PHC Chapter 10: Infections and related conditions

10.1 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 reducing bacterial load on skin and mucous membranes.

Disinfecting surfaces

Guidelines for the use of disinfectants

» Cleansing (removal of visible soiling) is the first and most important step in chemical disinfection.
» The disinfectant fluid must entirely cover the object and penetrate all crevices.
» Use the recommended strengths for specific purposes.
» Disinfectants cannot sterilise surgical instruments.
» No chemical agent acts immediately; note the recommended exposure time.
» Equipment must be rinsed with sterile water after immersion in a chemical disinfectant e.g. chlorhexidine solution, 0.5% in 70% alcohol.
» Avoid recontamination at this stage.
» Make sure that the rinsing water and all other apparatus are sterile.
» Equipment must not be stored in chemical disinfectants.
» The best disinfectant for killing HIV and other pathogens is a chlorinated solution such as bleach or hypochlorite:
  - Solutions must be freshly prepared.
  - Discard after 24 hours to disinfect properly.
  - Do not use on the skin.

Intact skin

» Use alcohol swabs to clean skin surface before injections are administered.
» Use antiseptics like povidone iodine or chlorhexidine for surgical scrubbing.

Wounds and mucous membranes

- Use chlorhexidine 0.05% aqueous solution to clean dirty wounds.
- Use sodium chloride 0.9% and sterile water on clean wounds.

Disinfectant	Indications	Directions for application
• Chlorhexidine solution: 0.05% aqueous solution.	» Cleaning dirty wounds.	» Remove all dirt, pus and blood before use.
• Chlorhexidine solution: 0.5% in 70% alcohol.	» Skin disinfection before surgery.	» Apply as a preoperative skin prep agent to the relevant area.
• Povidone iodine: o solution 10%. o ointment 10%. o cream 5%.	» Skin and wound infections **Contraindication**: iodine allergy.	» Use ointment for skin infection. » Use solution for cleaning skin and wounds. » **Avoid** using on large wounds because of danger of iodine absorption.

Table 10.1: Disinfectants

Articles and instruments
Adhere to the appropriate cleansing and disinfection policy.

10.2 CHICKENPOX

B01.9/B01.8

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 crusts. These stages may all be present at the same time.

Chickenpox is infective from the start of the fever until 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 such as secondary bacterial infection, encephalitis, meningitis and pneumonia may occur (more common in adults and immunocompromised patients).

GENERAL MEASURES

» Isolate from immunocompromised people and pregnant women until all lesions have crusted.
» Ensure adequate hydration.
» Cut fingernails short and discourage scratching.

MEDICINE TREATMENT

CAUTION
Avoid the use of aspirin in children and adolescents < 16 years of age with acute febrile illness because of risk of Reye's syndrome.

For itch:
- Calamine lotion, applied as needed.

In severe cases

Children
- Chlorphenamine, oral, 0.1 mg/kg/dose 6–8 hourly. See dosing table, pg 23.3.

Adults
- Chlorphenamine, oral, 4 mg, 6–8 hourly.

For fever with distress:

Children
- Paracetamol, oral, 10–15 mg/kg/dose 6 hourly when required. See dosing table, pg 23.8.

Adults

- Paracetamol, oral, 1 g 4–6 hourly when required to a maximum of 4 doses per 24 hours.
  - Maximum dose: 15 mg/kg/dose.
  - Maximum dose: 4 g in 24 hours.

If skin infection is present due to scratching, treat as for bacterial skin infection. See Section 5.4: Bacterial infections of the skin.

Treatments with antiviral agents are recommended for:

» Immunocompromised patients.
» All patients with severe chickenpox (irrespective of duration of rash).
  - Extensive rash.
  - Haemorrhagic rash.
  - Visceral involvement.
  - Presence of complications.
» Adults and adolescents presenting within 48 hours of the onset of the rash.
» Pregnant women.

Children

- Aciclovir, oral, 20 mg/kg/dose 6 hourly for 7 days (Doctor prescribed).

Weight kg	**Dose** mg	**Use one of the following:**			**Age** months/years
		Susp	**Tablet**		
		200 mg /5 mL	200 mg	400 mg	
>3.5–5	100	2.5 mL	–	–	>1–3 months
>5–7	140	3.5 mL	–	–	>3–6 months
>7–9	160	4 mL	–	–	>6–12 months
>9–11	200	5 mL	1 tablet	½ tablet	>12–18 months
>11–14	240	6 mL	–	–	>18 months–3 years
>14–25	400	10 mL	2 tablets	1 tablet	>3–5 years
>25–35	600	15 mL	3 tablets	1½ tablet	>7–11 years
>35–55	700	–	3 ½ tablets	–	>11–15 years

Adults

- Antiviral, (active against varicella zoster) e.g.:
- Aciclovir, oral, 800 mg 6 hourly for 7 days (Doctor prescribed). *LoE:IIIb*[1]

REFERRAL

» Complications such as:
  - meningoencephalitis
  - pneumonia
» Severely ill patients.
» Pregnant women.
» Asymptomatic neonates whose mothers had developed chickenpox during the period from 7 days before to 7 days after delivery.
» Neonates with clinical chickenpox.

10.3 CHOLERA

See Chapter 2: Gastrointestinal conditions.

10.4 DYSENTERY, BACILLARY

See Chapter 2: Gastrointestinal conditions.

10.5 FEVER

R50.0-1/R50.8-9

DESCRIPTION

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

Fever alone is not a diagnosis.

Fever may be associated with convulsions in children < 6 years of age, but is not a cause of the convulsions.

Note:

» Temperature > 40°C needs urgent lowering in children.
» Fluid losses are increased with fever.
» Malaria must be considered in anyone with fever who lives in a malaria endemic area, or who has visited a malaria area in the past 12 weeks.

GENERAL MEASURES

Children

» Caregivers should offer the child fluids regularly to keep them well hydrated (where a baby or child is breastfed the most appropriate fluid is breast milk).
» Dress child appropriately for the weather.
» Ensure the child is rested.
» Following contact with a healthcare professional, parents and carers who are looking after their feverish child at home should seek further advice if:
  - the child has a convulsion
  - the child develops a non-blanching rash
  - the parent or carer feels that the child is less well than when they previously sought advice
  - the parent or carer is more concerned than when they previously sought advice
  - the fever lasts > 2 days

Note: Tepid sponging and evaporative cooling are not recommended, as this causes the child to shiver which actually increases the core temperature.

Adults

Maintain hydration.

MEDICINE TREATMENT

Consider treatment with paracetamol in adults with associated tachycardia, possibility of worsening cardiac conditions, and adults and children who are in distress.

Antipyretic agents are not indicated with the sole aim of reducing body temperature in children and adults with fever.

Children

- Paracetamol, oral, 10–15 mg/kg/dose 6 hourly when required. See dosing table, pg 23.8.

Adults

- Paracetamol, oral, 1 g 4–6 hourly when required to a maximum of 4 doses per 24 hours.
  - Maximum dose: 15 mg/kg/dose.
  - Maximum dose: 4 g in 24 hours.

CAUTION

Do not treat undiagnosed fever with antibiotics, except in children < 2 months of age who are classified as having

POSSIBLE SERIOUS BACTERIAL INFECTION.

Do not give aspirin to children and adolescents with acute febrile illness.

Children < 2 months of age, fulfilling any criterion of possible serious bacterial infection (see referral criteria):

- Ceftriaxone, IM, 80 mg/kg/dose immediately as a single dose. See dosing table, pg 23.3.
  - Do not inject more than 1 g at one injection site.

CAUTION: USE OF CEFTRIAXONE IN NEONATES AND CHILDREN

» If SUSPECTING SERIOUS BACTERIAL INFECTION in neonate, give ceftriaxone, even if jaundiced.
» Avoid giving calcium-containing IV fluids (e.g. Ringer Lactate) together with ceftriaxone:
  - If ≤ 28 days old, avoid calcium-containing IV fluids for 48 hours after ceftriaxone administered.
  - If > 28 days old, ceftriaxone and calcium-containing IV fluids may be given sequentially provided the giving set is flushed thoroughly with sodium chloride 0.9% before and after.
  - Preferably administer IV fluids without calcium contents.
» Always include the dose and route of administration of ceftriaxone in the referral letter.

