

STANDARD TREATMENT GUIDELINES FOR COMMON ILLNESS OF ADULTS IN PAPUA NEW GUINEA

A Manual for Nurses,
Health Extension Officers and Doctors

National Department of Health

6th edition 2012



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Foreword

Papua New Guinea has been a leader in the development and use of standard treatment manuals. These manuals have played a vital and significant role in the management of patients and in the training of health workers at all levels. They are linked to training curricula and to medical supply system. The standard treatments in this manual should be used in all cases unless there are specific professional reasons to do otherwise. This will ensure safe, appropriate, and cost-effective management of patients.

This edition has been considerably revised. It reflects the changing disease patterns in PNG, and includes new drugs and new treatment protocols. The National Health Service Standards was used as a guide for the alignment of this adult standard treatment manual. It is a companion to similar manuals in Paediatrics, Obstetrics & Gynaecology and Surgery.

Patients throughout Papua New Guinea are becoming more aware of their needs as well as their rights. All health workers have a moral and ethical duty to ensure patients' needs are addressed including questions about side effects of drugs and possible complications of procedures.

I acknowledge the efforts of Dr Goa Tau CMO, Dr Lloyd Ipai Chief Physician, the Society of Physicians, all chiefs of clinical disciplines in updating this manual, and the contribution by Dr Laurens Manning and WHO of editorial assistance and funding.



Mr Pasco Kase
Secretary for Health

About the 6th Edition

A. Changes in treatment strategy

- i. Malaria, TB and many bacteria are becoming increasingly resistant to many common antimicrobials. The 6th edition of the adult standard treatment guidelines (STG) reflects this trend and is based on local resistance data from the National Department of Health and the Papua New Guinea Institute of Medical Research. First line treatment of malaria, severe bloody diarrhoea, acute bacterial meningitis and empiric treatment of severe sepsis have changed. Second line treatments for malaria, TB skin, soft tissue, bone and joint infections and urinary tract infections have also been changed.
- ii. The 6th edition of the adult STG is published at the same time as new specific STGs for malaria, TB/Leprosy, HIV/AIDS and diabetes. All are comprehensive, endorsed by the NDoH and have been produced by local and international experts in each field. In the interests of space, we have attempted to incorporate key recommendations from each disease specific STG, rather than simply transport each in its entirety. Health workers with a particular interest in any of these conditions should refer to the specific STG.
- iii. Fixed drug combinations (FDCs) are now recommended for malaria, TB and HIV/AIDS. This means many of the drugs previously prescribed as single agents will now be combined in a single tablet or capsule. For example, the first line treatment for uncomplicated malaria is now artemether-lumefantrine (also known as Mala-1, Co-artem, Lumartem or AL) with both ingredients in the same tablet. As a result, tablets containing only artesunate or artemether will no longer be available. FDCs that contain the second line treatment for malaria (dihydroartemisinin-piperazine [DP]), all 4 first line TB drugs and most HIV medications will also be available.
- iv. Drug information for the medicines available has been removed as the PNG National Formulary (PNGNF) containing information about medicines from the National Essential Medicine List is published. All medicines mentioned in the 6th edition of the adult STG are included in the PNGNF.

B. New chapters/Sections

This edition includes new chapters on obesity, cholera, influenza like illnesses (ILI) and scabies. The annex also contains section on normal values for biochemistry and haematology for adults and children. An additional annex is also provided on how to do a malaria rapid diagnostic test (RDT).

C. Abbreviations

AFB	Acid Fast Bacilli
AIDS	Acquired immuno-deficiency syndrome
b.d./bid	twice daily/ every 12 hours
BP	Blood Pressure
cap	capsule/capsules
COPD	Chronic Obstructive Pulmonary Disease (same as COAD/COPD)
CSF	Cerebrospinal Fluid
DOT	Directly Observed Treatment
DOTS	Directly Observed Treatment, Short course
ECG	Electrocardiogram
g	gram
GIT	Gastrointestinal Tract
Hb	Haemoglobin
HEO	Health Extension Officer
HIV	Human Immunodeficiency Virus
HMS	Hyper-reactive malarious splenomegaly
IM	Intramuscular injection
INH /H	Isoniazid (anti-TB drug)
IV	Intravenous injection
kg	kilogram
L./l.	litre
MB	Multi-bacillary (Leprosy)
mg	milligram
ml	millilitre
MDT	Multidrug therapy
MI	Myocardial Infarction
MRSA	Methicillin-resistant Staphylococcus aureus
MU	Mega-units of penicillin
NACS	National AIDS Council Secretariat
NDoH	National Department of Health
NSAID	Non-steroidal anti-inflammatory Drug
o.d	once daily
ORS	Oral Rehydration Solution
PB	Pauci-bacillary (Leprosy)
PID	Pelvic Inflammatory Disease
RDT	Rapid Diagnostic Test
q.d./qid	4 times daily/every 6 hours
s.c	sub-cutaneous
stat	immediately
STI	Sexually Transmitted Infection (previously called STD)
tab	tablet/tablets
TB	Tuberculosis
t.d.s/tid	3 times daily/ every 8 hours
UTI	Urinary tract infection

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1 General Management Principles and Emergencies

1.1 Anaphylaxis

Anaphylaxis is a severe allergic reaction to penicillin, other drugs, insect stings, vaccines or foods. This is a life-threatening emergency that may be fatal and requires urgent treatment.

Symptoms and signs

- Skin rash
- Swelling of face
- Shock (fast pulse, low BP)
- Shortness of breath with wheeze or stridor

Treatment

- Give:

adrenaline 1:1000 0.5ml IM.

Repeat every 10 minutes until the patient improves

- Give oxygen 4 litres per minute by mask
- IV fluids as for shock (on page 6)
- Then give:

hydrocortisone 100mg IV stat

- Treat wheezing as for severe asthma (on page 77)
- Get further advice from Medical Officer
- When stable, give:

prednisolone (1mg/kg o.d for 5 days) AND

promethazine (25mg o.d for 5 days)

Follow-up

Patients who get anaphylaxis from penicillin or another drug must NEVER have that drug again. Educate the patient, and write it clearly on his or her treatment card.

1.2 Analgesia (Pain Relief)

Assessment

Classify according to severity and whether acute or chronic (table 1).

Table 1. Simple Classification of Pain

Severity of pain		Acute vs. Chronic	
Mild	Can do normal activities	Acute	Present for hours or days
Moderate	Unable to do normal activities but can still sleep at night	Chronic	Present for weeks, months or years
Severe	Unable to sleep at night		

Make a diagnosis; look for and treat the cause of pain.

Treatment

- For acute mild pain (e.g. minor injuries) use:
*aspirin 600mg (2 tabs) q.i.d. OR
paracetamol 1g (2 tabs) q.i.d.*
- For acute moderate pain (e.g. septic arthritis on page 13) use:
*aspirin 600mg (2 tabs) q.i.d. OR
paracetamol 1g (2 tabs) q.i.d. AND
indomethacin 25mg (1 tab) up to q.i.d. AND/OR
codeine phosphate 30-60mg (1-2 tabs) up to q.i.d*
- For acute severe pain (e.g. fracture, peritonitis, heart attack on page 16) use:
*pethidine 50-100mg IM OR
morphine 5-10mg IM as required every 4-6 hours*
- For moderate or severe pain due to renal colic use:
indomethacin suppositories (100mg as required t.d.s)
- For mild chronic pain use:
paracetamol 1g (2 tabs) q.i.d.
- DO NOT give pethidine or morphine for chronic pain (headache, back pain) unless prescribed by Medical Officer

Precautions with pain relievers (analgesics)

Codeine phosphate, pethidine and morphine (opioids) can cause nausea, vomiting, constipation, sedation and convulsions.

- For opioid induced nausea and vomiting use:
chlorpromazine 25mg (1ml) IM up to q.i.d.

- For prevention and treatment of constipation due to opioids use:
senna 7.5 – 15mg (1-2 tabs) o.d OR
coloxyl and senna (1-2 tabs) o.d
- Avoid indocid and diclofenac if significant kidney disease or active bleeding
- DO NOT give aspirin if bleeding or suspected peptic ulcer (on page 39)
- All morphine and pethidine dosages must be strictly recorded

Refer if

- No obvious cause of pain can be found
- Moderate pain does not improve in a few days
- Severe pain
- Chronic pain not responding to simple analgesics

1.3 Burns

Emergency Management

- Clear and secure the airway
- Pain relief:
pethidine 75mg (1.5ml) IM for small adult,
100mg (2ml) for large adult

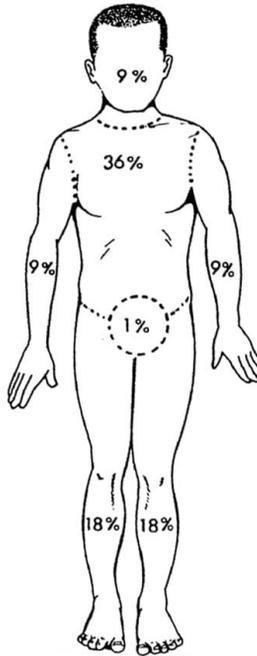
Assessment

Decide how much area has been burnt using the 'Rule of Nines':

Head and Neck	9%
Each arm	9%
Each leg	18%
Back and buttocks	18%
Front of chest and abdomen	18%
Genitalia	1%

Draw a picture of the body with the burns and estimate the total area burnt using the Rule of Nines. Count only areas burnt enough to cause fluid loss, not areas that are only red (see below).

Figure 1. Estimating body surface area affected by burns



- Decide how deep the burns are
- Partial thickness burns are inflamed and/or blistering. There is normal or reduced sensation and normal hair follicles. Full thickness burns are leathery or black, lack sensation and have no hair follicles

Treatment

Fluid loss kills the patient early. Infection kills the patient a little later. Contractures cause severe disability if they are not thought of early.

Fluid management

- If less than 20% burned (< 15% if over 65 years) give:
Oral Rehydration Solution (on page 52), 400ml every 3 hours
- If more than 20% burned (> 15% if over 65 years) give:
*normal saline 1 litre as fast as it will go,
then work out exactly how much fluid is needed*

Planning fluid requirements

Amount of fluid needed in the first 24 hours (volume in ml.) =
area of burns (%) x weight (kg) x 4

Using normal saline, give half this amount in the first 8hr, one quarter in the next 8 hrs and one quarter in the third 8 hrs. The 'first 24 hours' starts when the person was burnt, not when you first saw them. Insert indwelling urinary catheter and measure urine output. Increase fluids if necessary to maintain a urine output of at least 50ml/hr.

Treat the burn site

For serious burns, put on sterile dressing soaked in saline and keep patient warm during transfer to hospital. For less serious burns, treat as follows:

- Clean burned area with normal saline
- Cut off dead skin and tissue but not blisters
- Dressing: apply silver sulfadiazine (SSD) cream every day
- DO NOT put any dressings on unless the hands and fingers are affected. If they are, use paraffin gauze dressing and bandage each finger separately
- Each day wash with saline and apply more silver sulfadiazine until healed
- If silver sulfadiazine (SSD) cream is not available, then apply an antiseptic dressing to the burned area and change the dressing every 3 days
- Splint straight any joint affected (e.g. knee, elbow, wrist)
- Nurse under mosquito net to prevent flies and insects from infecting the wound

Watch for and prevent infection

- Give: TETANUS TOXOID 0.5ml subcutaneously stat
- Infection normally occurs after day 5
- If mild infection develops use:
amoxicillin 500mg t.d.s 5 days
- If no improvement, or severe infection use:
chloramphenicol 1g IV q.i.d.

Prevent contractures

- Move all joints each time a dressing is done and encourage patient to move joints
- Splint joints straight (e.g. elbow, knee, wrist)
- Bandage fingers separately

Refer if

- Airways involved
- Burns over 20%
- Compromised circulation

- Full thickness burns of hands, fingers or face, even if small areas
- Not able to give enough IV fluids to keep good urine output
- Surgery needed – debridement, skin graft or repair of contracture (non-urgent)

But, before urgent transfer of serious burns, do the following:

- Make an accurate drawing of the burnt areas of the body (send it with the patient)
- Dress the burns in sterile saline-soaked dressings and cover with plastic (e.g. large plastic bags around a limb)
- Put in a urinary catheter
- Give IV fluids as above, and increase if necessary to make a urine output of at least 50ml/hr
- Give adequate pain relief
- Give first doses of antibiotics
- Do observations (pulse, blood pressure, urine output) every half hour, record and send with patient

Intravenous fluids

Give IV fluids to a patient who

- Cannot drink
- Is shocked
- Is severely dehydrated (on page 50)
- Has burns to more than 20% of the body (on page 3)

DO NOT give IV fluids to a patient with head injury (it may make oedema of the brain worse). Instead, give fluids by mouth or by nasogastric tube.

Replacement fluids for shock

Use: 0.9% sodium chloride (normal saline)

- Give 1 litre as fast as the drip will run
- If signs of shock are still present, give another 1 litre fast
- If there are still signs of shock, give plasma volume expander (e.g. Haemaccel).
Give 1-1.5 litres (2-3 bottles)
- Then give 1 litre of Normal saline every 4 hours until the cause of shock is corrected
- When the patient is no longer shocked, continue maintenance fluids (see above) if necessary

Maintenance fluids for patients who cannot drink

Use: 4.3% dextrose in 0.18% sodium chloride

- Give 1 litre (1000 ml) every 8 hours (3 litres per day)
- Give only 2 litres/day to patients who are unconscious with meningitis or cerebral

malaria, because of possible brain oedema (and give by nasogastric tube rather than IV if possible)

- Give only 1 litre/day to patients with heart failure (on page 17)
- Add 2 grams (8 ml) of potassium chloride if available, to each bag if urine output is adequate (over 1L per day).

