chronic cryptosporidiosis
- » Chronic isosporiasis
- » Disseminated non-tuberculous mycobacteria infection
- » Cerebral or B cell non-hodgkin lymphoma
- » Progressive multifocal leukoencephalopathy
- » Symptomatic HIV-associated nephropathy or HIV-associated cardiomyopathy

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Diagnosis in children

Infant HIV testing (0–18 months)

- » Early HIV testing in infants exposed to HIV during pregnancy and/or breastfeeding is essential to optimise child survival because children can then access care, treatment and support as early as possible. HIV tests can never be 100% accurate. Therefore if HIV test results are discrepant with the clinical picture, repeat the HIV test.
- » Testing children younger than 18-months:
 - Virological testing using PCR is the test of choice.
 - After counselling and consent is obtained, test ALL HIV-exposed infants **at six weeks** of age using PCR.
 - **If an infant is symptomatic for HIV infection, do not wait until 6 weeks** to perform the PCR test. Perform the test and retrieve the result as a matter of urgency. If PCR test result is negative, consider other causes for symptoms.
 - If the PCR test was performed earlier than 4 weeks of age in an HIV-exposed child and the result is negative, repeat the PCR at 6 weeks of age to exclude HIV infection.
 - Up to 18 months, an antibody test could be falsely positive, because of the presence of the circulating antibodies from the mother. An antibody test cannot definitively diagnose HIV in this age group.
 - However, a negative antibody test in children under the age of 18 months can be helpful in excluding HIV infection in symptomatic children.
 - In an HIV-exposed, HIV PCR negative breastfed infant, repeat PCR 6 weeks after cessation of breastfeeding. If the cessation of breastfeeding happens after the child turns 18 months then an antibody test is done.
 - In an HIV-exposed, HIV PCR negative breastfed child becomes symptomatic for HIV infection, perform a repeat PCR.

Testing children older than 18 months:

- » At 18 months ALL HIV exposed children (PCR negative and positive) should be tested with an antibody test to confirm their HIV status to rule out false positive results and also to exclude a new infection
- » HIV antibody testing can be used to confirm HIV status in children older than 18 months as contained in the VCT policy
- » Testing should be done with counselling of parent/legal guardian/primary caregiver and, where appropriate, the child

Management of HIV infected children

All HIV positive children

All HIV positive children should receive standard preventative care, i.e.:

Immunisation – See chapter 15: Immunisation

Deworming – See section 2.1: Helminth infestation

Vitamin A – See section 3.3: Vitamin A deficiency

Chapter 11 **Human immunodeficiency virus and acquired immunodeficiency syndrome**

11.4 Antiretroviral therapy, children

!CAUTION!

Anti-retroviral drugs frequently interact with TB drugs.
Consult the latest National Guideline for the Management for HIV-infected children.

Eligibility for antiretroviral therapy

Patients must satisfy all the clinical and social criteria before being accepted for treatment.

Clinical Criteria

Consult the latest National Guideline for the Management for HIV-infected children.

Social criteria

- » At least one identifiable caregiver who is able to supervise the child for administering medication
 - All efforts should be made to ensure that the social circumstances of vulnerable children, e.g. orphans, are addressed so that they too can receive treatment.
- » These criteria are extremely important for the success of the program and need to be adhered to – the principle is that adherence to treatment must be at least probable.

Antiretroviral drug choices for children

Only facilities accredited as CCMT service points may initiate long term ARV therapy.

For detail of ARV therapy, consult the current National Guidelines.

What follows in the text below is only a summary, which may not be applicable to patients with complications.

	<u>Starting age under 3 years</u>
1 st Line	Stavudine (d4T) Lamivudine (3TC) Lopinavir/ritonavir (LPV/r)
2 nd Line	Zidovudine (AZT) Didanosine (ddl) Nevirapine (NVP) or Efavirenz (EFV)*
*Efavirenz if the child is over 3 years and > 10 kg; otherwise use nevirapine	
	<u>Starting age over 3 years and > 10 kg</u>
1 st Line	Stavudine (d4T) Lamivudine (3TC) Efavirenz (EFV)
2 nd Line	Zidovudine (AZT) Didanosine (ddl) Lopinavir/ritonavir (LPV/r)

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First line regimens

Option 1.1

Age birth to 3 years **or** < 10 kg

- Stavudine, oral, 1 mg/kg/dose 12 hourly

plus

- Lamivudine, oral, 4 mg/kg/dose 12 hourly

plus

- Lopinavir/ritonavir 80/20, oral, 230 mg/m²/dose of lopinavir component 12 hourly .
 - Administer with food.
 - A high-fat meal increases absorption, especially of the solution.
 - If co-administered with didanosine, didanosine should be given 1 hour before or 2 hours after lopinavir/ritonavir

Option 1.2

Age > 3 years **and** > 10 kg

- Stavudine, oral, 1 mg/kg/dose 12 hourly

plus

- Lamivudine, oral, 4 mg/kg/dose 12 hourly

plus

If < 40 kg

- Efavirenz, oral, 350 mg/m²/dose as a single daily dose

Second line regimens

Option 2.1

If previously on stavudine, lamivudine and lopinavir/ritonavir:

- Zidovudine, oral, 180–240 mg/ m²/dose 12 hourly after checking full blood count

plus

- Didanosine, oral, 12 hourly
 - < 8 months 100 mg/m²/dose
 - > 8 months 120 mg/m²/dose
 - Can be given as a single daily dose in older children.
 - Do not give simultaneously with other ARV medication.
 - Administer 2 hours before/after other ARV medication.

plus

If age < 3 years or < 10 kg

- Nevirapine, oral, 120 mg/m²/dose as a single daily dose for 2 weeks, then 12 hourly if no rash or severe side effects

or

If age > 3 years or > 10 kg

- Efavirenz, oral, 350 mg/m²/dose as a single daily dose

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Option 2.2

If previously on stavudine, lamivudine and efavirenz:

- Zidovudine, oral, 180–240 mg/ m²/dose 12 hourly

plus

- Didanosine, oral, 12 hourly
 - < 8 months 100 mg/m²/dose
 - > 8 months 120 mg/m²/dose
 - Can be given as a single daily dose in older children.
 - Do not give simultaneously with other ARV medication.
 - Administer 2 hours before/after other ARV medication.

plus

- Lopinavir/ritonavir 80/20, oral, 230 mg/m²/dose of lopinavir component 12 hourly
 - Administer with food.
 - A high-fat meal increases absorption, especially of the solution.
 - If co-administered with didanosine, didanosine should be given 1 hour before or 2 hours after lopinavir/ritonavir
 - Where TB treatment and lopinavir/ritonavir are given together seek expert advice on dosage adjustment

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Important side effects of ARVs requiring referral to/consultation with CCMT site:

	Continue ART with careful monitoring. Consider single drug replacement with expert advice.	Consider stopping treatment URGENTLY. Consult expert.
» Symptomatic hyperlactataemia/ » lactic acidosis	» lactate 2.5– 5 mmol/L	» lactate > 5 mmol/L or acidosis
» anaemia	» Hb = 7.0–9.9 g/dL	» Hb < 7 g/dL or cardiac failure
» neutropenia	» 0.4–1.2 X 10 ⁹ /L	» < 0.4 X 10 ⁹ /L
» increase liver enzymes and hepatitis	» ≤ 9.9 X upper normal limit	» ≥ 10.0 X upper normal limit
» increased serum triglycerides	» 5.65 – 8.48 mmol/L	» ≥ 8.49 mmol/L
» increased LDL cholesterol	» 3.35–4.9 mmol/L	» ≥ 4.91 mmol/L
» skin reactions	» diffuse maculo-papular rash, or » dry desquamation	» vesiculation, or » ulcers, or » exfoliative dermatitis, or » Stevens-Johnson syndrome, or » erythema multiforme, or » moist desquamation, or with elevated ALT or AST
» peripheral neuropathy » myopathy » abdominal pain » nausea and vomiting » pancreatitis » headache » fatigue » sedative effect » sleep disturbance » confusion » abnormal thinking » probably teratogenic	» clinical evaluation: Discuss all cases with a clinician with antiretroviral experience, before interrupting therapy	

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Knowledge about HIV and AIDS is constantly being updated. Practices may require changes based on the latest information.

- Multivitamin syrup (with the recommended daily allowance of zinc), oral, daily
 - Less than 6 months 2.5 mL
 - 6 months – 5 years 5 mL
 - over 5 years 10 mL

11.5 Opportunistic infections, prophylaxis in children

Z29.2

Description

Primary prophylaxis with cotrimoxazole prevents many infections, e.g.:

- » Pneumocystis pneumonia
- » toxoplasmosis
- » bacterial pneumonia
- » bacteraemia
- » isosporiasis

Do a PCR test at 6 weeks (or earlier if child is symptomatic).

For long term prophylaxis if PCR is positive or until PCR is known to be negative:

- Cotrimoxazole, oral, once daily

Age	Weight	Dose
≥ 6 weeks – 2 months	≥ 2.5–5 kg	2.5 mL
≥ 2 – 12 months	≥ 5–10 kg	5 mL
≥ 12 – 24 months	≥ 10–15 kg	7.5 mL
≥ 24–60 months	≥ 15–20 kg	10 mL

When can prophylaxis be stopped?

When there is evidence of immune reconstitution, i.e. in a child 18 months or older with a CD4 count of > 20% on more than 2 occasions no less than 3 months apart. If CD4 count is not available consider stopping cotrimoxazole only after 6 months of good ART adherence with clinical evidence of immune reconstitution. Cotrimoxazole may be of benefit even with clinical improvement. Mother no longer breastfeeding.

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11.5.1 Immunisation

Z26.9

Follow the normal immunisation schedule. Siblings should also be fully immunised.

Do not give BCG to children with symptomatic HIV.