REFERRAL

» All children < 2 months of age with any one of the following criteria of possible serious bacterial infection:
  - axillary temperature > 37.5°C
  - bulging fontanelle
  - decreased movement/moves only ,.when stimulated
  - convulsions with current illness
  - decreased level of consciousness
  - breathing difficulties, i.e. respiratory rate > 60, nasal flaring, chest in-drawing or apnoea

  - pus forming conditions, i.e. umbilical redness extending to the skin or draining pus, many or severe skin pustules, pus draining from eye
» All children in whom a definite and easily managed cause is not found.
» Fever that lasts > 2 days without finding a treatable cause.
» Fever that recurs.
» Fever combined with:
  - signs of meningitis
  - toxic-looking patient
  - convulsion
  - coma or confusion
  - jaundice
  - failure to feed

10.6 GIARDIASIS

See Chapter 2: Gastrointestinal conditions.

10.7 MALARIA

Note: notifiable medical conditions.

Refer to the most recent Malaria Treatment Guidelines from the Department of Health for the most suitable management in the various endemic areas.

Global malaria endemic areas:
https://www.iamat.org/risks/malaria?gclid=CjwKEAiAjIbBBRCitNvJ1o257WESJADpoUt072u5_X4Wb0fVtkQLiEFrWye263Ef_on8eykkOwLK_hoCFtDw_wcB

Local endemic areas:

https://www.santhnet.co.za/index.php/travel-health-advice/travel-advice/malaria-advice-for-travellers/item/330-malaria-risk-map-for-south-africa-2017.html

DESCRIPTION

Malaria is an infection of red blood cells by a parasite micro-organism called Plasmodium. Five species of Plasmodium are known to cause malaria in humans in Africa. The five species are:

» *Plasmodium falciparum (P. falciparum)*
» *Plasmodium vivax (P. vivax)*
» *Plasmodium ovale (P. ovale)*
» *Plasmodium malariae (P. malariae)*
» *Plasmodium knowlesi (P. knowlesi)*

The parasites are usually transmitted to humans by the bite of a vector mosquito. In South Africa, *P. falciparum* is the most common and the most dangerous of the malaria species. Malaria caused by *P. falciparum* is an acute febrile illness that may progress rapidly to severe disease if not diagnosed early and treated adequately.

Symptoms and signs of malaria are non-specific.

The most important element in the diagnosis of malaria is a high index of suspicion in both endemic and non-endemic areas. Any person resident in or returning from a malaria area **and** who presents with fever (usually within 3 months of possible exposure to vector mosquito bites) should be tested for malaria. The progression of *P. falciparum* malaria to

severe disease is rapid, and early diagnosis and effective treatment is crucial. **Pregnant women, young children ≤ 5 years of age and people living with HIV/AIDS are at particularly high risk of developing severe malaria**.

Symptoms and signs of malaria may include:

- » severe headache
- » fever > 38°C
- » muscle and joint pains
- » diarrhoea
- » shivering episodes
- » nausea and vomiting
- » flu-like symptoms
- » dry cough

Severe disease may present with one or more of the following additional clinical features:

- » prostration (severe general body weakness)
- » sleepiness, unconsciousness or coma, convulsions
- » respiratory distress and/or cyanosis
- » jaundice
- » renal failure
- » shock
- » repeated vomiting
- » hypoglycaemia
- » severe anaemia (Hb < 7 g/dL)
- » haemoglobinuria/black urine
- » abnormal bleeding

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. HRP2 antigen dipsticks are available, these can be used to diagnose malaria within 10–15 minutes.

Note:

- » Rapid tests may remain positive up to 1 month after successful treatment
- » One negative malaria test does not exclude the diagnosis of malaria. Request 2nd test.

GENERAL MEASURES

- » Provide supportive and symptomatic relief.
- » Monitor for complications.
- » Ensure adequate hydration.
- » Carefully observe all patients with P. falciparum malaria for the first 24 hours for features of severe malaria.

MEDICINE TREATMENT

All first doses of antimalarial medicines 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 areas with high incidence of malaria (whether locally transmitted or imported) it should be definitively diagnosed and treated at PHC level. In other areas, patients should be referred for treatment.

10.7.1 MALARIA, NON-SEVERE/UNCOMPLICATED

B50.9/B51.9/B52.9/B53.0/B54

Note: notifiable medical condition.

MEDICINE TREATMENT

- Artemether/lumefantrine, oral, 20/120 mg, with fat-containing food/full cream 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	Artemether/lumefantrine 20/120 mg/tablet	**Tablet(s)**	**Age** months/years
>5–15	20/120 mg	1 tablet	6 months–3 years
>15–25	40/240 mg	2 tablets	>3–8 years
>25–35	60/360 mg	3 tablets	>8–12 years
>35	80/ 480 mg	4 tablets	>12 years and adults

For fever in children < 5 years of age:

Children

- Paracetamol, oral, 10–15 mg/kg/dose 6 hourly when required. See dosing table, pg 23.8.

REFERRAL

Urgent

» All patients with any sign of severe (complicated) malaria, see Section 10.7.2: Malaria, severe/complicated.
» All patients presenting to PHC clinics in areas that do not stock antimalarials.
» Vomiting leading to inability to retain medication.
» Patients not responding to oral treatment within 48 hours.
» After 1st dose of artemether/lumefantrine 20/120 mg:
  - All children < 2 years of age.
  - Pregnant women.
  - Patients with co-morbidities such as HIV, diabetes etc.
  - Patients > 65 years of age.

10.7.2 MALARIA, SEVERE/COMPLICATED

B50.0/B50.8

Note: notifiable medical condition.

DESCRIPTION

Any one of the following is a sign of severe (complicated) malaria, is associated with a higher mortality, and requires urgent referral (after initial artesunate dose as below):

» prostration (severe general body weakness)
» sleepiness, confusion, unconsciousness or coma, convulsions
» respiratory distress and/or cyanosis
» jaundice
» renal failure
» shock
» repeated vomiting
» hypoglycaemia
» severe anaemia (Hb<7g/dL)
» haemoglobinuria/black urine
» abnormal bleeding

MEDICINE TREATMENT

Treatment may be commenced before referral in clinics designated by the regional malaria control programme provided they have facilities to diagnose malaria (either microscopy or rapid antigen point of care tests) and healthcare workers trained in the management of severe malaria.
Correct hypoglycaemia immediately, if present.

Adults and children ≥ 20 kg:

- Artesunate IM, 2.4 mg/kg immediately as a single dose and refer urgently.
  - If transfer to referral hospital is delayed, administer second dose at 12 hours and third dose at 24 hours.

LoE:Ia[2]

Children < 20 kg:

- Aresunate IM, 3 mg/kg immediately as a single dose and refer urgently.
  - If transfer to referral hospital is delayed, administer second dose at 12 hours and third dose at 24 hours.

LoE:IIIb[3]

Note: For all patients requiring referral, the patient must be transferred to reach the referral hospital **within 6 hours** of being seen at the PHC facility.
Advise referral hospital that an initial dose has been administered.

REFERRAL

Urgent
All patients.

For dosing of artesunate, see Figure 10.1: Dosing of artesunate, below.

GUIDELINES FOR ADMINISTRATION OF INJECTABLE ARTESUNATE FOR SEVERE MALARIA

WHO RECOMMENDED TREATMENT [2]

PRODUCT DESCRIPTION [1]

Dose: For children < 20 kg: 3.0 mg/kg
For children > 20 kg and adults: 2.4 mg/kg

Can be given by intravenous route (IV) or intramuscular route (IM).
IV is the preferred route of administration.
Please refer to the patient information leaflet for more information.

* Water for injection is not an appropriate dilutant

1 WEIGH THE PATIENT

2 DETERMINE THE NUMBER OF VIALS NEEDED

Weight	less than 25 kg	26-50 kg	51-75 kg	76-100 kg
60 mg vial	1	2	3	4

3 RECONSTITUTE

■ Activate the drug: artesunate powder + bicarbonate ampoule (immediately before use)

4 DILUTE

■ Reconstituted artesunate + saline solution (or dextrose 5%)
■ Volume for dilution

	IV	IM
Bicarbonate solution volume	1 ml	1 ml
Saline solution volume	5 ml	2 ml
Total volume	**6 ml**	**3 ml**
Artesunate 60 mg solution concentration	10 mg/ml	20 mg/ml

IMPORTANT
Water for injection is not an appropriate dilutant

5 CALCULATE THE DOSE

■ Calculate and withdraw the required dose in ml according to route of administration:

Less than 20 kg

For intravenous route (IV)
Concentration: 10 mg/ml

3.0 mg x body weight (kg)
IV artesunate solution concentration 10 mg/ml
Round up to the next whole number

Example:
Dose needed (ml) for 8 kg child:
3.0 x 8 / 10 = 2.4 ml
2.4 ml rounded up to 3 ml

Weight kg	Dose mg	Dose ml
6 - 7	20	2
8 - 10	30	3
11 - 13	40	4
14 - 16	50	5
17 - 20	60	6