Note

Encourage patients to drink (unless there is a good reason why they should not).

1.4 Poisoning

Common ingested poisons in PNG

Chloroquine, mushrooms, methyl alcohol (methanol), cassava (wild), paraquat, pesticides, paracetamol, iron, trumpet flowers, dapsone, aspirin, phenobarbitone, quinine, Derris root, kerosene, petrol, acid, alkali (bleach).

Find out

- What drug or poison was swallowed
- How much was taken
- What time this happened
- Why and how it happened (attempted suicide is common)

Treatment

- Under normal circumstances, make the patient vomit
- DO NOT make the patient vomit if he or she:
 - Has swallowed kerosene, petrol, acid or alkali (e.g. bleach, toilet cleaner)
 - Is unconscious or drowsy
 - Took the poison more than 4 hours ago (6 hours for aspirin or antidepressants such as amitryptilline)

For kerosene, petrol, acid or alkali ingestion

- DO NOT make the patient vomit. DO NOT give Ipecac.
- Give milk to drink
- If cough or shortness of breath occurs, start treatment for pneumonia (on page 80) and send to hospital
- If patient is unconscious or drowsy, send immediately to hospital. Make sure patient lies on side during transfer. The patient needs to have an endotracheal tube inserted to protect their airway before the stomach is washed out

For all other poisons (e.g. medicines)

- Give 1-2 cups of milk or water to drink

- Make the patient vomit:
- Rub the back of the throat with a spatula or spoon handle
- If vomiting does not occur, give:
 - Syrup of Ipecac 30mls*
- Repeat after 20 minutes if the first dose fails
- If attempts to produce vomiting fail or Ipecac is not available, position the patient with a head-down tilt and pass a large nasogastric tube into the stomach. Check that the tube is in the stomach by blowing air down the tube and listening with a stethoscope; or see if the aspirate turns blue litmus paper red. Pour about 400ml of water down the tube and let the water run out. Repeat until the fluid running out contains no food or drugs. It is not necessary to wash out the stomach if the patient has vomited adequately
- If the patient has presented within 1 hour, after emptying the stomach give:

Activated charcoal 100g

- Keep ALL patients under close observation for 24 hours

Refer if

- Unconscious on admission (see care of the unconscious patient on page 72)
- Drowsy or semiconscious
- Burns in mouth or throat
- Serious poisoning with poisons requiring special measures (see below)

Note

In chloroquine or quinine overdose, removing drugs from the stomach quickly (as above) is the most important treatment. Also consider giving diazepam (Medical Officer Only)

Prevention

Teach people to keep kerosene, drugs and other poisons in a safe place. Poisons should NOT be kept in plastic drink bottles.

1.5 Shock

Causes of shock

- Blood loss, e.g. trauma, PPH, vomiting blood, black pekpek
- Anaphylaxis (on page 1)
- Severe dehydration (on page 50)
- Sepsis (on page 62)

Signs of shock

- Pulse rate more than 100/min, weak and thready
- Blood pressure systolic less than 90mmHg
- Urine output nil or less than 100ml in the first hour
- Pale and sweaty
- Confusion

Treatment

- Lie patient down with legs raised
- Oxygen by mask 4 litres/min
- Place largest cannula into the largest vein possible
- IV fluids (on page 6)
- Insert urinary catheter and measure urine output hourly
- Diagnose and treat the cause (see relevant disease)

Refer if

- Cause is blood loss or septicaemia (start treatment before transfer)
- Severe dehydration is not improved after 4 hours of IV fluids

1.6 Snakebite

- ADMIT ALL PATIENTS who say they have been bitten by a snake
- OBSERVE the patient for SIGNS OF ENVENOMING (poisoning):

Early symptoms and signs

- Pain and tenderness in the lymph glands of the bitten limb
- Abnormal respiration
- Abdominal pain and vomiting
- Headache
- Occasionally collapse with loss of consciousness

Other symptoms and signs due to muscle weakness or bleeding abnormalities

(*Indication for airway support)

- Ptosis (drooping eyelids)
- Difficulty seeing properly or fixed eyeballs
- Thick speech or difficulty opening mouth
- Difficulty spitting out saliva*
- Poor cough*

- Difficulty breathing*
- Weakness of the limbs
- Bleeding (not usually seen in death adder bite)
- Abnormal clotting test (see below)
- Spitting or vomiting blood or bleeding gums, bleeding from bite site, venipuncture site or into skin, blood in urine

Note

The site of a death adder bite does not bleed, but may be swollen and tender.

Keep the patient in the health centre or hospital for at least 3 days. If no signs of envenoming (poisoning) occur within 3 days after the bite, the patient can be discharged.

Treatment

FIRST AID – BANDAGE AND IMMOBILISE LIMB

- Clean the skin around the bite, wiping away from the bite site.
- Apply firm bandage to the whole bitten limb (at least firm as for a sprained ankle)
Begin at the hand or foot and bandage towards the shoulder or thigh. Use broad crepe or elasticised bandages if possible (or wide strips of cloth)
- Splint whole limb (put the splint OUTSIDE the bandages)
- DO NOT apply a tight tourniquet
- DO NOT cut or suck the wound
- DO NOT remove the bandage until IV drip is inserted and antivenom is ready (the bandage can remain for hours, or even days if necessary – this is why it must not be too tight)
- Transport the patient as soon as possible

BED REST - The patient must keep still

- Nurse patient on the side and keep airway clear

CLOTTING TEST

- Take 10ml of blood from patient and put it in a glass tube or bottle. Leave standing for 20 minutes then gently tilt to see if clotting has occurred. If blood has not clotted after 20 minutes, this is an **ABNORMAL CLOTTING TIME** and the patient needs antivenom.

TETANUS TOXOID 0.5 ml IM Stat

ANTIVENOM

- Give antivenom if any symptoms and signs of envenomation (see above) are present
- Give **POLYVALENT ANTIVENOM** if you are not sure about the identity of the snake
- Give **DEATH ADDER ANTIVENOM** if you are certain that the snake is a death adder

(based on firm identification of killed snake - snake not more than 1 metre in length, flat diamond shaped head)

Method of giving intravenous antivenom

- The antivenom should be either injected IV directly into a Normal saline or dextrose/saline drip which is running OR run from a 100ml burette after dilution with a Normal saline or dextrose/saline to 100ml total burette volume. If there is no burette available, empty 1 litre Normal saline bag to 100ml – and use as burette
- Infuse a few drops of antivenom over one minute
- Look for signs of reaction to antivenom: (fever, itching, rash, swollen face, cough, shortness of breath, wheeze, shock)
- If there is no reaction within 5 minutes, infuse the rest of the antivenom over 20-30 minutes
- Take pulse and blood pressure every 5 minutes while antivenom running
- If a reaction occurs stop giving antivenom and give:
 - adrenaline (1:1000) ½ ml IM stat AND*
 - promethazine 25mg (1ml) IV slowly over 1 minute AND*
 - hydrocortisone 100mg (2ml) IV AND*
 - oxygen 4 litres/min by mask*
- Intravenous fluids necessary if hypotension and/or tachycardia
- Once reaction has settled, start the antivenom again and give slowly over 1 hour, but stop if the patient's reaction gets worse

Note

- In death adder bites the patient should improve with antivenom within 12 hours
- In bites from other snakes the patient usually does NOT initially improve with antivenom, but should stop getting worse

If you have no antivenom

- If the patient has signs of envenoming and you have no antivenom, make IMMEDIATE arrangements to transport the patient to hospital, or to another health centre that has supplies of antivenom
- If snake is identified as death adder and there is muscle weakness of limbs, difficulty seeing, swallowing or talking, give:
 - neostigmine 2.5mg IV slowly AND*
 - atropine 0.6mg IV slowly (to counteract slow pulse caused by neostigmine)*
- Leave the bandages on during transport
- Keep the patient in the recovery position
- Patient must be escorted by HEO or nursing officer with bag and mask for support of ventilation if necessary

If no signs of envenoming are present

- HOURLY OBSERVATIONS for a minimum of 24 hours
- REPEAT BLOOD CLOTTING TEST every 3 hours
- WAKE THE PATIENT UP TO TAKE OBSERVATIONS
- STRICT FLUID BALANCE – refer to hospital if urine output decreasing

2 Bone and joint diseases

2.1 Arthritis

Arthritis may be acute (few days) or chronic (weeks or months). It may involve a single joint, a few joints, or many joints.

2.1.1 Acute Arthritis

Table 2. Acute arthritis

Severity of pain	Acute vs. Chronic
Gout (severe pain in a single joint)	Gout
Septic arthritis (severe pain one joint, bacterial)	Gonococcal arthritis
Trauma (usually single joint)	Non-septic arthritis, also called tropical or reactive arthritis (usually involves many joints, and is the single most common cause of arthritis in young adults)
Gonococcal arthritis	Rheumatic fever (involves many joints, mainly elbows and wrists, pain flits from joint to joint)

Investigations

Aspirate the joint using full sterile precautions if there is an effusion (joint tense and painful) in a large joint. Send to laboratory for cell count, culture and microscopy.

Treatment

If pus is found refer to hospital for drainage and washout (and treat for septic arthritis). If no pus is found proceed as below.

- Splint and rest
- Pain relief. Give:
paracetamol 1g (2 tabs) q.i.d AND/OR
indomethacin 25-50mg (1-2 tabs) t.d.s OR
aspirin 600mg (2 tabs) q.i.d OR
diclofenac 25-50mg (1-2 tabs) t.d.s
- Antibiotics. Give:
flucloxacillin 1g (2 tabs) q.i.d for 2 weeks minimum unless you are sure there is no infection
- If gonococcal arthritis is suspected they should be examined for STI (on page 41) and treated with:
ceftriaxone 1g IM/IV o.d for 7 days

Refer if

- Not improved after 48 hours of treatment
- You suspect there is an effusion and you cannot aspirate it
- Pain not responding to
- You suspect rheumatic fever (risk of heart complications)

2.1.2 Chronic arthritis**May be caused by:**

- Osteoarthritis (affects large joints, older people)
- Non-specific arthritis (reactive)*
- Gout (base of big toe most commonly affected)
- Tuberculous arthritis (usually has other signs of TB e.g. weight loss)
- Rheumatoid arthritis (symmetrical affecting large and small joints any age group)

*Reactive arthritis may follow urethral discharge (see STI on page 41), dysentery (on page 51) or peptic ulcer (on page 39).

Treatment

- Exercise to strengthen the muscles around the joint
- Give paracetamol as above
- If reactive arthritis suspected give:

*doxycycline 100mg b.d OR
amoxycillin 500mg t.d.s for 5 days*

- For those with recurring episodes of acute gout give:

allopurinol 100-300mg daily, 2 weeks after NSAID treatment and pain subsided

- Also advise about reduction in consumption of purine rich foods (seafood, meat, alcohol).

Refer if

- Patient is not improving
- Tuberculosis or other diseases are suspected

2.2 Osteomyelitis and pyomyositis**2.2.1 Acute Osteomyelitis**

Consider acute osteomyelitis in all patients with a painful limb and fever. If the pain is in the joint, treat for septic arthritis).

Treatment

- Give empiric antibiotics:
flucloxacillin 1g IV q.i.d for 2-6 weeks (see below)
- Refer immediately to medical officer
- Intravenous therapy should continue for a minimum of 2 weeks. Thereafter, give:
flucloxacillin 1g (2 tabs) q.i.d for 4 weeks
- If there is no improvement with flucloxacillin, consider the possibility of MRSA (methicillin-resistant *Staphylococcus aureus*) and give:
lincomycin 600mg IV t.d.s for 2 weeks followed by cotrimoxazole 960mg (2 tabs) b.d for 4 weeks

2.2.2 Chronic Osteomyelitis

Chronic osteomyelitis normally presents with one or more sinuses discharging pus, usually over a long bone in the arm or leg or in the foot. There is often no fever or pain. Refer to Medical Officer for an X-ray, gram stain and culture of bone and pus, and possible surgery.

2.2.3 Pyomyositis

The abscess is in the muscle and does not involve the bone.

Treatment

- Incision and drainage is usually necessary
- If not unwell, give empiric antibiotics:
flucloxacillin 1g (2 tabs) q.i.d for 1 week
- Refer to Medical Officer if fever does not improve after incision and drainage and 2 days of antibiotics
- If unwell, use intravenous antibiotics:
flucloxacillin 1g IV q.i.d for 1 week
- If there is no improvement with flucloxacillin, consider the possibility of MRSA (methicillin-resistant *S. aureus*) and give:
lincomycin 600mg IV t.d.s for 1 week OR if not unwell, cotrimoxazole 960mg (2 tabs) b.d for 1 week

3 Cardiology

3.1 Chest Pain

Chest pain can be a symptom of very severe or life-threatening disease. If in doubt, treat as for heart attack.

Causes

- Heart attack (sudden onset of heavy or tight central chest pain, usually comes on at rest)
- Angina pectoris (similar pain to heart attack but does not last more than 10-15 minutes, comes on with physical exertion [e.g. climbing up stairs or walking] or emotional stress [e.g. anger, excitement], goes away with rest and relaxation)
- Note: both heart attack and angina can be brought on by chewing betelnut
- Pericarditis (usually due to TB - slow onset of sharp pain which is relieved by sitting up and leaning forward, with or without oedema or large liver)
- Pneumonia (slower onset, cough, fever, sharp pain on breathing).
- Rib injury (history of trauma, localised tenderness, sharp pain on breathing)
- Gallstones (crampy pain in lower chest or upper abdomen after fatty meal)
- Peptic ulcer disease/gastro-oesophageal reflux (burning or sharp pain in chest or upper abdomen. See on page 39)
- Pancreatitis (see Abdominal pain – serious causes on page 34).