See chapter 13: Immunisation

11.5.2 TB Chemoprophylaxis

B20.0

See section 17.3.9: Tuberculosis

11.6 Opportunistic infections, treatment in children

11.6.1 Candidiasis, oral (thrush), recurrent

B20.4

- Nystatin suspension, oral, 100 000 IU/mL, 0.5 mL after each feed.
or
Gentian violet, 0.5%, topical aqueous solution, applied to the inside of the mouth three times daily
 - Continue for 48 hours after cure.

If there is oral candidiasis and the child cannot swallow, this indicates the presence of oesophageal candidiasis – see below.

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11.6.2 Candidiasis, oesophageal

B20.4

- Fluconazole, oral, 3 mg/kg per day as a single daily dose for 21 days.
 - Maximum dose 200 mg a day.

Weight kg	Dose mg	Use one of the following:		Age Months/years
		Suspension 50 mg/5mL	Capsule 50 mg	
≥ 2.5–3.5 kg	10 mg	1 mL	–	≥ Birth–1 month
≥ 3.5–5.5 kg	15 mg	1.5 mL	–	≥ 1–3 months
≥ 5–7 kg	25 mg	2.5 mL	–	≥ 3–6 months
≥ 7–9 kg	30 mg	3 mL	–	≥ 6–12 months
≥ 9–11 kg	40 mg	4 mL	–	≥ 12–18 months
≥ 11–14 kg	50 mg	5 mL	1 capsule	≥ 18 months–3 years
≥ 14–25 kg	75 mg	7.5 mL	–	≥ 3–7 years
≥ 25–35 kg	100 mg	10 mL	2 capsules	≥ 7–11 years
≥ 35–55 kg	150 mg	15 mL	3 capsules	≥ 11–15 years

11.6.3 Diarrhoea

B23.8

See section 2.8: Diarrhoea

11.6.4 Pneumonia

B23.8

See section 17.3: Respiratory infections

11.6.5 Measles and chickenpox

B20.7

» Refer all patients

11.6.6 Skin conditions

B20.7

These are common and include scabies, seborrhoeic eczema and others. See chapter 5: Skin conditions.

If no response to care as directed in the chapter, refer.

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11.6.7 Tuberculosis (TB)

B20.0

Manage children with TB according to the national TB guidelines. See section 17.3.9: Tuberculosis

TB should be considered earlier in non-resolving pneumonias. Tuberculin tests are often not reliable and a negative test does not exclude TB. If TB is suspected but cannot be proven, refer for diagnosis.

11.7 Developmental delay or deterioration

B23.8

» Refer for assessment

11.8 Anaemia

B23.8

See section 3.1: Anaemia

11.9 Supportive Care

Respite care in hospital or hospice or help in the home by community health workers, etc. can provide relief from the burden of nursing a dying family member and providing care at the same time.

Counselling, listening, caring and loving can provide relief from grief and bereavement.

Pain relief

See section 20.2: Chronic non-cancer pain.

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Fever relief

» Tepid sponging

and/or

- **Paracetamol**, oral, 15 mg/kg/dose 4–6 hourly when required to a maximum of 4 doses per 24 hours
 - In children under 6 months calculate dose by weight

Weight kg	Dose mg	Use one of the following:		Age months/years
		Syrup 120 mg/5mL	Tablet 500 mg	
≥3.5–5 kg	48 mg	2 mL	–	≥ 1–3 months
≥ 5–7 kg	60 mg	2.5 mL	–	≥ 3–6 months
≥ 7–9kg	96 mg	4 mL	–	≥ 6–12 months
≥ 9–14 kg	120 mg	5 mL	–	≥ 12 months–3 years
≥ 14–17.5 kg	180 mg	7.5 mL	–	≥ 3–5 years
≥ 17.5–35 kg	240 mg	10 mL	½ tablet	≥ 5–11 years
≥ 35–55 kg	500 mg	–	1 tablet	≥ 11–15 years
≥55kg and above	Upto 1000mg	–	Upto 2 tablets	≥ 15 years and adults

11.10 HIV and kidney disease

Description

Various forms of kidney disorders are described among patients who are HIV positive.

Early detection of HIV kidney disease may be beneficial in an attempt to protect the kidney from further disease progression.

Screening should include all patients at time of HIV diagnosis.

Patients at high risk or susceptible for HIV renal disease include:

- » CD4 count < 200 cells/microL
- » History of nephrotoxic medications
- » Comorbidity such as diabetes mellitus, hypertension, or hepatitis C virus co-infection

Screening in HIV for Renal Disease

- » Tests should include:
 - A urinalysis for haematuria and proteinuria or albuminuria
 - A measure of kidney function, i.e. creatinine to estimate GFR
- » If there is no evidence of kidney disease at the initial evaluation, screening

should be repeated annually.

- » 6 monthly monitoring of kidney function and urinary markers of kidney damage is warranted for patients receiving tenofovir.

Referral

- » Patients with persistent abnormal urinalysis.
- » Estimated creatinine clearance less than 60 mL/minute.