For intramuscular route (IM)
Concentration: 20 mg/ml

3.0 mg x body weight (kg)
IM artesunate solution concentration 20 mg/ml
Round up to the next whole number

Example:
Dose needed (ml) for 8 kg child:
3.0 x 8 / 20 = 1.2 ml
1.2 ml rounded up to 2 ml

Weight kg	Dose mg	Dose ml
6 - 7	20	1
8 - 10	30	2
11 - 13	40	2
14 - 16	50	3
17 - 20	60	3

More than 20 kg

Concentration: 10 mg/ml

2.4 mg x body weight (kg)
IV artesunate solution concentration 10 mg/ml
Round up to the next whole number

Example:
Dose needed (ml) for 26 kg child:
2.4 x 26 / 10 = 6.24 ml
6.24 ml rounded up to 7 ml

Weight kg	Dose mg	Dose ml
20 - 25	60	6
26 - 29	70	7
30 - 33	80	8
34 - 37	90	9
38 - 41	100	10
42 - 45	110	11
46 - 50	120	12
51 - 54	130	13
55 - 58	140	14
59 - 62	150	15
63 - 66	160	16
67 - 70	170	17
71 - 75	180	18
76 - 79	190	19
80 - 83	200	20
84 - 87	210	21
88 - 91	220	22
92 - 95	230	23
96 - 100	240	24

Concentration: 20 mg/ml

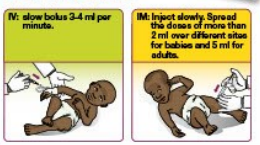
2.4 mg x body weight (kg)
IM artesunate solution concentration 20 mg/ml
Round up to the next whole number

Example:
Dose needed (ml) for 26 kg child:
2.4 x 26 / 20 = 3.12 ml
3.12 ml rounded up to 4 ml

Weight kg	Dose mg	Dose ml
20 - 25	60	3
26 - 29	70	4
30 - 33	80	4
34 - 37	90	5
38 - 41	100	5
42 - 45	110	6
46 - 50	120	6
51 - 54	130	7
55 - 58	140	7
59 - 62	150	8
63 - 66	160	8
67 - 70	170	9
71 - 75	180	9
76 - 79	190	10
80 - 83	200	10
84 - 87	210	11
88 - 91	220	11
92 - 95	230	12
96 - 100	240	12

Remark: the upper limit for each weight band is 0.9 kg e.g. 14 - 16 kg covers 14 - 16.9 kg.

6 ADMINISTER



7 DOSING SCHEDULE

1. Give **3 parenteral doses** over 24 hours as indicated in the opposite table

2. Give **parenteral doses** for a minimum of 24 hours once started irrespective of the patients ability to tolerate oral treatment earlier.

- **Day 1** **Dose 1: on admission (0 Hours)**
  Dose 2: 12 hours later
- **Day 2** **Dose 3: 24 hours after first dose**

- When the patient can take oral medication, prescribe a full 3-day course of recommended first line oral Artemisinin Combination Therapy (ACT).
  The first dose of ACT should be taken **between 8 and 12 hours** after the last injection of artesunate.
- Until the patient is able to take oral medication, continue parenteral treatment (one dose a day) **for a maximum of 7 days.**
- A course of injectable artesunate should always be followed by a 3-day course of ACT.

- Evaluate the patient's progress regularly.

IMPORTANT
- **Prepare a fresh solution for each administration.**
- **Discard any unused solution after use.**

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1. World Health Organization (WHO) List of Prequalified Medicinal Products (http://apps.who.int/prequal/query/ProductRegistry.aspx?list=vmp) artesunate injectable, reference N° MA061, prequalified on 05-Nov-2010.
2. World Health Organization, Management of Severe Malaria - A practical handbook - Third edition - April 2013 - (http://www.who.int/malaria/publications/atoz/9789241548526/en/index.html)

10.7.3 MALARIA, PROPHYLAXIS

Z29.1

DESCRIPTION

In South Africa, malaria chemoprophylaxis should be used, together with preventive measures against mosquito bites, from September to May in moderate-risk malaria-endemic areas. Risk areas in South Africa are shown in the map included in the National Guidelines for the Prevention of Malaria (2018) found at : https://www.nicd.ac.za/wp-content/uploads/2019/03/National-Guidelines-for-prevention-of-Malaria_updated-08012019-1.pdf

Malaria chemoprophylaxis is recommended for persons intending to travel to malaria-endemic areas within and outside of South Africa . There are moderate- and high-risk areas in neighbouring countries. Chemoprophylaxis must be started before entering the malaria area, and continued for a period of time after exiting the malaria area.

GENERAL MEASURES

Always use preventative measures, in addition to pharmacological therapy, against mosquito bites between dusk and dawn:

» Use di-ethyl 3-methylbenzamid (DEET) insecticide impregnated mosquito nets, insecticide coils or pads.
» Apply insect repellent to exposed skin and clothing. Aim for 30% DEET. Don't get on lips, eyes, breaks in skin.
» Wear long sleeves, long trousers and socks, if outside, as mosquitoes are most active at this time.
» Visit endemic areas only during the dry season.

MEDICINE TREATMENT

Prophylaxis

CAUTION

Immunocompromised patients, pregnant women and children <8 years of age should avoid visiting malaria-endemic areas, as they are more prone to the serious complications of malaria.

However, if this cannot be avoided, malaria chemoprophylaxis should be considered (as recommended by the National Guidelines for the Prevention of Malaria (2018) found at: https://www.nicd.ac.za/wp-content/uploads/2019/03/National-Guidelines-for-prevention-of-Malaria_updated-08012019-1.pdf

However, as only doxycycline is provided in the public sector, alternative options for pregnant women and children <8 years of age need to be purchased in the private sector.)

Non-pregnant adults:

- Doxycycline oral, 100 mg daily.

- Take from 2 days prior to entering endemic area until 4 weeks after exiting the endemic area.

Children ≥8 years of age: *LoE:IIIb*[4]

- Doxycycline oral, 2 mg/kg/dose daily.
  - Take from 2 days prior to entering endemic area until 4 weeks after exiting the endemic area. *LoE:IVb*[5]

Note: Doxycycline is contra-indicated in pregnant women, and in children <8 years of age.

10.8 MEASLES

B05.0-4/B05.8-9

Note: notifiable medical condition.

CASE DEFINITION

» Fever.

AND

» Red maculopapular (blotchy) rash.

AND

» Cough or coryza (runny nose) or conjunctivitis.

Inform the local EPI co-ordinator about all cases of suspected measles, (i.e. which fulfil the case definition criteria). Send clotted blood and throat swabs 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, that occur 7–14 days after contact with an infected individual, include:

» coryza
» conjunctivitis which may be purulent
» fever
» cough
» diarrhoea

After 2–3 days of the initial clinical features, a few tiny white spots, like salt grains appear in the mouth (Koplik spots).

The skin rash appears 1–2 days later, lasting 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, and otitis media) may occur, especially in children with poor nutrition or other concomitant conditions.

GENERAL MEASURES

» Isolate the patient in the clinic to prevent spread.
» In the clinic use face masks and gloves when examining the patient.
» Counsel the caregiver to isolate the patient in the home (if feasible).
» Reduce exposure of children < 12 months of age and pregnant women to the index patient.
» Ensure that the caregiver and other close contacts have been previously immunised.

MEDICINE TREATMENT

All children < 5 years of age with measles should be given an extra dose of vitamin A, unless the last dose was received within a month:

- Vitamin A (retinol), oral, as a single dose.

Age range	Dose units	Capsule 100 000 IU	Capsule 200 000 IU
Infants 6–11 months	100 000	1 capsule	–
Children 12 months–5 years	200 000	2 capsules	1 capsule

In children < 5 years of age, give the 1st dose immediately. If the child is sent home, the caregiver should be given a 2nd dose to take home, which should be given the following day.

Administration of a vitamin A capsule

- Cut the narrow end of the capsule with scissors.
- Open the child's mouth by gently squeezing the cheeks.
- Squeeze the drops from the capsule directly into the back of the child's mouth. If a child spits up most of the vitamin A liquid immediately, give one more dose.

For fever with distress:

Children

- Paracetamol, oral, 10–15 mg/kg/dose 6 hourly when required. See dosing table, pg 23.8.

Adults

- Paracetamol, oral, 1 g 4–6 hourly when required.
  - Maximum dose: 15 mg/kg/dose.
  - Maximum dose: 4 g in 24 hours.

Children with diarrhoea:

Treat according to Section 2.9.1: Acute diarrhoea in children.

Children with pneumonia (1st dose before referral):

- Amoxicillin, oral, 45 mg/kg/dose. See Section 17.3.4.1: Pneumonia in children.