Treatment

- For patients suspected of heart attack, angina or pericarditis, transfer URGENTLY to medical officer.
- For chest pain due to other causes, treat the cause in the usual way (see relevant disease).

3.2 Heart Attack (Myocardial Infarction)

Blockage of a coronary artery, causing abnormal heart function. Cardiac arrest may occur at any time, especially during the first few hours and days after the attack. Heart attack is becoming more common in PNG as people change from their traditional diets and lifestyles to Western ones. Risk factors are: diabetes, male sex, obesity, smoking, family history, high blood pressure, lack of exercise and high cholesterol.

The main symptom is chest pain:

- Severe, described as heavy or tight
- Behind breastbone, may radiate to left arm and/or neck
- Usually starts at rest
- Lasts between 30 minutes and 3 hours

Other symptoms may include

- Shortness of breath (in 'silent MI' this may be the only symptom)
- Sweating
- Nausea or vomiting

A patient with these symptoms has a heart attack until proven otherwise.

Treatment

- Give oxygen immediately 4 litres/min by mask
- Insert IV cannula immediately (will be needed if patient has cardiac arrest)
- Give anti-platelet agent:
aspirin 150mg (½ x 300mg tab) stat
- For pain relief give:
morphine 5mg IM (2.5-5mg IV if in hospital) stat
- Do ECG if available – look for ST elevation
- Go with the patient to the hospital

3.3 Heart Failure

Heart failure occurs when the heart becomes inefficient and is unable to pump enough blood around the body. Heart failure may affect either the right side of the heart or the left side.

3.3.1 Right heart failure (cor pulmonale)

- COPD (chronic cough & breathlessness – see on page 79)
- Constrictive pericarditis (see Oedema & Ascites on page 37)
- Some forms of congenital heart disease (present at birth)
- Pulmonary hypertension.

Symptoms and signs

- Symptoms and signs of COPD, PLUS
- Fast pulse
- Oedema
- Cyanosis
- Distended veins in the neck
- Enlarged tender pulsating liver

If symptoms and signs of COPD are absent and the patient is less than 30 years of age, think of congenital heart disease or pulmonary hypertension, or if the patient is older, think of constrictive pericarditis.

Treatment

- Treat COPD (on page 79) if present
- If hypoxic or short of breath give: oxygen – 2 litres/min by mask
- For fluid overload give:

*frusemide 40-80mg (1-2 tabs) o.d (can be increased) AND
potassium chloride slow release (Span K) 600mg o.d*

3.3.2 Left Heart Failure

Causes

- Valvular heart disease
- Coronary artery disease (heart attack, angina)
- Hypertension
- Severe anaemia
- Congenital heart disease (present at birth)
- Cardiomyopathy

Symptoms and signs

- Shortness of breath on exertion, at rest, or at night
- Strong cough at night
- Oedema and distended neck veins may appear late
- Cough produces thin, frothy sputum which may be bloodstained (have specks of blood)
- Fatigue

Treatment

- If hypoxic or short of breath give: oxygen – 4 litres/min by mask
- For fluid overload give:

*frusemide 40-80mg (1-2 tabs) o.d (can be increased) AND
potassium chloride slow release (Span K) 600mg o.d*

- Start an ACE inhibitor:

enalapril 2.5-5mg o.d (can be increased up to 5mg b.d)

- Look for and treat anaemia if present (on page 45)
- Advise the patient to restrict salt intake and fluid restriction (~1L per day)
- Refer to medical officer for investigation of cause.

Refer if

- Left heart failure, or
- Suspected constrictive pericarditis or primary pulmonary hypertension
- No improvement with treatment

- Side effects from medication.

3.4 High Blood Pressure (Hypertension)

Defined as a blood pressure >140/90 on three separate occasions when the patient has rested for more than 15 minutes after activity.

Risk factors are the same as for heart attack (on page 16).

High blood pressure in pregnancy is very different and dangerous– see Manual of Standard Managements in Obstetrics and Gynaecology.

Signs and symptoms

Most commonly presents without symptoms but can present with:

- Headache
- Dizziness

The complications of severe or long-standing untreated hypertension including:

- Stroke (on page 76)
- Heart attack (on page 16)
- Heart failure (on page 17)
- Kidney failure
- Eye problems

Investigations (if possible)

- Test urine for protein and blood and microscopy (for casts)
- Test blood for sugar.
- UEC, cholesterol and triglycerides
- ECG
- Chest x-ray

Treatment (in non-pregnant adults only)

Lifestyle modifications:

- Weight loss, if obese
- Exercise (regular walking is best)
- Reduce salt intake and high fat food
- Reduce alcohol consumption
- Stop smoking

If lifestyle interventions fail, give:

*bendrofluazide 2.5mg o.d OR
enalapril 2.5-5mg o.d OR*

*atenolol 50mg o.d (use with caution in asthma) OR
methyl-dopa 250mg b.d or t.d.s*

Patients on drugs for hypertension must be regularly reviewed, and life-long treatment may be needed

Refer if

- Systolic BP greater than 160 or diastolic BP greater than 100 on the first measurement
- Urine or blood tests are abnormal
- Blood pressure greater than 140/90mmHg persists after 1 month of treatment
- Patient is pregnant
- Patient is under 30 years of age

4 Ear, Nose & Throat Diseases

Danger symptoms and signs requiring referral:

- Change of voice
- Difficulty breathing (stridor)
- Foreign body sensation
- Difficulty swallowing
- Blood stained or smelly nasal discharge
- Neck swelling

4.1 Otitis Media

4.1.1 Otitis Media – Acute

Symptoms and signs

- An ear drum which is red in appearance with prominent streaks of blood vessels on the drum (may be poor or absent light reflex)
- Pain in the ear (otalgia) or behind the ear (mastoid)
- Jaw pain on opening mouth

Treatment

- Give:
amoxicillin 500mg t.d.s for 5-7 days
- If pain or fever present, give:
paracetamol 1g (2 tabs) q.i.d
Advise the patient to take measures that prevent water getting into affected ear

4.1.2 Otitis Media – Chronic

Symptoms and signs

- One or both ears discharging pus.
- Hole in eardrum
- Complications include meningitis, brain abscess, and osteomyelitis of the skull (tender swelling behind the ear)

Treatment

- Clean ear with toilet paper spear. Teach the family to do ear cleaning four times daily, followed each time by antibiotic eardrops (see Standard Treatment Manual for Children). Cotton buds must not be used (use toilet or tissue paper)
- Tell the patient to keep inside of the ear dry (no swimming, and care when washing). Use aids such as cotton wool, ear-plugs or shower caps to prevent water getting in the ear

- Review every 2 weeks until the ear is dry
- If pus still discharging after 7 days treatment use:
cotrimoxazole (Septrin) 960mg (2 tabs) b.d. for 5 days
- If there is still a hole in the drum after 6 months and the ear is still dry, refer to a Medical Officer

4.2 Deafness ('hard of hearing')

Look into the ear with an auroscope:

- If there is wax or foreign body, syringe the ear (DO NOT syringe the ear if there is any past history of pus discharging from the ear. This means that the eardrum has a hole)
- If there is pus treat as chronic otitis media (see above)
- If the drum is red treat for acute otitis media (see above)
- If the ear canal is clear and the drum looks normal, refer to Medical Officer

4.3 Insect in the ear

- Insert 2-3 drops of oil or glycerine in the ear to drown the insect
- Syringe the ear when the insect is dead

5 Endocrinology and diabetes

5.1 Diabetes

The section on diabetes in the 6th version of adult STG provides a general summary for diabetes in PNG. For a more comprehensive guideline please see the Clinical Practice Guidelines for PNG (April 2011) developed by the PNG NDoH in partnership with HOPE worldwide (PNG) with the support of World Diabetes Foundation.

Organisation of diabetes care

Well-organised diabetes clinics with appropriately trained staff and well-designed protocols improve the quality of diabetes care. It is therefore suggested that where diabetes clinics DO NOT exist, these be integrated into the health-care system.

Definition

Diabetes mellitus is a group of metabolic diseases characterised by chronic hyperglycaemia, resulting from defects in insulin secretion, insulin action, or both. It is associated with acute complications such as ketoacidosis and hypoglycaemia, as well as long-term complications affecting the eyes, kidneys, feet, nerves, brain, heart and blood vessels.

Diagnosis

Diagnosis of diabetes must be confirmed biochemically prior to initiation of any therapy.

- The presence of symptoms of hyperglycaemia, such as polyuria, polydipsia, pruritus vulvae, lethargy, and loss of weight, and a random venous plasma glucose of 11.1 mmol/L OR
- A fasting venous plasma glucose ≥ 7.0 mmol/L

Classification

The classification of diabetes has been revised by the WHO and is based on aetiology (the cause).

Table 3. Classification of diabetes

Type of diabetes	Mechanism and defining features
Type 1 diabetes	Results from destruction, most commonly autoimmune, of the pancreatic beta cells. Insulin is required for survival.
Type 2 diabetes	Characterised by insulin resistance and/or abnormal insulin secretion, either of which may predominate, both of which are usually present. It is the most common type of diabetes.
Other specific types of diabetes	These are less common and include genetic disorders, infections, diabetes and diseases of the exocrine pancreas, endocrinopathies or as a result of drugs.
Gestational diabetes	Appearing or recognised for the first time in pregnancy.

5.1.1 Type 1 diabetes

Patients present at a young age (usually their teens or twenties, but earlier presentation may also occur) with rapid onset of severe symptoms, in particular weight loss, thirst and polyuria (excessive urination).

Blood glucose levels are high and ketones often present in the urine. If treatment is delayed diabetic ketoacidosis (DKA) and death may follow. Type 1 diabetes is rare in PNG.

5.1.2 Type 2 diabetes

Type 2 diabetes is by far the most common form of diabetes in PNG. Most patients are unaware that they have the disease and present with diabetic complications such as visual difficulties from retinopathy, pain and/or tingling in the feet from neuropathy, foot ulcerations, and stroke.

Type 2 diabetes is most common in adults in certain tribal groups (Wanigela, Tolais and other islanders), but can occur in any tribal group. Type 2 can also occur in adolescents and pre-adolescent children in high-risk ethnic groups.

5.1.3 Gestational diabetes

This is covered in detail in the Obstetrics and Gynaecology STG.

Diabetes prevention and lifestyle modifications

The components of lifestyle modification should include, but not be limited to:

- Weight loss of 5% - 10% if initially overweight
- Return to traditional diet, but avoid the use of excessive coconut cream
- Use low-fat cooking techniques such as steaming, grilling and mumu; roasting of root vegetables in hot ashes
- Reduction in fat intake to < 30% of calories
- Reduction in saturated fat intake to < 10% of calories
- Increase in fibre intake to > 15 g/1 000 kcal (traditional PNG diets are high in fibre content)
- Increase in physical activity level: this type of exercise (e.g. brisk walking) should last for at least 30 minutes and should be undertaken at least five times a week
- Reduction in high levels of alcohol intake to less than one drink per day of any type
- Stop smoking
- Stop chewing of betel nut for non-traditional purposes.

Principles of management (this is covered in detail in the diabetes STG)

- Diabetes education
- Dietary management (see lifestyle changes above and the diabetes STG)
- Physical activity and exercise - The goal is to accumulate at least 30 minutes of

moderate intensity physical activity on most (preferably all) days of the week

- Walking, fishing, dancing, swimming
 - Gardening – sweeping leaves, weeding, cutting grass, planting
 - Housework – sweeping, cleaning windows, mopping floors, washing clothes by hand
 - Carrying water, fire wood, coconuts
 - Sports – rugby, soccer, volleyball, basketball etc
 - Light / moderate strength-developing exercise e.g. gym work
 - Stretching exercises
- Pharmacological - Oral hypoglycaemics are indicated when dietary modifications and exercise DO NOT improve blood sugar measurements. Start with:

*metformin 500mg (1 tab) o.d and increase to a maximum of 1g (2 tabs) t.d.s OR
glibenclamide (Daonil) 2.5mg (1/2 tab) o.d and increase to a maximum of 10mg (2 tabs) b.d*

- If diabetes remains poorly controlled, use glibenclamide and metformin in combination
- If diabetes remains poorly controlled after 3 months consider adding in a single injection of long acting insulin at nighttime. This is given sub-cutaneously. Use:
Isophane 10u (0.1U/kg) nocte and review sugars in 3 months
- More intensive regimens may be necessary if the first line treatments fail. Refer to physician or diabetes educator

Managing the complications of diabetes

Diabetes is a very strong risk factor for coronary artery disease and heart attack. In addition, diabetes also damages the nerves, kidneys and eyes leading to foot ulcers, kidney failure and blindness. Good blood sugar control is the best way to prevent these complications.

- Manage hypertension aggressively and aim for a BP <130/80 or <125/75 if proteinuria found on urine dipsticks. ACE inhibitors are the preferred antihypertensives. Use:
*enalapril 5-10mg up to b.d OR (if unavailable)
captopril 12.5mg b.d up to a maximum of 50mg t.d.s*
- Aim for total cholesterol <5.0mmol/L (and LDL <2.0mmol/L, HDL >1.0 mmol/L and triglycerides <2.0mmol/L). In addition to lifestyle changes above, use:
simvastatin (1-2 tabs) 20-40mg o.d
- Check urine for proteinuria. If present, use ACE inhibitors as above
- Regular screening for retinopathy and neuropathy can reduce the risk of major outcomes like blindness and foot amputations, but present a considerable challenge in PNG and are currently not available nor recommended as part of routine examinations

5.2 Obesity and the metabolic syndrome

Being overweight or obese significantly increases the risk of morbidity and mortality from type 2 diabetes and its co-morbidities. Successful weight reduction has a positive impact on these outcomes. Obesity is also a major component of the metabolic syndrome, a known cluster of signs and symptoms including: central obesity, impaired blood sugars

or diabetes, hypertension, high blood lipids and gout.

Defining obesity

- Calculate overall obesity using the body mass index (BMI) (see annex 7)
- Determination of central fat distribution by measurement of waist circumference. Waist circumference should be measured midway between the lower rib margin and the iliac crest. It is a good indicator of central or upper-body obesity. The upper limits of normal are 102 cm in men and 88 cm in women

General Principles of Obesity Management

Whilst weight loss may be difficult for some to achieve and maintain, it is very beneficial when achieved.

- Assess dietary intake, level of physical activity, BMI, and waist circumference on presentation and monitor regularly (see annex 7)
- Integrate weight control measures into the overall management of diabetes and co-morbidities if BMI > 25 and/or waist circumference >102 cm in men or >88 cm in women
- Educate families as well as patients
- Involve a nutritionist if available
- Dietary changes and increased level of physical activity are the most economical means to lose weight. Set realistic goals – the socio-economic situation will affect ability to comply with dietary advice – see the section above on lifestyle changes in type 2 diabetes
- Maintain records of goals, instructions and weight progress charts.

6 Eye Diseases

Painful Red Eye

Common causes of a painful red eye are:

- Conjunctivitis
- Corneal ulcer
- Pterygium
- Acute glaucoma
- Foreign body
- Subconjunctival haemorrhage (black eye)
- Chemical burns
- Welding flash burns
- Trauma.

6.1 Conjunctivitis

May be caused by bacteria, viruses, Chlamydia or allergies.

Symptoms and signs

- Purulent discharge (pus) in one eye, spreading to other eye
- Difficulty opening eyes in the morning
- History of contact with other cases
- Allergic conjunctivitis is very itchy
- Redness all over eye and under lid margins
- Vision not affected unless cornea involved
- No green staining of cornea with fluorescein dye or strip

Treatment (treat as outpatient)

- Clean pus from the eye with cotton wool or tissue and clean water t.d.s for 5 days.

Apply:

antibiotic compound OR

chloramphenicol ointment q.i.d for 5 days

- DO NOT pad the eye
- If persists more than 5 days refer to Medical Officer or Eye Care Nurse

6.2 Corneal Ulcer

May be due to bacterial, viral or fungal infection after trauma, foreign body or corneal abrasion.

Symptoms and signs

- Painful tearing eye
- With or without white corneal spot
- Stains green with fluorescein (dye collects in the break in the cornea).

Treatment

- ADMIT and treat as inpatient.
- Look carefully for foreign body. If present, remove gently with cotton bud after using:
amethocaine 0.5% eye drops
- Apply:
*antibiotic compound OR
chloramphenicol ointment q.i.d for 5 days*
- Keep a firm eye pad on (unless there is a discharge)
- Dilate the pupil using:
atropine 1% eye ointment b.d until pupil is large (dilated) and then once daily
- Stain with fluorescein and examine every day. Continue treatment until there is no green staining
- Refer to Eye Nurse or Medical Officer after 2 or 3 days, if the stain is not getting smaller and the eye is still painful.

Note

- A scar may be present – no treatment possible
- Complications of corneal ulcer include pus in the anterior chamber (behind the cornea)
- Fungal ulcers will not improve with above treatment

6.3 Iritis – Uveitis

Inflammation of the iris and uveal tissue. May be viral, fungal or traumatic but can also be secondary to other conditions such as TB, Leprosy, HIV/AIDS and STIs. Cause may be unknown.

Symptoms and signs

- Redness usually around cornea
- Dull aching eye with blurred vision
- Pupil small or irregular
- Does not stain with fluorescein
- Consider TB, leprosy, AIDS or STI

Treatment

- ADMIT and treat as inpatient
- Look for signs of other diseases (above) and treat if present.
- Dilate the pupil using:
atropine 1% eye ointment b.d until pupil is large (dilated) and then once daily
- For analgesia give:
aspirin 600mg (2 tabs) q.i.d
- Keep a light EYE PAD on (unless there is a discharge)
- Apply:
*antibiotic compound OR
chloramphenicol ointment q.i.d for 5 days*
- Following medical officer review consider using:
*hydrocortisone eye ointment (0.5%) q.i.d
for at least 10 days or until improvement*

6.4 Pterygium

Symptoms and signs

- Fleshy growth on cornea, usually on nasal side of eye, grows slowly (a lumpy raised area on the conjunctiva, not involving the cornea, is a pinguecula)
- Irritation & pain, especially in bright lights, windy & smoky areas.

Treatment

- Apply:
*antibiotic compound OR
chloramphenicol ointment q.i.d for 5 days*
- Advise patient to wear sunglasses
- Needs excision if affecting vision – refer to Eye Nurse or Medical Officer

6.5 Subconjunctival Haemorrhage

Symptoms and signs

- Bleeding under conjunctiva – with or without history of trauma
- No pain
- Normal vision
- May be associated with hypertension – check BP

Treatment

- Treat hypertension if present (on page 19)
- Reassure patient that redness will fade in several weeks

6.6 Acute Glaucoma

Symptoms and signs

- Caused by increased pressure in the globe (eye), usually after trauma or cataract surgery
- Severe pain
- Fixed dilated pupil not reacting to light
- Congested red eye
- Patient may be vomiting with severe headache on affected side.

Treatment

- If diagnosis is suspected give:
*pilocarpine 2% drops q.i.d AND
diamox 250mg oral stat.*
- If vomiting, give:
*chlorpromazine IM 25mg OR
metoclopramide IM 10mg*
- Refer patient to eye specialist URGENTLY if vision still present (once vision is totally lost it cannot be restored, urgent referral is too late).

6.7 Foreign Body

May be superficial or penetrating. Serious eye injuries happen after grinding or chipping steel or working with power tools.

Treatment

- Test vision.
- Turn the eyelid to exclude foreign body under the lid after using:
amethocaine 0.5% eye drops
- If foreign body is loose, irrigate or wash the eye.
- If foreign body is stuck, use cotton bud to remove it. If unsuccessful, refer to Medical Officer
- After removal:
*antibiotic compound OR
chloramphenicol ointment q.i.d for 5 days*
- If there is loss of vision and you cannot find a foreign body, refer immediately

6.8 Chemical Damage

Alkali burns (e.g. lime) are more severe than acid burns. The commonest situation is

accidental exposure to betelnut lime (kambang).

Treatment

- Wash immediately and continuously with water for 15 minutes.
- Remove loose bits from conjunctival sac after applying:
amethocaine 0.5% eye drops
- Evert the upper lids and irrigate with normal saline until no visible lime remains.
- Apply:
*antibiotic compound OR
chloramphenicol ointment q.i.d for 5 days*
- Pad the eye and review within 24 hours

6.9 Welding Flash Burns

The best way to prevent this is to USE the welding glass. The cornea is damaged when exposed to heat without adequate shield or mask. Painful watery eyes occur several hours later.

Treatment (same as for corneal abrasion)

- Look carefully for foreign body. If present, remove gently with cotton bud after using:
amethocaine 0.5% eye drops
- Apply:
*antibiotic compound OR
chloramphenicol ointment q.i.d for 5 days*
- Keep a firm eye pad on (unless there is a discharge)
- Dilate the pupil using:
atropine 1% eye ointment b.d until pupil is large (dilated) and then once daily
- Stain with fluorescein and examine every day. Continue treatment until there is no green staining
- Review in 24 hours

6.10 Trauma

Blunt trauma

- Due to fists, balls, beer bottles etc
- Large objects damage orbital margins (bone)
- Small objects damage eye and orbit.

Treatment

- Bed rest
- Refer or contact Eye Care Worker or medical officer for management.

Penetrating trauma

May be due to hammering or chipping or due to sharp objects such as sticks, knives, thorns

Treatment

- Eye pad
- Give:
 - tetanus toxoid IM stat AND*
 - chloramphenicol 500mg (2 tabs) q.i.d*
- Refer immediately to medical officer or ophthalmologist.

6.11 Poor Vision/Double Vision

Decide whether the poor vision is for distance or near.

Test distance vision with an eye chart

- Stand patient 6 metres from chart
- Test each eye in turn
- Write the line that the patient can read under 6 (e.g. 6/60 for the top line, 6/5 for the bottom)
- Normal vision is 6/6.

Test near vision

- Thread a needle or read fine print

Examine the eye with a good light for

- Any of the conditions above (painful red eye)
- A scar on the cornea
- A cataract (white looking pupil)
- Squint (abnormal deviation of the eye found by asking patient to look in different directions).

Treatment

- 'Painful Red Eye' condition – treat as above if present
- Corneal scar - no treatment available
- Cataracts – book to see eye doctor or eye nurse. Surgery will be performed only if there are cataracts in both eyes that interfere with the patient's normal activities
- Squint causing double vision – refer to Medical Officer
- If there is nothing to find on examination except poor vision, see if vision improves with pin-hole test and refer to Eye Nurse or Medical Officer

Note

Rapidly deteriorating vision, especially with headaches, may be caused by tuberculous or cryptococcal meningitis – refer to medical officer

Refer if

- Any eye condition in patients with diabetes (retinopathy)
- Any eye condition in HIV/AIDS patients
- Cataract
- Swelling, growth or bulging eyeball

7 Gastrointestinal System

7.1 Abdominal Pain

Serious causes which need urgent transfer to hospital

- Peritonitis, including appendicitis, pancreatitis (fever, tenderness, guarding, rigidity/hard abdomen)
- Ectopic pregnancy (late period, pale, shocked)
- Ruptured spleen (history of trauma, pale, shocked)
- Pericarditis (distended neck veins, large tender liver, oedema, weak pulse)
- Before referral give:
 - IV fluids (0.9% sodium chloride) before and during transfer
 - For pain, if there is no evidence of strangulated hernia, give:
pethidine 50mg (1ml) IM before transfer
 - If suspected strangulated hernia avoid pethidine, elevate the foot of the bed and use:
paracetamol 1g IV or PR

Other causes:

When pain is all over abdomen consider:

- Typhoid (fever, diarrhoea or constipation, slow pulse, confusion. See on page 69)
- Bowel obstruction (vomiting and/or not passing stool or wind)
- Pigbel (after large protein meal) (see Paediatric STG)
- Worms (crampy pain, worms in stool) (on page 71)
- Malaria (fever) (on page 56)

When pain is in lower abdomen consider:

- Pelvic inflammatory disease (PID, may have abnormal vaginal discharge or painful sexual intercourse – (see STIs on page 41)
- When pain is in upper abdomen
- Peptic ulcer (pain after meals) (on page 39)
- Gall bladder disease (pain after fatty food)
- Kidney disease (loin pain, blood in urine)
- Liver disease (jaundice – yellow eyes)

Treatment

- Treat any cause found
- Treat vomiting or diarrhoea with extra fluids

Refer if

- Serious cause suspected
- Not improving after 2 days of treatment

7.2 Jaundice

Jaundice (yellow eyes) may be caused by a number of diseases:

- Severe malaria (both *P. falciparum* and *P. vivax* – on page 57)
- Pneumonia (breathlessness, cough, chest pain – on page 80)
- Hepatitis - viral (nausea or vomiting – on page 36)
- Drugs (usually TB drugs - on page 68)
- Liver abscess (on page 37)
- Hepatoma
- Gall bladder disease
- Heart failure (oedema, fast pulse – see on page 37)
- Septicaemia (very sick – see on page 62)

Investigations

- Test and treat for malaria (blood slide or RDT)
- Chest x-ray if possible
- Liver function tests if possible
- Urine dipstick (if urobilinogen negative then highly likely to be due to obstructive jaundice – requires surgical review)
- Ultrasound of the liver and gallbladder

Note

Obstructive jaundice is a surgical condition and should be referred to surgical doctors.

7.3 Liver Disease

Symptoms and signs:

- Jaundice
- Enlarged liver (heart failure, hepatoma, viral hepatitis, liver abscess)
- Ascites (see on page 37)

7.3.1 Hepatoma (cancer of the liver)

Hepatoma usually presents with a hard, tender irregular liver.

Treatment

- Transfer patient to medical officer
- If unable to transfer, give liver abscess treatment (below)

- Give adequate pain relief (on page 2)
- Confirmed hepatoma cases (by a medical officer) must be given adequate pain relief and should be allowed to go home if they want to, once the diagnosis and prognosis are explained

7.3.2 Hepatitis A

Hepatitis A is a viral infection of the liver – a disease of poor hygiene.

Symptoms and signs:

- Loss of appetite
- Jaundice (yellow eyes)
- Nausea
- Vomiting
- Tender liver
- Bleeding gums and skin (in severe disease)
- Confusion (in severe disease)

Treatment

- Treat/prevent dehydration (see Diarrhoea on page 50)
- Refer severe disease to medical officer
- Bedrest, good diet
- Complete avoidance of alcohol
- Prevent spread of the disease by handwashing and good hygiene (see Public Health Manual)
- Oral contraceptives can be resumed after clinical and biochemical recovery

7.3.3 Hepatitis B

Hepatitis B is a blood-borne infection but also sexually transmitted OR passed from mother to baby. In PNG, 20% of people are infected with the virus, but this can be reduced by childhood immunisation against Hepatitis B.

Symptoms and signs

- Can cause acute symptoms similar to Hepatitis A
- Most cases are asymptomatic (have no symptoms)
- May be acute or chronic
- Acute Hepatitis B has signs & symptoms similar to Hepatitis A (see above)
- Chronic Hepatitis B is an important cause of chronic hepatitis and hepatoma

Treatment

- Treat acute Hepatitis B the same as Hepatitis A

- Refer to medical officer if you suspect hepatoma (see above)

7.3.4 Liver Abscess

Liver abscess is usually caused by amoeba and presents with a smooth tender mass in the liver.