Children with otitis media:

- Amoxicillin, oral, 45 mg/kg/dose. See Section 19.4.2 Otitis media, acute.

Pneumonia or otitis media with severe penicillin allergy:

Z88.0

Children

- Macrolide, e.g.:
- Azithromycin, oral, 10 mg/kg/dose daily for 3 days. See dosing table, pg 23.2. *LoE:IVb*[6]

Purulent conjunctivitis:

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

REFERRAL

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

Provide emergency treatment, if needed, before referral.

10.9 MENINGITIS

See Chapter 15: Central nervous system.

10.10 MUMPS

B26.0-3/B26.8-9

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.
» 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. Isolate until swelling subsides.
» Children may return to school 1 week after initial swelling.

MEDICINE TREATMENT

Children

- Paracetamol, oral, 10–15 mg/kg/dose 6 hourly when required. See dosing table, pg 23.8.

Adults

- Paracetamol, oral, 1 g 4–6 hourly when required.
  - Maximum dose: 15 mg/kg/dose.
  - Maximum dose: 4 g in 24 hours.

REFERRAL
» Abdominal pain (to exclude pancreatitis).
» Painful swollen testes (orchitis).
» Suspected meningo-encephalitis.

10.11 RUBELLA (GERMAN MEASLES)
B06.0/B06.8-9

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 red 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 (Section 10.8: Measles).

Clinical features include:
» mild rash.
» swollen and tender lymph nodes behind the ears or at the back of the neck(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. All pregnant women should be referred for confirmation of diagnosis of rubella and counselling.

GENERAL MEASURES
» Bed rest, if needed.
» Isolate from pregnant women for 7 days after onset of the rash.

MEDICINE TREATMENT
Children
- Paracetamol, oral, 10–15 mg/kg/dose 6 hourly when required. See dosing table, pg 23.8.

Adults
- Paracetamol, oral, 1 g 4–6 hourly when required.
  - Maximum dose: 15 mg/kg/dose.
  - Maximum dose: 4 g in 24 hours.

REFERRAL
Urgent
» Pregnant women with rubella.
» Pregnant women who have been in contact with a patient with rubella.

10.12 SCHISTOSOMIASIS (BILHARZIA)
B65.0-3/B65.8-9

Note: notifiable medical condition.

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.

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.

	Schistosoma haematobium	***Schistosoma mansoni***
Clinical features	» blood in the urine » recurrent cystitis » other urinary symptoms	» diarrhoea with blood and mucus in the stools » colicky abdominal pain » enlarged liver and spleen
Diagnosis	» eggs in urine or stool on microscopy	» eggs in urine or stool on microscopy, rectal biopsy

Table 10.2: Differences between *Schistosoma haematobium* and *Schistosoma mansoni*

Acute schistosomiasis occurs several weeks after exposure and may present with non-specific signs such as fever, cough, headache, and urticaria.

Life threatening cardiac and neurological complications may occur.

Refer all suspected cases for diagnosis and further management.

Diagnosis is made by assessing for eosinophilia and conducting serological testing.

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 risk of infestation is lowest.
» Boil all water before use.

MEDICINE TREATMENT

In endemic areas where urine microscopy cannot be done patients should be treated empirically after first excluding possible glomerulonephritis, i.e. no raised blood pressure, no oedema, and no 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.

Children

- Praziquantel, oral, 40 mg/kg as a single dose. See dosing table pg 23.8.

Adults

- Praziquantel, oral, 40 mg/kg as a single dose. LoE:Ia[7]

Note: Praziquantel may cause life-threatening deterioration if given in acute schistosomiasis. If the acute phase is suspected, consult with a specialist.

REFERRAL

» Children < 2 years of age.
» Ongoing urinary tract symptoms including haematuria persisting for 60 days after treatment.
» Signs of bleeding disorders or glomerulonephritis.
» Suspected acute schistosomiasis.

10.13 SHINGLES (HERPES ZOSTER)

B02.0-3/B02.7-9

DESCRIPTION

Dermatomal eruption of vesicles on an erythematous base due to varicella zoster virus (lies dormant in nerve ganglia following chickenpox).

GENERAL MEASURES

» Isolate patient from immunocompromised or pregnant non-immune individuals (who may develop severe chickenpox).
» Offer HIV test, especially to patients.

MEDICINE TREATMENT

Antiviral therapy, indicated for herpes zoster:

» in immunocompetent individuals - only of benefit within 72 hours of onset, and
» in immunocompromised patients - beyond 72 hours, provided that there are active lesions.

Adults:

- Antiviral, (active against herpes zoster) e.g.:
- Aciclovir, oral, 800 mg five times daily for 7 days (4 hourly missing the middle of the night dose). LoE:Ia[8]

For pain:

Pain is often very severe and requires active control. A combination of different classes of analgesics is often necessary.

- Paracetamol, oral, 1 g 4–6 hourly when required.
  - Maximum dose: 15 mg/kg/dose.
  - Maximum dose: 4 g in 24 hours.

AND/OR LoE:IVb[9]

During acute presentation if pain is severe and not adequately controlled:

- Tramadol, oral 50 mg 6 hourly (Doctor prescribed).
  - If response not adequate, increase dose to 100 mg 6 hourly. LoE:IVb[10]

To treat post-herpetic neuralgia:
Initiate treatment with adjuvant therapy early.

- Amitriptyline, oral, 25 mg at night (Doctor prescribed).
  - Titrate as necessary to a maximum of 75 mg. *LoE:IVb*[11]

REFERRAL

» Herpes zoster with secondary dissemination or neurological involvement.
» Ocular involvement (if the tip of the nose is involved then ocular involvement is more likely).
» Uncontrolled pain.
» All children.

10.14 TICK BITE FEVER

A77.1/A79.8/A79.9

DESCRIPTION

Tick-borne infection due to *Rickettsia conorii*, acquired from dogs, or *Rickettsia africae*, acquired from cattle and game. The hallmark of tick bite fever is the eschar, i.e. round black lesion ± 5 mm in diameter with an inflammatory halo. A rash develops on about the third day of illness in about two thirds of patients with *R. conorii* and in fewer cases of *R. africae* infection. In *R. conorii* infection the rash is maculopapular and involves the palms and soles. In *R. africae* infection the rash is sparse and may be vesicular. The classic triad of fever, eschar, and rash occurs in 50-75% of patients. Signs of severe tick bite fever include severe headache, hypotension, shortness of breath, and neurological manifestations.

GENERAL MEASURES

» Application of insect repellent to exposed skin and clothing.
» Wearing long sleeves, long trousers, and socks, if outside.
» Inspect clothing for presence of ticks after suspected exposure.

Complications include:

» vasculitis
» encephalitis
» thrombosis
» renal failure
» myocarditis
» pneumonitis
» thrombocytopaenia

MEDICINE TREATMENT

Antibiotic therapy:
Treatment must be started before confirmation of diagnosis by serology.
Although not recommended for children < 8 years of age, doxycycline is still regarded as the medicine of choice for children with tick bite fever. However, due to the unavailability of lower dosage forms of doxycycline alternative medicines are considered in children < 8 years of age or those weighing < 45kg with mild infection.

Mild to moderate infection:

Children < 45 kg

- Azithromycin, oral, 10 mg/kg/dose daily for 3 days. See dosing table pg 23.2. *LoE:IIIb*[12]

Children ≥ 45 kg and adults

- Doxycycline, oral, 100 mg 12 hourly, for at least 3 days after the fever subsides with clinical improvement.
  - Maximum duration of treatment is 7 days. *LoE:IIIb*[13]

In pregnancy:

- Doxycycline, oral, 100 mg 12 hourly for 2 days.

Then switch to:

- Azithromycin, oral, 500 mg 12 hourly for 3 days. *LoE:IVb*[14]

For headache and fever:

Children

- Paracetamol, oral, 15 mg/kg/dose, 6 hourly as required. See dosing table, pg 23.8. *LoE:IVb*[15]

Adults

- Paracetamol, oral, 1 g 4–6 hourly when required.
  - Maximum dose: 15 mg/kg/dose.
  - Maximum dose: 4 g in 24 hours *LoE:IVb*[16]

REFERRAL

» Patients unable to take oral therapy.
» Patients not responding to adequate therapy, e.g. fever persisting for > 48 hours after initiation of treatment.
» Patients with complications.
» Patients with severe tick bite fever.

10.15 TYPHOID FEVER

See Section 2.13: Typhoid fever.

10.16 TUBERCULOSIS

See Chapter 17: Respiratory conditions. Section 17.4: Pulmonary tuberculosis.
Note: notifiable medical condition.