Investigations

Where facilities are available, examine warm stool for amoebic trophozoites (Note: absence of amoebae in stool does not exclude amoebic liver abscess).

Treatment

- First line treatment for liver abscess is:
*metronidazole 800mg (4 tabs) t.d.s for 10 days AND
chloramphenicol 1 g (4 caps) q.i.d for 2 weeks*
- If metronidazole unavailable use:
*chloroquine 150mg t.d.s for 2 weeks AND
chloramphenicol 1 g (4 caps) q.i.d for 2 weeks*

Note

A high dose of metronidazole is used to eliminate endoluminal carriage of amoebae. If a high dose is not tolerated then an alternate regimen is:

*metronidazole 400mg (2 tabs) t.d.s for 10 days FOLLOWED BY
diloxanide furoate 500mg t.d.s for 10 days*

Refer if

- Liver abscess not cured by the above treatment
- Liver abscess looks likely to burst through the skin
- Suspected hepatoma

7.4 Oedema and ascites

Oedema is defined as the abnormal collection of fluid in the body tissues and can be found in the legs, face, lungs (pulmonary oedema) or brain (cerebral oedema).

Ascites is the abnormal collection of fluid in the abdomen.

Causes of oedema and ascites:

Ascites without oedema

- TB of the abdomen
- Cancer of abdominal organs
- Localised oedema (one location, such as a limb)
- Trauma, bites or allergies

- Local infection (cellulitis, osteomyelitis, pyomyositis – on page 14)
- Lymphatic disease (filariasis, cancer)
- Blocked veins in legs (blood clot or thrombosis)

Generalised oedema (several parts of the body)

- Heart failure (distended neck veins, enlarged tender liver, no ascites)
- Kidney disease (swelling of lower eyelids and face)
- Severe anaemia (pale conjunctivae, tongue and creases of palms)
- Pre-eclampsia (pregnancy, BP 140/90, with or without protein in urine)
- Cirrhosis of liver (ascites but no distended neck veins)
- Pericardial effusion or constriction (distended neck veins, large tender liver with or without ascites, heart beat difficult to feel in chest)

Investigations

- Urinary protein
- Ultrasonography of liver and abdomen
- Chest x-ray
- Liver function tests, kidney function test (creatinine)
- Blood films for filariasis

Treatment

For localised oedema:

- Treat local cause (e.g. infection) as indicated.
- Transfer to medical officer if you suspect cancer or blood clot in leg

For generalised oedema:

- Treat right-sided heart failure if present (on page 17)
- Transfer all other cases to medical officer:
- Pre-eclampsia or pericardial effusion – DO NOT give diuretics prior to transfer
- Liver or kidney disease – as soon as possible

For ascites:

- Weigh daily to monitor weight loss (loss of excess fluid). Aim for loss of 1kg/week
- Give diuretics:
 - frusemide 40-80mg (1-2 tabs) daily AND*
 - potassium chloride 1200mg (2 tabs) for each frusemide tablet*
- Alternatively, use (without potassium chloride):
 - spironolactone 25-50mg (1-2 tabs) daily*

7.5 Peptic Ulcer

Symptoms and signs

Pain is often:

- In upper abdomen
- Worse after eating (may feel hungry but afraid to eat)
- May wake patient in the middle of the night
- Worsened by aspirin, alcohol, indocid, smoking
- Tends to recur over months and years

Treatment

- For acute symptomatic relief use:

aluminium hydroxide gel compound (Gastrogel) 2 tabs 1-2 hours after meals and at night for up to 3 weeks

- For long term relief give:

ranitidine 150mg b.d or 300mg at night for 4 weeks

- Advise patients to
 - Stop smoking
 - Avoid alcohol, aspirin, indocid, diclofenac
 - Avoid any foods that make the pain worse
- If persisting pain, refer for gastroscopy and if gastric or duodenal ulcer seen then eradication therapy for H. pylori is indicated. Use:

omeprazole 20mg b.d for 2 weeks AND

amoxicillin 1g b.d for 2 weeks AND

metronidazole 500mg b.d for 2 weeks

Refer if

- Not responding to the above treatment after 1 month
- Vomiting or weight loss
- Vomiting blood (haematemesis)
- Black pekpek (malaena)
- Suspected perforation (signs of peritonitis)

7.6 Pigbel

Severe abdominal pain up to 5 days after a protein meal. Severe pigbel is now rare in PNG, but should be considered in severe abdominal pain.

There may also be:

- Diarrhoea with blood, often followed by constipation
- Black-flecked vomit

- Abdominal swelling

If the patient is toxic (looks sick, fast pulse), has black-flecked vomit or a lot of abdominal swelling, this is considered severe pigbel and should be sent to hospital urgently.

Treatment

- Intravenous fluids. Give:

1L 0.9% sodium chloride (normal saline) every 8 hours

- Pass a large nasogastric tube, aspirate and leave on free drainage

- Antihelminthics. Give:

albendazole 400mg (2 tabs)

- Nil by mouth

- Also give antibiotics:

benzyl penicillin 1.2g IV q.i.d

- If severe pigbel, also give:

chloramphenicol 1g IV q.i.d until patient has improved

- If there is improvement (reduced abdominal swelling and pain, no vomiting, feels hungry and has bowel motions), then change to oral fluids
remove nasogastric tube, if no vomiting after oral fluids and if continues to improve, over next 24 hours then start solid food

Refer if

- Severe pigbel
- Mild pigbel which is not improving after 2 days treatment

8 Genitourinary System

8.1 Sexually transmitted infections (STIs)

This section summarises the Standard Treatment Book for Sexually Transmitted Infections. The protocols for STIs depend on recognising and treating syndromes (groups of symptoms and signs) rather than diagnosing specific diseases. These syndromes are:

- Urethral discharge syndrome in men
- Vaginal discharge syndrome
- Genital ulcer syndrome (men and women)
- Lower abdominal pain syndrome in women

For every patient:

- Ask about both genital discharge and genital ulcer
- Treat the syndrome or syndromes with the appropriate drugs (see below)
- Educate the patient about how to prevent spread of the disease (safe sex – abstain from sex or stick to one partner or use a condom every time you have sex)
- Provide condoms if appropriate
- Treat the partner(s)

8.1.1 Urethral Discharge Syndrome in Men

- Treat for both gonorrhoea and Chlamydia. Give the following:

*amoxicillin 2g (4 tabs) stat AND
probenecid 1g stat AND
augmentin (or amoxyclav) 2 tabs stat AND
azithromycin 1g stat.*

- If augmentin/amoxyclav is not available, give an extra amoxicillin 1g stat
- If there is no azithromycin available, give:

*doxycycline 200mg stat,
then 100mg oral b.d for another 9 days OR
erythromycin 500mg oral q.i.d for 10 days*

8.1.2 Vaginal Discharge Syndrome

- Syndromic management includes treatment for Trichomonas, bacterial vaginosis, candida, plus gonorrhoea and Chlamydia if at risk.
- Give the following:

*tinidazole 2g (warn patients not to drink alcohol for 3 days after taking tinidazole; DO NOT give to pregnant patients) AND
nystatin pessary 100,000 units inserted into vagina b.d) for 7 days OR
clotrimazole pessary (once) followed by clotrimazole cream for 7 days*

Risk factors for gonorrhoea and Chlamydia:

- Patient below 21 years old
- Patient single
- Patient has had sexual intercourse with more than one person in the last 3 months
- Patient has had sexual intercourse with a new partner in the last 3 months

If the woman has any of these risk factors, in addition give:

*amoxicillin 2g oral (4 tabs) AND
probenecid 1g oral AND
augmentin (or amoxycrav) 2 tabs oral AND
azithromycin 1g oral*

- If augmentin/amoxycrav is not available, give an extra amoxicillin 1g stat
- If there is no azithromycin available, give:

*doxycycline 200mg,
then 100mg oral b.d for another 9 days OR
erythromycin 500mg oral q.i.d for 10 days*

- If woman is pregnant and azithromycin unavailable, avoid doxycycline and use erythromycin instead

8.1.3 Genital Ulcer Syndrome

If there are painful blisters, treat for genital herpes:

- Pain relief as necessary
- Tell patient to keep blisters clean and dry
- Tell patient the blisters will go away but may come back later

If there is an ulcer, treat for syphilis and see the patient once every week until completely better. Use:

benzathine penicillin IM 2.4 million units

If the ulcer is still present 1 week after treatment for syphilis, treat for Donovanosis and give:

*azithromycin 500mg oral for 7 days OR 1 gram weekly for 4 weeks OR
chloramphenicol 500mg oral q.i.d until ulcers heal (at least 21 days) OR
doxycycline 100mg oral b.d until ulcers heal (at least 21 days)*

If patient is pregnant:

Azithromycin is safe to use in pregnancy. DO NOT give doxycycline during pregnancy/lactation. If close to term, avoid chloramphenicol. An alternative treatment in pregnancy is:

erythromycin 500mg oral q.i.d until ulcers are completely healed (at least 21 days)

8.1.4 Lower Abdominal Pain Syndrome in women

Syndromic treatment for lower abdominal pain in women involves treatment for gonorrhoea, Chlamydia and anaerobic infections. Give:

*amoxicillin 2g oral (4 tabs) AND
probenecid 1g oral AND
augmentin (or amoxyclav) 2 tabs AND
azithromycin 1g oral AND
tinidazole 1g b.d for 3 days (warn patients not to drink alcohol for 3 days after taking tinidazole; DO NOT give to pregnant patients)*

If augmentin/amoxyclav is not available, give an extra amoxicillin 1g stat

If there is no azithromycin available, give:

*doxycycline 200mg, then 100mg oral b.d for another 9 days OR
erythromycin 500mg oral q.i.d for 10 days*

If patient is pregnant:

Azithromycin is safe to use in pregnancy. DO NOT give doxycycline or tinidazole during pregnancy/lactation. An alternative treatment in pregnancy is:

erythromycin 500mg oral q.i.d until ulcers are completely healed (at least 21 days)

8.2 Urinary Tract Infection

Urinary tract infections may be in the:

- Urethra (discharge, burning pain when passing urine)
- Bladder (burning pain when passing urine, passing urine more often than usual, incontinence, smelly urine) OR
- Kidney (fever, rigors, pain and tenderness around kidneys).

Treatment – Men

In MEN, the symptoms of dysuria and urinary frequency are commonly due to Sexually Transmitted Infections. Examine and treat as for Urethral Discharge Syndrome (see on page 41).

- An MSU must be performed before treatment. If UTI confirmed, give:

*cotrimoxazole (septrin) 960mg (2 tabs) b.d for 14 days OR
cefaclor 500mg t.d.s for 14 days*

- If not cured by the above treatment and still has evidence of UTI on MSU, give:

ciprofloxacin 500mg b.d 14 days

If persisting problems despite full course of antibiotics consider referral to medical officer for further investigations

Treatment – Cystitis in non-pregnant women

- Give:

*cotrimoxazole (septrin) 960mg (2 tabs) b.d for 5 days OR
cefaclor 500mg t.d.s for 5 days*

- Urinary alkalinisation. Give:

ural sachets (Na HCO₃)

- Tell the patient to drink plenty of fluids

- If not cured by the above treatment and still has UTI on MSU, give:

ciprofloxacin 500mg b.d 14 days

Treatment - Cystitis in pregnant women

*cefaclor 500mg t.d.s for 5 days OR
nitrofurantoin 100mg b.d for 5 days*

Refer if

- Not cured by the above treatment
- The infection keeps coming back
- Blood is seen in the urine

9 Haematology

9.1 Anaemia

Anaemia is defined as haemoglobin (Hb) less than 10 g/dl (100 g/L). Severe anaemia Hb < 5 g/dl (50g/L).

Common causes

- Malaria
- Iron deficiency (blood loss, hookworm, and poor nutrition)
- Parvovirus B19
- Folate/vitamin B12 deficiency
- Cancer
- Chronic kidney failure
- Chronic disease (HIV, TB, rheumatic diseases,
- Poor nutrition (poor dentition)
- Blood loss (menstrual bleeding, gastrointestinal bleeding)
- Haemolysis or thalassaemia

Investigations

- Haemoglobin (Hb) or full blood count if possible
- Test and treat for malaria (blood slide or RDT)
- Look for and treat any obvious bleeding or chronic illness

Treatment

- If malaria testing is unavailable OR if moderate/severe anaemia, treat for malaria regardless of RDT or blood slide (on page 56)
- If the spleen is very large (below umbilicus) give:

chloroquine (2 tabs) weekly for 3 months

- After 3 months of prophylaxis if the spleen size does not decrease in size refer to Medical Officer. If the spleen size is reduced continue prophylaxis for 1 year
- Give iron/folate supplementation:

fefol (2 tabs) daily for 3 months

(Hb should increase by 2-4 grams/dl or 20-40 grams/L in 1 month)

- If there has been a good response to fefol, it may be necessary to treat for some time after Hb has normalised to replenish iron stores
- Encourage the patient to eat plenty of protein foods (e.g. meat, fish, peanuts, beans) and protective foods (e.g. dark green leafy vegetables, fruit). DO NOT overcook green leafy vegetables

- Treat for hookworm. Give:
albendazole 400mg (2 tabs) (on page 71)
- Advice on family planning and antenatal care for anaemic women in reproductive age (15 – 45yrs)

Transfusion

ONLY USE SCREENED BLOOD FROM THE BLOOD TRANSFUSION SERVICE

- Consider transfusing any patient if the haemoglobin is less than 50g/L AND there is also:
- High fever or severe infection
- Heart failure (see on page 17)
- Severe symptoms (dizziness, shortness of breath)
- Pregnancy at any stage (always use packed cells)
- Always transfuse any patient if the haemoglobin is less than 75 g/L AND bleeding which may occur again e.g. after a recent haematemesis (vomiting blood), melaena (passing black pekpek) or haemoptysis (coughing out blood).

Transfusion Notes

- If signs of fluid overload, give:
furosemide 20mg IV with transfusion
- Monitor blood pressure, pulse and temperature regularly during blood transfusion.
- If fever, rash, fast pulse or low blood pressure, stop transfusion and seek review from medical officer

Refer if

- if anaemia persists for >1month despite treatments above
- Patient looks very pale, is dizzy or breathless, has oedema or looks very sick
- There is any abnormal bleeding
- Anaemia not improving or recurrent
- Blood transfusion is necessary

9.2 Lymphadenopathy (Lymph gland enlargement)

The major lymph gland groups are in the neck, supraclavicular area, axilla and groin.

Common Causes

- TB (firm, matted, non-tender, mobile – on page 64)
- HIV (flu-like illness with enlarged lymph glands all over body – on page 54)
- Skin or other soft tissue infection (acute enlarged tender local lymph glands, disappear after treatment)

- Filariasis (lymph glands, size of betel nut, in groin – see Public Health Manual)
- Sexually transmitted infection (with genital ulcer – on page 42)
- Cancer (hard non-tender lymph glands)
- Lymphoma/leukaemia (rubbery, non-tender, may be all over body)

Investigations

- Take smears for acid fast bacilli (tuberculosis) from any discharging lymph node
- Chest x-ray
- HIV test
- Full blood count

Refer if

- Cause of enlarged lymph glands uncertain
- Malignancy suspected
- Lymph glands DO NOT go away after treatment of infection
- Enlarged lymph glands plus breathlessness or bleeding gums, nose or skin

9.3 Splenomegaly (enlarged spleen)

Slightly enlarged spleens rarely cause symptoms, but may be tender in acute infections.

Mild or moderate splenomegaly is usually due to:

- Infections, e.g. malaria, typhoid, septicaemia, TB, viruses
- liver disease, e.g. cirrhosis, hepatitis (jaundice)
- Blood diseases, e.g. leukaemia (fever, anaemia and abnormal bleeding), lymphoma (large liver, spleen and lymph glands), thalassaemia (anaemia)
- Infective endocarditis (fever and heart failure)
- Splenomegaly with ascites is usually due to cirrhosis or tuberculosis

Massive splenomegaly (below umbilicus) is usually due to:

- Hyper-reactive malarious splenomegaly (HMS) – previously this entity was known as tropical splenomegaly syndrome (TSS)
- Chronic myeloid leukaemia (large liver and lymph glands, high white cell count)
- Both these conditions can be treated, and referral to Medical Officer is needed to make the correct diagnosis.

Investigation

- Test and treat for malaria (blood slide or RDT)
- Chest x-ray and sputum for acid fast bacilli

- HIV test
- Hb, full blood count and blood film for cell morphology
- Liver function tests

Treatment

- Diagnose and treat cause
- For suspected hyper-reactive malarious splenomegaly (HMS) (huge spleen + anaemia + enlarged lymph glands) give:
chloroquine (2 tabs) weekly for 3 months
- After 3 months of prophylaxis if the spleen size does not decrease in size refer to Medical Officer. If the spleen size is reduced continue prophylaxis for 1 year
- Treat anaemia with fefol and/or blood transfusion (on page 46)

Refer if

- Massive splenomegaly not responding to weekly chloroquine (malaria prophylaxis)
- You suspect TB
- Splenomegaly is accompanied by enlarged lymph nodes
- You suspect infective endocarditis
- Severe anaemia
- You suspect leukaemia

10 Infectious Diseases

10.1 Fever

Do a full history and examination to find the cause.

Common causes

- Pneumonia
- Malaria
- Upper respiratory tract infection
- Typhoid
- Meningitis
- Tuberculosis
- Otitis media
- Diarrhoea
- Abscess/skin infection
- Pelvic inflammatory disease
- Urinary tract infection
- Cancer
- HIV

Investigations

If available, consider the following:

- Test and treat for malaria (blood slide or RDT)
- Lumbar puncture if signs or symptoms consistent with meningitis
- Urine microscopy and/or dipstick and/or culture
- Chest x-ray/KUB
- Sputum smear for AFB
- Blood culture

General management

- Treat the cause of fever if found
- Give:
 - aspirin 600mg (2 tabs) OR*
 - paracetamol 1g (2 tabs) q.i.d*
- Cool sponge if the temperature is over 39°C.
- Encourage oral fluids
- If very sick and no obvious cause found, treat as severe community acquired sepsis (on page 63)

- For fever that persists think of: TB, typhoid, abscess in muscle, liver, pelvis

Refer if

- Very sick without obvious source of infection
- Fever persists after 2 weeks of treatment

10.2 Diarrhoea and dysentery

10.2.1 Diarrhoea

Common causes of diarrhoea

- Viral
- Food poisoning (acute vomiting and diarrhoea)
- Cholera (severe watery diarrhoea)
- Malaria (high fever)
- Typhoid (high fever, confusion, tremor, deafness)
- AIDS (chronic diarrhoea > 1 month)

Assessment of dehydration

Table 4. The assessment of dehydration

Look at:	No dehydration	Some dehydration	Severe dehydration
Pulse	normal	80-100/min	More than 100/min
Blood pressure	normal	normal	Less than 90 mmHg systolic
Eyes	normal	may be sunken	Sunken
Skin	normal	a little slack	Slack
Urine volume	normal	reduced	Less than 30ml/hour
Urine colour	clear	yellow	dark (strong tea colour)
Mental state	alert	alert	confused or drowsy
Treatment	Oral fluids	Oral fluids/ORS	IV fluids

Severe dehydration

- Give:

1L of 0.9% sodium chloride (normal saline) as fast as it will go

- If still dehydrated, repeat above
- When improved, give:

1L of 0.9% sodium chloride (normal saline) every 2 hours until the signs of dehydration have gone

- When all signs of dehydration have gone, give maintenance fluids:

1L of 4.3% dextrose in 0.18% sodium chloride
(one fifth normal saline) every 6 hours

- At this stage add:
1g (4ml) potassium chloride to each litre of fluid if available
- Start oral fluids as soon as possible and stop IV fluids when the patient can drink

10.2.2 Dysentery

Dysentery is mucus and blood mixed in watery stool. Fresh blood associated with perianal conditions like haemorrhoids/fissures are NOT dysentery

Common causes of dysentery (mucus and blood in stool):

- shigella (bacillary)
- salmonella (typhoid)
- amoebic

Treatment

- Fluids - see above for treatment of dehydration
- Antibiotics are required only if shocked OR still very sick (fever, abdominal tenderness) after 6 hours of the above treatment OR blood or mucous persists in stool after 3 days of the above treatment. Give:

ciprofloxacin (500mg twice daily for 3 days)

- If dysentery persists after ciprofloxacin treatment or after 2 weeks, give:

metronidazole 800mg (4 tabs) t.d.s for 5 days

Refer if

- A surgical condition is suspected, (e.g. swollen abdomen, severe tenderness, much vomiting)
- Vomiting does not improve after 24 hours
- Diarrhoea or dysentery not cured after all of the above treatment
- Notify Provincial Health Adviser of any unusually large number of cases of diarrhoea or dysentery.

10.3 Cholera

This guide is a summary of the Interim Guidelines for the Management of Cholera published by the NDoH (August 2010).

Cholera is a diarrhoeal disease now endemic in PNG and is caused by infection with the bacterium *Vibrio cholerae*. Children and adults can get infected and develop acute watery diarrhoea. Patients lose large amounts of fluids and salts and can become severely dehydrated and die within hours if not adequately treated in due time.

Untreated cases may have a 30-50% case fatality rate. However, the mainstay of treatment is rehydration and if applied appropriately, case fatality rates should be below 1%.

People are infectious from the onset of illness until few days after recovery. During this period, they excrete the cholera bacteria in the stool.

Suspect a case of cholera

In an area where the disease is not known to be present, a patient aged >5 years developed severe dehydration or dies from acute watery diarrhoea.

In the setting of a cholera outbreak, any person with acute watery diarrhoea (≥3 watery stools in 24 hours).

General case management

Cholera cases must be isolated from non-cholera patients and disinfection procedures must be applied in isolation ward. Every person and every item (including medical waste) must be disinfected with adequate chlorine solution before leaving the isolation ward. Rehydration is the most important part of the management of cholera

Table 5. Assessment of dehydration in the setting of cholera outbreak

	No dehydration	Moderate dehydration	Severe dehydration
General Condition	Well, alert	Irritable, less active	Lethargic, unconscious
Eyes sunken recently	No	Yes	Yes
Thirst	Drinks normally	Drinks eagerly, thirsty	Unable to drink
Skin pinch	Normal	Goes back slowly	Goes back very slowly
	↓	↓	↓
MANAGEMENT	Plan A	Plan B	Plan C
	Maintain hydration	Rehydration with ORS	Rehydration I.V. + ORS

Table 6. Titrating the amount of ORS following each stool

Amount of ORS after each stool		
Children < 2 yrs 50 - 100 ml	Children 2 – 9 yrs 100 – 200 ml	Adults and children >10 yrs As much as wanted

Theoretically, patients suspected of cholera showing no signs of dehydration can be sent at home with ORS for 2 days (and proper instructions on how to prepare the ORS solution). However, it might be careful to keep them in observation for a few hours, as the clinical condition may evolve and deteriorate rapidly. This is especially true if patients live far from the health facility

Resume feeding with normal diet as soon as possible

At any time, if the clinical situation worsens and signs of severe dehydration appear, shift immediately to Plan C

Table 7. Plan B – Oral rehydration with ORS in moderate dehydration

	Oral Rehydration during the first 4 hours					
Age	< 4 mo	4 - 11 mo	12 – 23 mo	2 - 4 yrs	5-14 yrs	>14 yrs
Weight	< 5kg	5 - 7.9kg	8 - 10.9kg	11-15.9 kg	16 -29.9kg	>30 kg
ORS in ml	200-400	400-600	600-800	800-1200	1200-2200	2200-4000
Number of cups ORS (200ml)	1-2	2-3	3-4	4-6	6-11	11-20

- If the patient wants more ORS, it's ok to give him / her more
- In case of vomiting, wait for 10 minutes and continue slowly with ORS
- If the vomiting keeps repeating frequently, put an I.V. line and rehydrate with Ringer's Lactate. Reassess hydration in order to know which amount of fluids is needed (Plan B/Plan C)
- After the first 4 hours, reassess the patient, if there is no more sign of dehydration, switch to treatment Plan A
- If there are still signs of moderate dehydration, repeat treatment Plan B (for 4 hours) , then reassess
- Resume feeding with normal diet as soon as possible
- At any time, if the clinical situation worsens and signs of severe dehydration appear, shift immediately to Plan C

Table 8. Plan C - IV Ringer's Lactate for severe dehydration

Children < 1 year	Children 1 – 15 years	Adult
First hour 30 ml/kg	First ½ hour 30 ml/kg	First 15 minutes 1 litre
↓	↓	↓
check radial pulse	check radial pulse	check radial pulse
* if very weak repeat 30 ml/kg in 1 hour	* if very weak repeat 30 ml/kg in ½ hour	* if very weak repeat 1 litre in 15 min * if pulse ok 1 litre in 45 minutes
* if pulse ok give 70 ml/kg in 5 hours	* if pulse ok give 70 ml/kg in 2 ½ hours	↓ then 1 litre in 2 – 5 hours

- Whenever possible, ORS should be used during I.V therapy
- If the patient wants more ORS, it's ok to give him/her more
- Resume feeding with normal diet as soon as possible
- Remove IV line as soon as the patient is able to drink AND no more signs of dehydration

Complications

- Hypoglycaemia
- Over hydration
- Renal Failure. This is rare, but occurs when shock is not rapidly treated. Most of the time, urine output will resume within 6-8 hours after starting the rehydration.

Antibiotics

The routine use of antibiotics is controversial. Currently 10% of *Vibrio cholerae* isolates in PNG are resistant to doxycycline, but this may change over time.

Antibiotics should only be considered for patients with severe dehydration. They must be given after IV rehydration. They might help to reduce the volume of diarrhoea and the period of excretion but are not a substitute for rehydration. For adults use:

doxycycline 300mg(3 tabs) as a single dose

- And for children use:

erythromycin [(30mg/kg/day (in 4 doses)] for 3 days

- For breastfeeding or pregnant women use:

*azithromycin 1g oral stat OR
erythromycin 500mg q.i.d for 3 days*

Use of Zinc Sulphate in treatment of cholera:

- For adults use:

zinc sulphate 40mg (2 tabs) t.d.s for 10 days

- For children < 6 months old, give:

zinc sulphate 10mg (half tab) once daily for 10 days

- For children >6 months old, give:

zinc sulphate 20mg (1 tab) once daily for 10 days

10.4 HIV/AIDS

The section on HIV/AIDS in the 6th version of adult STG provides a general summary for HIV/AIDS in PNG. For a more comprehensive guideline please see the Guidelines for HIV Management produced by the NDoH 2011.

Between 1-2% of all adults in PNG have Human Immunodeficiency Virus (HIV).

Suspect HIV if patient presents with: chronic diarrhoea, weight loss >10%, shingles, crusted scabies, severe skin infections, lymph node enlargement.

Patients with confirmed TB, cryptococcal meningitis, oesophageal thrush should also be tested for HIV.