10.17 TUBERCULOSIS, EXTRAPULMONARY

A18.0-8
Note: notifiable medical condition.

DESCRIPTION

Extra-pulmonary tuberculosis is defined as infection of organ systems other than the lung with Mycobacterium tuberculosis. Extra-pulmonary TB can present with non-specific

symptoms such as unintentional weight loss (> 1.5 kg in a month), night sweats, and fever for more than 2 weeks. Other symptoms depend on the organ affected. The most common types of extra-pulmonary TB are listed below along with commonly associated signs and symptoms:

Extra-pulmonary TB type	Common presenting sign/symptom
TB lymphadenitis	» Audible wheeze or typical brassy cough caused by large mediastinal lymph nodes. » Peripheral TB lymphadenopathy occurs in neck and armpits. Typically nodes are large (> 2 cm), tender, non-symmetrical, matted, firm to fluctuant and rapidly growing.
TB pleural effusion (usually single-sided)	» Non-productive cough. » Chest pain. » Shortness of breath. » High temperature. » Tracheal and mediastinal shift away from the side of the effusion. » Decreased chest movement. » Stony dullness on percussion on the side of the effusion.
TB of spine, bones and joints	» Decreased movement in the joints. » Excessive sweating, especially at night. » Joint swelling with warm, tender joints. » Low-grade fever. » Muscle atrophy and/or spasms. » Numbness, tingling, or weakness below the infection (if the spine is involved).
TB pericardium	» Chest pain. » Shortness of breath. » Dizziness and weakness from low cardiac output » Signs and symptoms of right-sided heart failure (tachycardia, low BP, peripheral oedema, liver congestion, ascites).
TB meningitis	» During the early phase of TB meningitis, malaise, low-grade fever, headache and personality change may be present. » With suspected established infection assess for: – gradual onset of headache – malaise – confusion – decreased consciousness – vomiting – neck stiffness and positive Kernig's sign » In children, TB meningitis may be acute, sub-acute or chronic and typically presents between 23-49 months of age with: – altered level of consciousness – history of fever – irritability – headache – convulsions – poor feeding and failure to thrive – vomiting – cough

	– meningism
Disseminated/miliary TB	» Most often seen in children and young adults. » Fever. » Cough. » Generalised lymphadenopathy. » Hepatomegaly. » Consider in febrile patients presenting with HIV wasting syndrome.
TB empyema	» Similar to pleural effusion, but aspiration reveals thick pus.
TB peritoneum	» Ascites with no signs of portal hypertension. » Possible palpable abdominal masses. » Possible bowel obstruction.

Table 10.3: Types of extra-pulmonary TB

REFERRAL

All suspected cases of extra-pulmonary TB should be referred immediately to secondary or tertiary care for diagnosis and further management.

10.18 VIRAL HAEMORRHAGIC FEVER (VHF)

A98.0-5/ A98.8/A99/A91

Note: notifiable medical conditions.

Consult the most recent Viral Haemorrhagic Fever Guidelines from the National Department of Health.

DESCRIPTION

Viral haemorrhagic fevers (VHF) are uncommon conditions in South Africa. They may present with non-specific signs or with signs strongly suggestive of VHF (Table 10.4). Other symptoms and organ involvement may be variable.

Signs strongly suggesting VHF	Non-specific signs that may occur with VHF
» Petechial rash. » Ecchymoses. » Other haemorrhagic signs (e.g. epistaxis, haematemesis, melaena). » Non-specific signs of infection.	» Fever. » Headache. » Conjuctivitis. » Pharyngitis. » Myalgia (especially lower back pain). » Vomiting. » Abdominal pain. » Diarrhoea.

Table 10.4: Signs and symptoms of viral haemorrhagic fevers (VHF)

More than 90% of suspected cases of VHF in South Africa prove to be severe forms of common diseases. Many of the diseases mistaken for VHF are treatable if diagnosed early.

These include:

» Severe tick bite fever.
» Severe falciparum malaria.
» Severe bacterial infections, particularly *N.meningitidis*.
» Fulminant hepatitis.
» Leptospirosis.

Endemic causes of VHF in South Africa are Crimean-Congo fever and Rift Valley Fever, both of which may be transmitted between humans by means of blood and body fluids. Imported conditions include Lassa, Ebola and Marburg Fever amongst others.
Obtaining a history of possible exposure to infection (including a detailed travel history) is crucial to diagnosing VHF. Relatives and friends often provide more reliable information than severely ill patients.

GENERAL MEASURES

All suspected, probable VHF cases and contacts of VHF cases must be discussed and managed in consultation with the Regional Virologist or Infectious Diseases Consultant at the referral centre.
Cases should also be discussed with the Special Pathogens Unit of the National Institute for Communicable Diseases (NICD):

Tel: 011 386 6000, Outbreak hotline: 082 883 9920

Transfer of patients will only occur once all relevant arrangements have been made to limit further exposure to a potentially contagious and life threatening agent.

Viral haemorrhagic fevers (VHF) are readily transmitted to healthcare workers, so it is essential to apply strict contact precautions.
ISOLATE ALL SUSPECTED SYMPTOMATIC CASES AT ALL TIMES

If VHF is considered, isolate patient in a single room and take proper precautions to limit further exposure. These include where available:
» long-sleeved disposable gown,
» waterproof apron if the patient is bleeding,
» two pairs of latex gloves, one underneath the gown and one with the wrist of the glove pulled over the gown cuff,
» disposable face mask (preferably with a visor),
» goggles if a mask without the visor is used,
» waterproof boots or 2 pairs of overshoes, one over the other.

Note: Do not touch your own skin with your gloved hands.

MANAGEMENT

Management of VHF contact
» Consult clinician, discuss with NICD and isolate patient (See above).
» Record and follow-up all patient contacts.

Management of suspected/possible/probable VHF
» Non-specific signs:
  - Consult with clinician, discuss with NICD, isolate patient, initiate ceftriaxone and record and follow-up all patient contacts.
» Signs strongly suggestive of VHF:
  - Consult with a clinician, discuss with NICD, isolate patient, initiate ceftriaxone and arrange transfer with EMS (providing patient's VHF status, and names, addresses and telephone numbers of patient contacts).

Adults

- Ceftriaxone, IV, 2 g immediately. *LoE:IVb*[17]

Children

- Ceftriaxone, IM, 80 mg/kg/dose immediately as a single dose. See dosing table, pg 23.3.
  - Do not inject more than 1 g at one injection site.

CAUTION: USE OF CEFTRIAXONE IN NEONATES AND CHILDREN

» If *SUSPECTING SERIOUS BACTERIAL INFECTION* in neonate, give ceftriaxone, even if jaundiced.

» Avoid giving calcium-containing IV fluids (e.g. Ringer Lactate) together with ceftriaxone:
- If ≤ 28 days old, avoid calcium-containing IV fluids for 48 hours after ceftriaxone administered.
- If > 28 days old, ceftriaxone and calcium-containing IV fluids may be given sequentially provided the giving set is flushed thoroughly with sodium chloride 0.9% before and after.
- Preferably administer IV fluids without calcium contents.

» Always include the dose and route of administration of ceftriaxone in the referral letter.

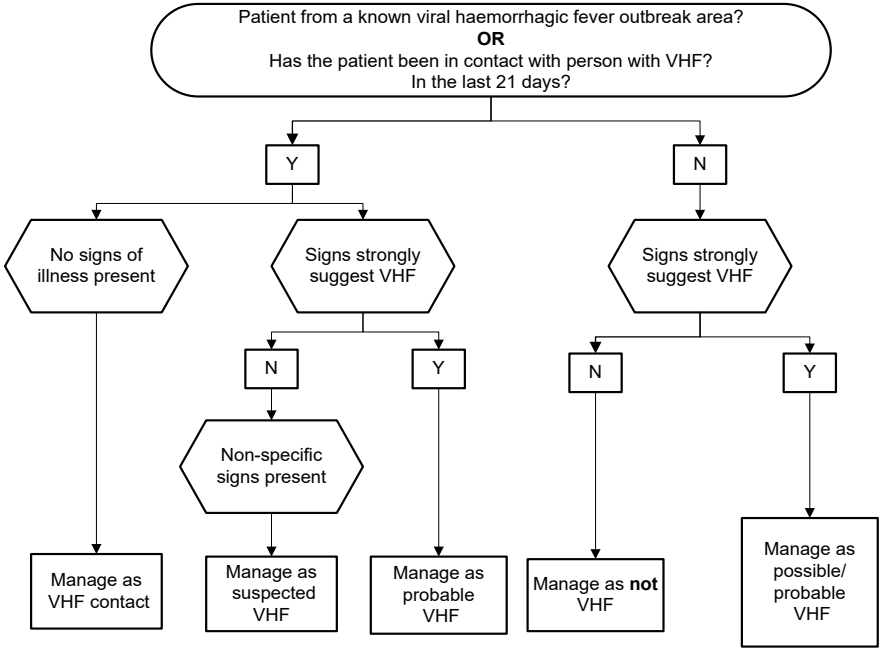

Figure 10.2: Algorithm for management of VHF

REFERRAL

» All cases, after consultation with clinician, discussion with NICD, isolation of patient and management of acute condition.