- Provide counselling and testing for HIV – see HIV standard treatment guidelines
- It is essential to keep the patient's HIV diagnosis CONFIDENTIAL
- If the patient is HIV positive, advise them that treatment is available

Refer if

- New diagnosis of HIV
- Patient with known HIV who has signs of AIDS defining illness
- Patient with HIV is pregnant

Prophylaxis against opportunistic infections

- If CD4 count <200 give *Pneumocystis jirovecii* (PCP) prophylaxis:
cotrimoxazole (septrin) 480mg (1 tab) daily
- TB – after exclusion of active TB disease, give:
isoniazid (INH) 5mg/kg up to a maximum of 300mg daily for 6 months

Antiretroviral drugs - see HIV standard treatment guidelines

General advice to HIV positive patients

People who are found to be HIV positive (e.g. blood donors or people attending sexual health or antenatal clinic), but are not sick are still infectious though their body fluids (semen, vaginal fluid, blood) are infective. They are likely to develop AIDS in the next few years. However they need to be aware of the following:

- How to prevent spread of the disease (safe sex – abstain from sex or stick to one partner or use a condom every time they have sex) AND
- Healthy lifestyle - how to prolong their own good health and postpone the onset of AIDS. This includes advice regarding hygiene, nutrition, minimising alcohol and stopping smoking
- Early treatment if they get sick (e.g. pneumonia, malaria, diarrhoea) because people with HIV are likely to develop many infections, and their infections are likely to become severe very quickly

10.5 Malaria

The section on malaria in the 6th version of adult STG provides a general summary for malaria in PNG. For a more comprehensive guideline please see the National Protocol for Malaria Treatment, NDoH 2009.

Malaria is a common cause for admission to hospital and death in PNG. In PNG, *Plasmodium falciparum*, *P. vivax*, *P. ovale* and *P. malariae* are transmitted and can cause clinical disease.

These guidelines for malaria treatment are different to previous editions.

Investigations

- Blood slides and/or Malaria Rapid Diagnostic Tests (RDTs) are the cornerstone of malaria diagnosis and MUST be done
- In uncomplicated illness, the results of blood slide or RDT should guide whether antimalarial treatment is given or not
- Always look for other possible causes of fever and treat accordingly

10.5.1 Uncomplicated Malaria

Patients can have any of the following: fever, chills, headache, general body aches, nausea, vomiting, irritability or diarrhoea. They are able to eat and drink.

First Line treatment of uncomplicated malaria

- Artemether-lumefantrine (AL) is now first line treatment for all species of malaria. In PNG, AL is called Mala-1 and has both drugs [20mg/120mg] in one tablet. AL may also be available as Coartem and Lumartem. The treatment plan is as below*.

	Day 1	Day 2		Day 3	
Time 0	8 hours	24 hours	36 hours	48 hours	60 hours
4 tabs	4 tabs	4 tabs	4 tabs	4 tabs	4 tabs

* Best given with a fatty meal. This could include kulau, milk or tinned fish

In addition, for *P. vivax*, *P. ovale* and mixed infections, after day 3 add primaquine (see table 6, below). Primaquine can cause haemolysis in people with glucose-6-phosphate deficiency (G6PD). Advise the patient to seek medical attention if s/he develops dark urine or jaundice.

For *P. malariae*, treat as *P. falciparum*

Table 10. Primaquine (7.5 mg tablets) dosing (number of tablets) according to weight for treatment of *P. vivax*, *P. ovale* or mixed infections

Days and doses	Weight (kg)		
	30-39.9	40-49.9	≥50
Once a day, 14 days	1	1.5	2

Second-line treatment of uncomplicated malaria

- Administer second line treatments ONLY when first line treatment fails (confirmed by microscopy) within 14 days of treatment with AL
- If treatment failure occurs after 14 days of treatment, treat with first line treatment (AL)
- Repeat blood slide. RDTs can remain positive for a number of weeks.
- If blood slides are still positive after 3 days it could be an indicator of early treatment failure

For second line treatment use:

Dihydroartemisinin-piperazine (DP) is now second line treatment for all species of malaria. The trade names are Eurartesim, Artekin or Duo-cotecxin. Each tablet has both drugs [40mg/320mg] together. The treatment plan is as below:

Table 11. Dihydroartemisinin-piperazine (DP) dosing (number of tablets) according to weight for second line treatment of uncomplicated malaria

Weight (kg)	Number of tabs on day 1	Number of tabs on day 2	Number of tabs on day 3
5 - 6.9	1/4	1/4	1/4
7 - 12.9	1/2	1/2	1/2
13 - 23.9	1	1	1
24 - 35.9	2	2	2
36 - 74.9	3	3	3
>75	4	4	4

In addition, for *P. vivax*, *P. ovale* and mixed infections, after day 3 add primaquine (table 6) – see above.

For *P. malariae*, treat as *P. falciparum*

10.5.2 Severe Malaria/Complicated Malaria

Severe malaria can be caused by both *P. falciparum* and *P. vivax*

Any of the following may be indicators of severe disease:

- Unable to sit or stand
- Frequent vomiting or severe diarrhoea
- Jaundice
- Severe anaemia (Hb<50g/L)
- Confusion and irritable
- Passing very little urine or urine
- Hypoglycaemia (blood glucose level < 2.2mmol/L)
- Respiratory distress

- Hypotension or shock
- Coma or convulsions (cerebral malaria)
- Abnormal bleeding

Investigation

- Blood slides and/or Malaria Rapid Diagnostic Tests (RDTs) must be done
- If the blood slide and/or RDT are negative but clinical suspicion remains high, treat as for severe malaria
- Always consider other possible causes of fever
- Check plasma glucose and Hb
- Do a lumbar puncture (LP) if comatose, convulsions, confusion or signs of meningitis
 - If CSF is clear give treat as for severe malaria (see below)
 - If CSF is cloudy, treat for meningitis (on page 61)
 - If CSF is blood stained or has not been performed, treat for severe malaria AND ningitis

First line treatment of severe malaria

Artesunate (AS) injection (IV/IM) is now first line treatment for severe malaria

For the preparation of artesunate please see annex 6 (on page 97)

Remember: For IV use the mixture is 60mg/6ml
For IM use the mixture is 60mg/3ml

Table 12. Artesunate injection (ml) for first line treatment of severe malaria according to weight

Formulation	Days and dosage	Dose by weight (ml)		
		30-39.9 kg	40-49.9 kg	≥50 kg
IV formulation (60mg in 6 ml)	Day 1: 1st dose and 2nd dose 12 hours later	8	10	12
	Days 2 onwards (onwards)	8	10	12
IM formulation (60mg in 3ml)	Day 1: 1st dose and 2nd dose 12 hours later	4	5	6
	Days 2-7	4	5	6

In addition, for *P. vivax*, *P. ovale* and mixed infections, after day 3 add primaquine (table 6).

Patients should receive a minimum of 24 hours of AS. If able to tolerate oral medication, a full course of artemether-lumefantrine should be given (table 5).

Second line treatment of severe malaria

The second line treatment for severe malaria is quinine (QN) followed by quinine tablets and doxycycline when patient able to swallow.

- Give parenteral quinine
- Loading dose (LD):
*quinine IV 20mg/kg (in 100ml 5% Dextrose) given over 4 hours OR
IM 10mg/kg stat*
- Maintenance dose (MD):
*IVIIM 10mg/kg (in 100ml Dextrose over 2 hours) 8 hourly after
the START of the first dose*
- When able to tolerate oral therapy give:
*quinine tablets (<50kg 450mg three times daily, ≥50kg 600mg t.d.s) for 7 days AND
doxycycline 200mg daily for 7 days*
- Give quinine for a total of 7 days.
- Give quinine deep IM and NOT subcutaneous.
- Treat hypoglycaemia. The combination of severe malaria and quinine treatment can result in hypoglycaemia (low blood sugar), particularly in pregnancy
- If you can measure blood sugar and it is low, put up a drip of 5% dextrose or give:
*50% dextrose IV 50ml stat THEN
5% dextrose drip*
- Treat convulsions (on page 73)

Refer if

- Not improving after 24 hours treatment with artesunate
- LP required (persisting coma, neck stiffness, convulsions)
- Decreased urine output persists after rehydration/treatment
- Blood transfusion is unavailable
- Suspected renal failure (oliguria)
- Jaundice persists or worsens

Pre-referral treatment of severe malaria

- Where IM/IV AS is not available, all patients with severe malaria should be given artesunate suppositories:
- Artesunate 200mg suppositories (<50kg 2 suppositories, >50kg 4 suppositories)
- If pre-referral rectal AS has been given, the first dose of IM/IV AS should be 12 hours after the last suppository.
- If not, start first line treatment with AS (table 8).

10.5.3 Uncomplicated malaria in pregnancy

AL is not recommended in the first trimester of pregnancy.

First line treatment of uncomplicated malaria in the first trimester of pregnancy:

quinine tablets (<50kg 450mg three times daily, ≥50kg 600mg three times daily) for 7 days AND fansidar (SP) 2 tablets on day 1

First line treatment of uncomplicated malaria in the 2nd & 3rd trimesters

– treat with AL (see table 5 for dosing and duration)

For second line treatment of uncomplicated malaria in all trimesters use:

quinine tablets (<50kg 450mg three times daily, ≥50kg 600mg three times daily) for 7 days AND fansidar (SP) 2 tablets on day 1

Important: Do not use primaquine in pregnancy and for up to 6 weeks post partum.

10.5.4 Severe malaria in pregnancy

Severe malaria is dangerous for the developing foetus and is associated with high foetal loss.

- Give parenteral artesunate (table 8) or quinine (see below)
- Loading dose (LD):

quinine IV 20mg/kg (in 100ml 5% Dextrose) given over 4 hours OR IM 10mg/kg stat

- Maintenance dose (MD):

IV/IM 10mg/kg (in 100ml Dextrose over 2 hours) 8 hourly after the START of the first dose

- When able to tolerate oral therapy give:

quinine tablets (<50kg 450mg three times daily, ≥50kg 600mg t.d.s) for 7 days AND fansidar (SP) 2 tablets on day 7

10.5.5 Malaria prophylaxis (prevention)

Indications for malaria prophylaxis are:

- Pregnancy - intermittent presumptive treatment in pregnancy (IPTp) is now recommended. Give:

fansidar (3 tabs as a single dose) 2-3 times, at least a month apart in the 2nd and 3rd trimesters

- HIV+ women receiving septrin (co-trimoxazole) prophylaxis should not receive IPTp
- For hyper-reactive malarial spleen ('HMS' or 'TSS') use:

chloroquine (CQ) 2 tabs weekly for 3 months then review

- Splenectomised patients require lifelong prophylaxis. Use:

chloroquine (CQ) 2 tabs weekly for life

- Patients receiving blood transfusion should also receive prophylaxis. Give:

artemether-lumefantrine 4 tabs

at time 0, 8, 24, 36, 48 and 60 hours

10.6 Acute Bacterial Meningitis (ABM)

The main causes of ABM in PNG are *Streptococcus pneumoniae*, *Haemophilus influenzae* and *Neisseria meningitidis*. Although likely to become less important with widespread immunization, all recent *H. influenzae* isolates in PNG are resistant to chloramphenicol (CMP). There is also some evidence of decreasing susceptibility of *S. pneumoniae* to CMP. The 6th edition of the adult STG reflects these trends and recommended treatment for ABM has changed.

Symptoms and signs

- Fever
- Headache
- Abnormal behaviour
- Neck stiffness
- Confusion
- Convulsion
- Coma
- Rash (purpura, or small haemorrhages under the skin of inner arms and upper thighs, roof of mouth, lips, fingers and toes – this is a sign of meningococcal meningitis)

Investigations

- Always do a lumbar puncture (LP) if you suspect meningitis
- If concerns about raised intracranial pressure (such as papilloedema) or other contraindications to LP, seek advice from Medical Officer
- HIV should be considered in all cases of ABM in adults. Provider initiated counselling and testing (PICT) may be appropriate

Treatment

Treat for meningitis if the cerebrospinal fluid (CSF):

- Cannot be obtained
- Is cloudy or not absolutely clear
- Is blood-stained
- If the laboratory confirms ABM
- Give:
ceftriaxone IV 2g b.d for 14 days OR
(if ceftriaxone unavailable)

chloramphenicol IV 1g q.i.d for 14 days

- Test and treat for malaria (blood slide or RDT)
- Anticonvulsants if needed (on page 73)
- Fluids (maintenance fluids, IV or nasogastric)
- Care of the unconscious patient

Refer if

- You suspect meningococcal meningitis (urgent, start treatment before transfer)
- No improvement after 2 days of antibiotics
- Not cured after 2 weeks of treatment
- Chronic meningitis

10.7 Chronic Meningitis

Symptoms

- Chronic headache (more than 2 weeks)
- Low grade fever
- Vomiting
- Visual disturbance
- neck stiffness

Causes

- TB (on page 64)
- Cryptococcal meningitis – refer to tertiary hospital
- Partially treated bacterial meningitis

Investigations

- LP (request for ZN [TB] and India Ink [Cryptococcus] stains),
- CXR
- HIV testing is recommended

10.8 Sepsis and septic shock

Septicaemia is a serious condition caused by infection that has spread through the bloodstream to the whole body. It is very severe and can be fatal, and the patient looks very sick.

Septic shock is sepsis with any of the indicators of shock (low blood pressure, fast pulse etc).

You must act quickly. Start treatment below and refer immediately to medical officer.

Symptoms and signs

Diagnosis can be difficult. The patient looks sick, but symptoms and signs can be very variable. They may or may not include:

- History, symptoms or signs of a localised infection such as pneumonia (on page 80), urinary tract infection (on page 43), meningitis (on page 61), post-partum sepsis (see O & G Manual) or skin abscess (on page 87)
- Known or undiagnosed diabetic (on page 23)
- High, low or normal temperature
- Shock (fast pulse, low blood pressure <90mmHg systolic, cold hands and feet)
- Slow pulse (suspect typhoid - on page 69)
- Increased respiratory rate
- Low urine output
- Confusion/irritability and drowsiness
- Purpuric rash (small haemorrhages under skin)

In elderly patients septic shock can present without fever with or without confusion.