Manage all contacts of VHF cases according to the current national guidelines. Ensure that contact details are obtained and that there is a plan to manage contacts.

10.19 EMERGING RESPIRATORY PATHOGENS, E.G. COVID-19: CORONAVIRUS DISEASE-19; MIDDLE EAST RESPIRATORY SYNDROME CORONAVIRUS INFECTION: MERS COV

Note: notifiable medical conditions.

Consult the most recent guidelines from the National Department of Health or NICD.

DESCRIPTION

Viral respiratory illness caused by coronaviruses, including Middle East respiratory syndrome (MERS-CoV), severe acute respiratory syndrome (SARS), and severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). SARS-CoV-2 causes coronavirus infectious disease-2019 (COVID-19).

Individuals present with a wide spectrum of clinical presentations ranging from asymptomatic infection to acute upper respiratory illness, and rapidly progressing lower respiratory illness; respiratory failure, septic shock and multi-organ failure resulting in death.

A typical presentation includes:
» fever (>38°C), chills or rigors, cough, shortness of breath
Presentation may include:
» hemoptysis, sore throat, myalgias, diarrhoea, vomiting, abdominal pain

Complications:

» severe pneumonia
» acute respiratory distress syndrome (ARDS)
» acute renal failure
» refractory hypoxaemia

GENERAL MEASURES

All suspected, probable cases and contacts must be discussed and managed in consultation with the regional virologist or infectious diseases specialist at the referral centre. Transfer of patients will only occur once all relevant arrangements have been made to limit further exposure to a potential contagious and life threatening agent.
Droplet precautions should be added to the standard precautions. Airborne precautions should be applied when performing aerosol-generating procedures.

Isolate suspected symptomatic cases at all times.

Management
Treatment
Treatment is supportive.
No antiviral agents are currently available.
Management of contact: consult with NICD and isolate contact.
Record and follow-up all patient contacts.

Prevention
Handwashing and the careful disposal of materials infected with nasal secretions.
Antiseptic/disinfectant solutions: choroxylenol, benzalkonium chloride, and cetrimide.
Chlorhexidine has been shown to be ineffective.

REFERRAL
All cases, after consultation with infectious diseases and NICD.

10.19.1 COVID-19: CORONAVIRUS DISEASE-19
U07.1/U07.2
Note: notifiable medical condition.

Consult the most recent guidelines on the clinical management of suspected or confirmed Covid-19 disease available at:
https://www.knowledgehub.org.za/content/covid-19

DESCRIPTION
» Viral respiratory illness caused by the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2).
» The mean incubation period is 4-5 days but may be up to 14 days. Patients may however be infectious for 2-3 days prior to the onset of symptoms.
» The elderly are at high risk for severe COVID-19 disease. Other risk factors include cardiopulmonary comorbidities, uncontrolled diabetes mellitus, obesity, TB, HIV, mental illness and substance use disorders. *LoE:IIIb*[18]
» COVID-19 presents as an asymptomatic infection; or as a respiratory tract infection that may range from mild to severe, with atypical manifestations such as diarrhoea, skin manifestations, hyperglycaemic syndromes, and large vessel strokes.

» A suspected COVID-19 case includes any person presenting with an acute (≤14 days) respiratory tract infection or other clinical illness compatible with COVID-19, or an asymptomatic person who is a close contact to a confirmed case.
» In the context of COVID-19, the key respiratory syndrome consists of ANY of:
  - Cough
  - Sore throat
  - Shortness of breath
  - Anosmia (loss of smell) or dysgeusia (loss of taste)
» This may present with or without other symptoms (such as fever, weakness, myalgia or diarrhoea).

» Complications include refractory hypoxaemia, acute respiratory distress syndrome (ARDS), long-COVID and multisystem inflammatory syndrome in children (MIS-C) and in adults (MIS-A).

Testing
» Rapid antigen tests or PCR-based tests are both acceptable options to use for diagnosis. Rapid antigen tests may be performed on all patients for whom the PCR

test is indicated in situations where no PCR tests are available, or when the PCR turnaround time limits the clinical or public health response utility.
» Upper respiratory tract (nasopharyngeal or oropharyngeal) samples should be sent on all patients. Sputum can be sent when available.
» A single positive rapid or PCR test is sufficient proof of COVID-19 infection.
» A negative rapid test should be followed up by a PCR test if the patient has symptoms compatible with COVID or if the patient has had a recent exposure to a confirmed case.
» Due to poor sensitivity within the first 1-2 weeks after symptom onset, serology (antibody test) is not recommended for the diagnosis of acute COVID-19 infection.
» All healthcare workers should wear appropriate personal protective equipment (PPE) for both contact and respiratory precautions when obtaining specimens
» Record and report and notify all confirmed COVID-19 cases. *LoE:IVb*[19]

GENERAL MEASURES

» Manage patients who are asymptomatic or who meet criteria for mild disease at home, provided they can safely self-isolate and seek urgent health care if required.
» Give strict advice to patients who self-isolate at home and how to reduce possible transmission to others.

Criteria for management at home (for age >12 years):

Mild disease:
» SpO2 ≥95%
» Respiratory rate <25 breaths/minute
» HR <120 beats/minute
» Mental status normal

Able to safely self-isolate:
» Separate bedroom available for patient to self-isolate in
» Able to maintain physical distancing at home
» Able to maintain hand hygiene
» Patient able to contact, and return to, healthcare facility in case of progression to severe disease

MEDCINE TREATMENT

Note: Antibiotics are of no value for the treatment of confirmed COVID-19, unless there is clear evidence of a coexisting infection.

Paracetamol is recommended for symptomatic treatment of patients with pain in preference to nonsteroidal anti-inflammatory drugs (NSAIDs).

Children
- Paracetamol, oral, 10–15 mg/kg/dose 6 hourly when required. See dosing table, pg 23.8.

Adults
- Paracetamol, oral, 1 g 4–6 hourly when required.
  - Maximum dose: 15 mg/kg/dose.
  - Maximum dose: 4 g in 24 hours.

Note:

» Any deterioration in the ability to perform activities of daily living at home as a result of dyspnoea should prompt re-evaluation at a healthcare facility.
» Corticosteroids should not be used for the treatment of COVID-19 in patients who do not require supplemental oxygen or mechanical ventilation, unless they are required for another reason such as an acute exacerbation of asthma or chronic obstructive pulmonary disease.

COVID-19 HOTLINE NUMBER
0800029999
http://www.nicd.ac.za/ ; https://sacoronavirus.co.za/

Infection Prevention and Control (IPC)

» Practice hand hygiene.
» Use healthcare worker PPE: gloves, gown (or apron), and a medical mask.
» Practice safe waste management.
» Use either disposable or dedicated equipment (e.g. stethoscopes, blood pressure cuffs and thermometers). If equipment needs to be shared among patients, clean and disinfect between each patient use.
» Limit patient movement within the institution and ensure that patients wear medical masks when outside their rooms.

Comprehensive national IPC guidelines for COVID-19 are available at:
https://www.knowledgehub.org.za/content/covid-19

REFERRAL

Urgent

Refer cases urgently where there is a respiratory rate of >25 breaths/minute, SpO2 <94% in patients breathing room air or oxygen, heart rate of >120 beats/minute, are confused, agitated or have decreased consciousness. Administer oxygen and monitor oxygen saturation during referral. If unsure, consult with ID expert or NICD (see above).

LoE:IIIb[20]

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SOUTH AFRICAN PRIMARY HEALTHCARE LEVEL ESSENTIAL MEDICINES LIST
CHAPTER 10: INFECTIONS
NEMLC RECOMMENDATIONS FOR MEDICINE AMENDMENTS (2020 -2023 REVIEW CYCLE)

Medicine amendment recommendations, with supporting evidence and rationale are listed below.
Kindly review the medicine amendments in the context of the respective standard treatment guideline (STG).

All reviews and costing reports may be accessed at: https://www.knowledgehub.org.za/content/standard-treatment-guidelines-and-essential-medicines-list

MEDICINE AMENDMENTS:

SECTION	MEDICINE/MANAGEMENT	ADDED/DELETED/AMENDED
10.7.2 Malaria, severe/complicated	Quinine, parenteral	Not added as a therapeutic alternative
	Artesunate, parenteral	Retained & dosing amended
10.7.3 Malaria, prophylaxis	Doxycycline, oral	Added (for non-pregnant adults & children ≥8 years)
	Atovaquone-proguanil, oral	Not added
	Mefloquine, oral	Not added
NEW: Malaria, reduction in transmission	Primaquine, oral	Not added
10.14 Tick bite fever *- In pregnancy*	Doxycycline	Added as initial therapy
	Azithromycin	Retained
10.19.1: Coronavirus Disease-19 (COVID-19)	Antibiotics	Statement added that antibiotics are of no value for the treatment of confirmed COVID-19, unless there is clear evidence of a co-existing infection
	Antigen and PCR tests	Amended to align with NDoH policy
	Referral	Aligned with the Adult Hospital Level COVID-19 STGs in terms of SpO2

10.7.2 MALARIA, SEVERE/COMPLICATED

Quinine, parenteral: *not added as a therapeutic alternative*
Artesunate, parenteral: *retained and dosing amended*
Parenteral quinine was not added as a therapeutic alternative for the management of complicated *Plasmodium falciparum.* Artesunate has a superior effect on mortality compared to quinine RR 0.76 (95% CI 0.65 to 0.9), *(reviewed in previous review cycle).* Artesunate is currently SAHPRA-registered and widely available.

NEMLC also noted with concern reports of quinine being administered for treatment of severe complicate malaria, despite the availability of artesunate (and artesunate has also been added to the medicine tracer list for the PHC ideal clinic/CHC framework).

Level of Evidence: I Systematic review of high certainty[1]

Artesunate, IM dosing

[1] Artesunate, IV: Artesunate, parenteral: Sinclair D, Donegan S, Isba R, Lalloo DG. Artesunate versus quinine for treating severe malaria. Cochrane Database Syst Rev. 2012 Jun 13;6:CD005967. http://www.ncbi.nlm.nih.gov/pubmed/22696354

Aligned to 2022 WHO Malaria Guidelines[2] and SAMF[3], based on a pharmacokinetic modelling study[4] that showed that smaller children need higher dosing of intramuscular artesunate.
Level of Evidence: III Pharmacokinetic study

The STG was amended to include the following text:

Children < 20 kg:
- Aresunate IM, 3 mg/kg immediately as a single dose and refer urgently.
  - If transfer to referral hospital is delayed, administer second dose at 12 hours and third dose at 24 hours.

Dosing guidelines developed in collaboration with Medicines for Malaria Venture is recommended for inclusion in the PHC STGs and EML.

10.7.3: MALARIA PROPHYLAXIS

Doxycycline, oral: *added for non-pregnant adults & children ≥8 years*
Atovaquone-proguanil, oral: *not added*
Mefloquine, oral: *not added*

BACKGROUND: Historically, malaria chemoprophylaxis was not considered for inclusion on the national EML, as the NDoH Malaria Programme was not able to provide estimated numbers of travellers requiring prophylaxis in order to determine an estimated budget impact[5]. In addition, a request had been made previously to the Programme to advise of the delivery platform model for malaria chemoprophylaxis. However, recently, the South African Malaria Elimination Committee provided annual case-load reports (2019/2020), to estimate the approximate budgetary investment to provide malaria chemoprophylaxis at primary level of care.

Refer to the medicine review: Malaria chemoprophylaxis, 13 June 2021, below.

Doxycyline as Malaria Prophylaxis_PHC Med

Recommendation: The PHC/Adult Hospital Level Committee suggests that doxycycline be used as malaria chemoprophylaxis in non-pregnant adults.
Rationale: Available evidence shows that doxycycline reduces parasitemia and clinical malaria due to *P falciparum.* Furthermore, mefloquine is currently unavailable in South Africa, and atovaquone-proguanil is unaffordable.
Level of Evidence: Low certainty evidence
Review indicator: Price reduction of atovaquone-proguanil, availability of mefloquine

NEMLC MEETING OF 24 JUNE 2021:

NEMLC Recommendation: The NEMLC accepted the recommendation of doxycycline as malaria chemoprophylaxis as proposed by the PHC/Adult Hospital Level Committee but included children ≥8 years of age[a].
Recommended dosing:
- *Non-pregnant adults:* Doxycycline oral, 100 mg daily, taken from 2 days prior to entering endemic area until 4 weeks after exiting the endemic area.

[2] WHO Guidelines for malaria, 25 November 2022. Geneva: World Health Organization; 2022 (WHO/UCN/GMP/2022.01 Rev.3). License: CC BY-NC-SA 3.0 IGO.
[3] SAMF, 2022
[4] Hendriksen IC, Mtove G, Kent A, Gesase S, Reyburn H, Lemnge MM, et al. Population pharmacokinetics of intramuscular artesunate in African children with severe malaria: implications for a practical dosing regimen. Clin Pharmacol Ther. 2013 May;93(5):443-50. https://pubmed.ncbi.nlm.nih.gov/23511715/
[5] Minutes of the NEMLC meetings of 2 March 2017, 29 June 2017 and 2 November 2017.

- *Children ≥ 8 years of age:* Doxycycline oral, 2.2 mg/kg/dose daily, taken from 2 days prior to entering endemic area until 4 weeks after exiting the endemic area.

Note: Pregnant women and children <8 years of age should avoid travelling to endemic areas. However, if this cannot be avoided, self-provided malaria chemoprophylaxis should be considered (as recommended by the National Department of Health Malaria Treatment Guidelines)

[a] SAMF, 2020

The STG was updated, accordingly from:

~~In South Africa, malaria prophylaxis should be used, together with preventive measures against mosquito bites, from September to May in high-risk areas. 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 between dusk and dawn include:~~

~~» Use of di-ethyl 3-methylbenzamid (DEET) insecticide impregnated mosquito nets, insecticide coils or pads.~~

~~» Application of insect repellent to exposed skin and clothing.~~

~~» Wearing long sleeves, long trousers and socks, if outside, as mosquitoes are most active at this time.~~

~~» Visiting endemic areas only during the dry season.~~

~~**CAUTION**~~

~~Immunocompromised patients, pregnant women and children <5 years of age should avoid visiting malaria-endemic areas, as they are more prone to the serious complications of malaria.~~

~~Refer to National Department of Health Malaria Guidelines.~~

To:

Description

In South Africa, malaria prophylaxis should be used, together with preventive measures against mosquito bites, from September to May in high-risk areas. It is recommended that persons intending to travel to high-risk areas take the relevant prophylactic therapy. Prophylactic therapy must be started before entering the malaria area, and continued for a period of time after exiting the malaria area.

General measures

Always use preventative measures, in addition to pharmacological therapy, against mosquito bites between dusk and dawn include:

» Use of di-ethyl 3-methylbenzamid (DEET) insecticide impregnated mosquito nets, insecticide coils or pads.

» Application of insect repellent to exposed skin and clothing. Aim for 30% DEET. Don't get on lips, eyes, breaks in skin.

» Wearing long sleeves, long trousers and socks, if outside, as mosquitoes are most active at this time.

» Visiting endemic areas only during the dry season.

Medicine treatment

Prophylaxis

CAUTION

Immunocompromised patients, pregnant women and children <8 years of age should avoid visiting malaria-endemic areas, as they are more prone to the serious complications of malaria.

However, if this cannot be avoided, self-provided malaria chemoprophylaxis should be considered (as recommended by the National Department of Health Malaria Treatment Guidelines)

Non-pregnant adults:

- Doxycycline oral, 100 mg daily.
  - Take from 2 days prior to entering endemic area until 4 weeks after exiting the endemic area.

Children ≥8 years of age:

- Doxycycline oral, 2.2 mg/kg/dose daily.
  - Take from 2 days prior to entering endemic area until 4 weeks after exiting the endemic area.

Note: Doxycycline is contra-indicated in pregnant women, and in children <8 years of age.

In 2023, post publication of the chapter, an external comment was received for the STG to be amended to make it clear that malaria chemoprophylaxis should be used for persons intending to travel both inside and outside of South Africa as most malaria cases are imported from the malaria high-risk areas outside of South Africa. The table of contents heading for section 10.7.3 has also been amended to remove reference to the mention of malaria prophylaxis: "self-provided care" as malaria chemoprophylaxis is no longer only self-provided. A link to the National guidelines for the prevention of malaria has also been added to the STG.

The STG has been editorially amended from:

~~MALARIA, PROPHYLAXIS (SELF-PROVIDED CARE)~~

~~Z29.1~~

~~DESCRIPTION~~

~~In South Africa, malaria prophylaxis should be used, together with preventive measures against mosquito bites, from September to May in high-risk areas. It is recommended that persons intending to travel to high-risk areas take the relevant prophylactic therapy. Prophylactic therapy must be started before entering the malaria area, and continued for a period of time after exiting the malaria area.~~

~~GENERAL MEASURES~~

~~**Always use preventative measures, in addition to pharmacological therapy,** against mosquito bites between dusk and dawn:~~
~~» Use di-ethyl 3-methylbenzamid (DEET) insecticide impregnated mosquito nets, insecticide coils or pads.~~
~~» Apply insect repellent to exposed skin and clothing. Aim for 30% DEET. Don't get on lips, eyes, breaks in skin.~~
~~» Wearg long sleeves, long trousers and socks, if outside, as mosquitoes are most active at this time.~~
~~» Visit endemic areas only during the dry season.~~

~~MEDICINE TREATMENT~~

~~**Prophylaxis**~~

~~**CAUTION**~~

~~Immunocompromised patients, pregnant women and children <8 years of age should avoid visiting malaria-endemic areas, as they are more prone to the serious complications of malaria.~~

~~However, if this cannot be avoided, self-provided malaria chemoprophylaxis should be considered (as recommended by the National Department of Health Malaria Treatment Guidelines~~

To:

MALARIA, PROPHYLAXIS

Z29.1

DESCRIPTION

In South Africa, malaria chemoprophylaxis should be used, together with preventive measures against mosquito bites, from September to May in moderate-risk malaria-endemic areas. Risk areas in South Africa are shown in the map included in the National Guidelines for the Prevention of Malaria (2018) found at : https://www.nicd.ac.za/wp-content/uploads/2019/03/National-Guidelines-for-prevention-of-Malaria_updated-08012019-1.pdf

Malaria chemoprophylaxis is recommended for persons intending to travel to malaria-endemic areas within and outside of South Africa . There are moderate- and high-risk areas in neighbouring countries. Chemoprophylaxis must be started before entering the malaria area, and continued for a period of time after exiting the malaria area.

GENERAL MEASURES

Always use preventative measures, in addition to pharmacological therapy, against mosquito bites between dusk and dawn:
» Use di-ethyl 3-methylbenzamid (DEET) insecticide impregnated mosquito nets, insecticide coils or pads.
» Apply insect repellent to exposed skin and clothing. Aim for 30% DEET. Don't get on lips, eyes, breaks in skin.
» Wear long sleeves, long trousers and socks, if outside, as mosquitoes are most active at this time.
» Visit endemic areas only during the dry season.

MEDICINE TREATMENT

Prophylaxis

CAUTION

Immunocompromised patients, pregnant women and children <8 years of age should avoid visiting malaria-endemic areas, as they are more prone to the serious complications of malaria.

However, if this cannot be avoided, malaria chemoprophylaxis should be considered (as recommended by the National Guidelines for the Prevention of Malaria (2018) found at: https://www.nicd.ac.za/wp-content/uploads/2019/03/National-Guidelines-for-prevention-of-Malaria_updated-08012019-1.pdf

However, as only doxycycline is provided in the public sector, alternative options for pregnant women and children <8 years of age need to be purchased in the private sector.)

MALARIA, REDUCTION IN TRANSMISSION

Primaquine, oral: *not added*

Refer to the medicine review: Single, low-dose primaquine to reduce *P. Falciparum* malaria transmission, 25 January 2021.

Primaquine for malaria elimination_Ac

Recommendation: The PHC/Adult Hospital Level Committee proposed that single low-dose primaquine (0.25mg/kg), be added to artemisinin-based treatment for *P. falciparum* malaria, to reduce transmission. Pre-testing for G6PD deficiency is not required unless there is a clinical indication.

Rationale: Evidence of efficacy and safety for SLD primaquine for reducing gametocyte carriage.

Level of Evidence: II Moderate certainty evidence

Review indicator: Evidence of reduced community transmission

HOWEVER, THE NEMLC REVIEWED THE EVIDENCE PRESENTED BY THE PHC/ADULT HOSPITAL LEVEL COMMITTEE AND RECOMMENDED THE FOLLOWING (SEE BELOW):

NEMLC MEETING 25 FEBRUARY 2021:

NEMLC Recommendation: NEMLC acknowledges that there is reasonable evidence showing that primaquine, single dose (SLD), reduces gametocyte carriage. However, there is uncertainty regarding the actual effect on reduction of transmission and malaria eradication *(South African Malaria Elimination Committee was engaged, but no further evidence was forthcoming).* As SAHPRA registration of this product is currently underway, NEMLC recommends that including primaquine SLD on the national EML is premature for use from primary level of care. However, this will be revisited once the product is SAHPRA registered.

Rationale: Routine section 21 access at primary level of care, specifically by nurse prescribers, of an essential medicine is problematic in terms of continuous availability and consistency of price.

Review indicator: Availability of SAHPRA registered primaquine products.

In 2024 post publication of the chapter, an external comment recommended for better clarity in STG

10.14 TICK BITE FEVER

In pregnancy

Doxycycline: *added as initial therapy*

Azithromycin: *retained*

Doxycycline is the antibiotic of choice for the treatment of tick bite fever.[6] However, doxycycline is generally avoided for use in pregnancy, as other tetracyclines have been associated with adverse effects on fetal teeth and bones.[7] A systematic review[8] demonstrated that doxycycline use by these patient groups had a safety profile that differed from that of tetracycline, with no correlation between doxycycline and teratogenic effects during pregnancy or dental

[6] Frean J, Grayson W. South African Tick Bite Fever: An Overview. Dermatopathology (Basel). 2019 Jun 26;6(2):70-76. https://pubmed.ncbi.nlm.nih.gov/31700846/

[7] SAMF, 2022

[8] Cross R, Ling C, Day NP, McGready R, Paris DH. Revisiting doxycycline in pregnancy and early childhood--time to rebuild its reputation? Expert Opin Drug Saf. 2016;15(3):367-82. https://pubmed.ncbi.nlm.nih.gov/26680308/

staining in children. In addition, a retrospective cohort study suggests that doxycycline (and other antibiotics – azithromycin, ciprofloxacin and amoxicillin) used by pregnant women should not result in a greater incidence of overall major congenital malformations in their infants.[9]
As there is a high fetal risk associated with rickettsial illnesses in pregnancy (higher than in malaria),[10] treatment with doxycycline outweighs the risks and consequences of the side effects associated with doxycycline. Early initiation of empirical doxycycline, to bypass any diagnostic challenges associated with rickettsial infections may likely save lives and prevent severe disease.

The PHC STGs and EML recommends initial treatment with doxycycline for 2 days, followed by azithromycin, for tick bite fever in pregnancy.

STG text was updated as follows:

In pregnancy:
- Doxycycline, oral, 100 mg 12 hourly for 2 days.

Then switch to:
- Azithromycin, oral, 500 mg 12 hourly for 3 days.

Level of Evidence: Very low certainty, conditional recommendation

10.19.1: CORONAVIRUS DISEASE-19 (COVID-19)

Description: A statement was added to the narrative that antibiotics are of no value for the treatment of confirmed COVID-19 unless there is clear evidence of a co-existing infection.

Testing: Guidance on the use of antigen and PCR COVID-19 tests for diagnosis of COVID-19 was aligned with National Department of Health Policy.[11]
Referral: Referral criterion was amended to align with the Adult Hospital Level COVID-19 STGs in terms of SpO2 as follows:

Refer cases urgently where there is a respiratory rate of >25 breaths/minute, SpO2 <~~95%~~ 94% in patients breathing room air or oxygen, heart rate of >120 beats/minute, are confused, agitated or have decreased consciousness. Administer oxygen and monitor oxygen saturation during referral. If unsure, consult with ID expert or NICD (see above).

[9] Cooper WO, Hernandez-Diaz S, Arbogast PG, Dudley JA, Dyer SM, Gideon PS, et al. Antibiotics potentially used in response to bioterrorism and the risk of major congenital malformations. Paediatr Perinat Epidemiol. 2009 Jan;23(1):18-28. https://pubmed.ncbi.nlm.nih.gov/19228311/
[10] McGready R, Prakash JA, Benjamin SJ, Watthanaworawit W, Anantatat T, Tanganuchitcharnchai A, et al. Pregnancy outcome in relation to treatment of murine typhus and scrub typhus infection: a fever cohort and a case series analysis. PLoS Negl Trop Dis. 2014 Nov 20;8(11):e3327. https://pubmed.ncbi.nlm.nih.gov/25412503/
[11] National Department of Health. Guide to antigen testing for SARS-COV-2 in South Africa, 21 July 2021.