Causes of sepsis/septic shock

Community acquired

- Intra-abdominal sepsis
- Meningococcus
- Severe pneumonia
- Skin, bone or soft tissue infection
- Malaria

Hospital acquired

- Surgical site infections
- Sepsis in the immunocompromised patient
- Hospital acquired pneumonia

Investigations

- Test and treat for malaria (blood slide or RDT)
- Blood culture
- MSU
- Chest x-ray
- LP

Empiric treatment (if you are not sure of the source of infection)

These patients are so sick that they require the widest possible spectrum of antibiotic coverage.

- Start antibiotic treatment immediately (before transferring patient) and give:
 - chloramphenicol IV or IM 1g q.i.d AND*
 - metronidazole IV or suppository 500mg t.d.s AND*
 - gentamicin IV or IM 5-7mg/kg o.d*
- Alternative treatment regimens are:
 - flucloxacillin IV 2g q.i.d AND*
 - gentamicin IV or IM 5-7mg/kg o.d*
 - OR
 - flucloxacillin IV 2g q.i.d AND*
 - ceftriaxone IV 2g o.d*
- Test and treat for malaria, but give treatment for severe malaria as well (on page 58)
- Oxygen 4 litres/min by mask
- IV fluids
- Insert urinary catheter
- Refer to medical officer

Treatment for specific sepsis syndromes

- If meningococcus suspected (shock plus purpuric rash [small haemorrhages under skin]) give:
 - ceftriaxone IV 2g o.d OR*
 - benzyl-penicillin IV or IM 2MU or 1.2g every 4 hours*
- If intra-abdominal cause is suspected give:
 - chloramphenicol IV or IM 1g q.i.d AND*
 - metronidazole IV or suppository 500mg t.d.s AND*
 - gentamicin IV or IM 5-7mg/kg o.d*
- Suspect methicillin resistant *S. aureus* (MRSA) in skin, soft tissue and bone infections not responding well to flucloxacillin. If MRSA suspected, substitute flucloxacillin with:
 - lincomycin IV 600mg t.d.s*
- Suspect multi-resistant organisms in septic patients who have been hospitalised for a long period and give:
 - lincomycin IV 600mg t.d.s AND*
 - gentamicin IV or IM 5-7mg/kg o.d*

10.9 Tuberculosis

The section on malaria in the 6th version of adult STG provides a general summary for tuberculosis in PNG. For a more comprehensive guideline please see the National Protocol for Tuberculosis Control, NDoH.

PNG has adopted the DOTS strategy for TB control, as recommended by World Health Organisation (WHO). DOTS means Directly Observed Treatment Short course.

For DOTS to work

- Adequate funding with political and community support are critical
- All infectious cases must be identified by sputum microscopy
- First line treatment must be given under directly observed treatment (DOT)
- Have adequate supply of all TB drugs
- Know and use the information system to record, monitor, report and evaluate the TB control program

To control TB, we need to achieve and sustain

- A cure rate of >85% of all new positive cases.
- Case detection rate >70% of the estimated new positive cases.

Treat only patients in the following situations:

Pulmonary sputum positive TB (PTB+), diagnosed by:

- One or more sputum smears positive for AFB, OR
- Sputum negative, but culture positive

Pulmonary sputum negative TB (PTB-), diagnosed by:

- At least 3 negative sputums, AND
- Chest x-ray consistent with active PTB AND
- No response to a short course of amoxicillin or co-trimoxazole AND decision of a medical officer or clinical HEO

Extrapulmonary TB (EPTB) is diagnosed by:

- Strong clinical evidence consistent with active EPTB, OR
- AFBs or granulomas seen on biopsy, OR
- One culture-positive specimen, AND decision by a medical officer or clinical HEO

There is no room for trial treatment.

Registration Procedure

- Fill in Treatment Card (TB01)
- Fill in patient's small personal card (TB02)
- Refer to TB officer for registration in TB registration book (TB03)

Principles of Directly Observed Treatment (DOT)

- Every dose must be supervised by a health worker or a trained volunteer (treatment partner)

- Treatment partner must tick patient's card after each dose is taken
- The patient and his/her family must be constantly educated about TB and the need for regular treatment lasting for up to 9 months

Treatment – Category 1 (new cases)

Treatment is now in fixed dose combinations (FDC) (i.e all drugs in the same tablet) and is daily dosing for both intensive and continuation phases. If FDCs are not available contact the provincial disease control office.

All new cases of pulmonary and extrapulmonary TB (PTB+, PTB-, EPTB) should receive an intensive phase consisting of (see table below):

2 months of 4 drugs daily – isoniazid (INH or H), rifampicin (R), pyrazinamide (Z) and ethambutol (E) (2 HRZE)*

Following the intensive phase, the continuation phase consists of:

4 months of 2 drugs daily – isoniazid (INH or H), rifampicin (R) (4HR)

Pyridoxine is not recommended as standard treatment but should be given (25mg daily) for the following patients: diabetics, alcoholics, HIV+, malnourished patients

Table 13. Dosing by weight for fixed dose combination (FDC) drugs, ethambutol and streptomycin

Weight (kg)	Intensive Phase FDC (HZRE)	Continuation Phase FDC (HR)	Ethambutol (loose tablets only) - Category 2 only	Streptomycin IMI Daily
	Number of tablets	Number of tablets	Number of tablets	
30-39	2	2	1.5	500mg (2.5ml)
40-54	3	3	2	750mg (3.75ml)
55-70	4	4	3	1000mg (5ml)
>70	5	5	3	1000mg (5ml)

Follow up – Category 1

- Remember all TB patients should have an HIV test
- Temperature, body weight, clinical assessment
- Give education to patient and family; encourage them to continue treatment
- Sputum follow-up at 2 months, 4 months and during sixth month (for follow-up of retreatment cases, refer to TB officer for advice)
- If sputum positive at 2 months change to continuation phase BUT collect sputum for TB culture and susceptibility testing (DST)
- Further management depends on results of DST

Special situations – TB meningitis

- TB meningitis is a special case – use streptomycin (STREP or S) instead of ethambutol

for intensive phase

- HRZ should be available as a FDC, but if unavailable, loose drugs can be used
- Continuation phase as above (RH)
- Steroids should also be used for TB meningitis (and CNS TB), spinal TB, pericardial TB use:

*prednisolone 1 mg/kg daily for 4 weeks,
then taper over the next 4 weeks*

If treatment is missed – general principles

- For various reasons patients may miss some of their treatment. Take the following steps:
- Trace the patient (visit or send message)
- Help them to solve the problem that caused them to miss treatment
- Advise them to continue treatment as follows:

If patient missed treatment for less than 1 month:

- Continue treatment and prolong by the number of days missed (no need to repeat sputum test)

If patient missed treatment for 1 - 2 months:

- Do 2 sputum smears and continue treatment while waiting for results
- If all smears negative, continue treatment and prolong by the number of days missed

If any smears positive, use this table:

Table 14. Recommended treatment if patient missed treatment between 1-2 months

Previously treated for < 5 months	Continue treatment and prolong to make up for missed doses
Already treated for > 5 months	Category 1 – refer to TB officer for Category 2 treatment Category 2 – DST & refer

If patient missed treatment for more than 2 months:

These patients are **DEFAULTERS**

- Do 2 sputum smears and wait for results before continuing

Table 15. Recommended treatment if patient missed treatment greater than 2 months

If all smears negative or EPTB	Clinical decision on individual basis whether to restart or continue treatment or no further treatment	
If one or more positive smears	Previously on Category 1	Start Category 2
	Previously on Category 2 (DST)	Refer to medical officer

Managing Side Effects

Table 16. Side effects from TB medications and their management

Side effects	Drug(s) probably responsible	Management
Minor		Continue TB drugs, check drug doses
Anorexia, nausea, abdominal pain	RZ	Give drugs last thing at night
Joint pains	Z	Aspirin or diclofenac or indocid
Burning sensation in the feet	INH/H	Pyridoxine 100mg daily
Orange/red urine	R	Reassurance
Itching, skin rash	Any	Promethazine 25mg
Major		Stop drug(s) responsible
Deafness	STREP	Stop streptomycin, continue other drugs. Check ears for wax.
Dizziness (vertigo & nystagmus)	STREP	Stop STREP, continue other drugs
Jaundice	HRZ	Stop ALL TB drugs & refer
Confusion (suspect acute liver failure)	Most TB drugs	Stop ALL TB drugs, refer urgently to hospital
Loss of vision	ETH	Stop ETH, refer urgently
Shock, purpura, acute renal failure	RIF	Stop RIF, refer urgently
Severe skin side effects	Most TB drugs	Stop ALL drugs. Refer to MO

Treatment – Category 2 (retreatment cases)

Any patient who has ever previously received any TB treatment for more than 1 month, regardless of type or site of TB (PTB+, PTB-, EPTB) should receive category 2 treatment.

Refer to TB officer or medical officer for assessment and treatment

- All category 2 cases of pulmonary and extrapulmonary TB (PTB+, PTB-, EPTB) should receive an intensive phase consisting of:

*HRZE and S for 2 months followed by HRZE for 1 month
(S is streptomycin IM 15mg/kg daily)*

- This is followed by a continuing phase consisting of:

HRE (FDC) daily for 5 months

Refer if

- Any patient needing Category 2 treatment (retreatment cases)
- Sputum negative and you are not confident to make a clinical diagnosis
- You suspect extrapulmonary TB but are not confident to make a clinical diagnosis

- Patient has major drug side effects as indicated above
- Patient is pregnant
- Patient is sputum negative and missed treatment for more than 2 months
- Treatment failure (sputum remains positive after 5 months of treatment)

Multidrug resistant (MDR)-TB

MDR-TB is on the rise in PNG and means resistance to both Rifampicin (R) and Isoniazid (H). Drug sensitivity testing must be performed on sputum and is available in Madang and Port Moresby.

Suspect MDR-TB if any of the following:

- Supervised Cat 1 failures
- ALL CAT 2 failures
- Smear positive defaulters
- Contacts of MDR-TB patients
- Non-converters in at the end of intensive phase for Cat 1/2

Contact SMO for TB if MDR-TB confirmed because second line treatments are available (Ofloxacin/Cycloserine/Ethionamide/Capreomycin)

Contact Tracing

- Examine all household contacts of smear-positive cases
- Identify suspects (3 weeks cough, blood in sputum, fever, weight loss, enlarged glands)
- Examine sputum for AFB
- Screening tests: history, clinical examination, sputum test, Mantoux test (for children <5 years old), chest x-ray, and refer for HIV counselling and testing if mother is HIV positive
- If no evidence of active disease, give prophylaxis to children under 5 years: INH 5mg/kg for 6 months, follow up every 2 months during treatment

10.10 Typhoid

Common symptoms

- High fever
- Diarrhoea or constipation
- Headache
- Confusion
- Abdominal pain
- Deafness

Useful signs are

- Fever and reduced pulse rate

- Purple spots on abdomen or chest
- Tremor or unsteady gait
- Deafness
- Disorientation
- Enlarged spleen

Investigation

- Test for malaria (blood slide, RDT) and treat accordingly
- Blood cultures are the gold standard for diagnosis of typhoid
- Widal's test is not sensitive or specific enough to confirm the presence or absence of typhoid so is not recommended as routine investigation

Treatment

- Give IV fluids if very sick, dehydrated or BP systolic less than 90mmHg.
- If unwell or unable to tolerate oral medications, give:
 - chloramphenicol IV, IM or orally 1g q.i.d until the fever starts to come down*
- Then give:
 - chloramphenicol 500mg (2 caps) orally q.i.d until day 14*
- If chloramphenicol is not available, give:
 - amoxicillin IM, IV or orally 1g t.d.s for 14 days*
- Typhoid relapse should be treated in the same way as the first attack.
- Educate patient and family about personal hygiene, clean water supply and the need for other possible typhoid cases in village to come for treatment

Refer if

- Low urine output (suggests acute renal failure)
- Persistently low BP
- Acute intestinal bleeding occurs
- Intestinal perforation is suspected.

Notify provincial health adviser

- All confirmed cases of typhoid should be notified to the provincial disease control officer.

10.11 Worms

10.11.1 Roundworm and hookworm

Symptoms and signs

- Anaemia (on page 45)
- Malnutrition
- Roundworms vomited or passed in stool
- Abdominal pain for which no other cause is found.
- Diarrhoea
- Itchy rash/urticaria
- Arthralgia

Treatment

- Give:
albendazole 400mg (2x200mg tabs) stat

10.11.2 Threadworm

Symptoms and signs:

- Itching around the anus
- Threadworms are seen

Treatment

- Give:
albendazole 400mg (2x200mg tabs) stat and repeat after 2 weeks

10.11.3 Strongyloides

Symptoms and signs

- Malnutrition, unexplained oedema
- Abdominal pain with no other cause found

Treatment

- Give:
albendazole 400mg (2x200mg tabs) daily for 3 days

11 Neurological Diseases

11.1 Acute floppy paralysis (Polio)

PNG is now polio free. Continuing surveillance is necessary to make sure it continues that way.

Any person with acute muscle weakness, floppy limbs, and difficulty walking, swallowing or talking must be presumed to have acute poliomyelitis.

Treatment

- Look for and treat other causes of AFP – particularly SNAKEBITE (on page 9), TB spine (see Leg Weakness on page 74), trauma, Guillaine-Barré syndrome, periodic hypokalaemic paralysis
- Refer to medical officer and Public Health Advisor immediately

11.2 Convulsions, confusion, coma

Causes

- Cerebral malaria
- Meningitis/encephalitis
- Typhoid
- Stroke
- Brain tumour
- Diabetes (hypoglycaemia, DKA)
- Kidney failure
- Liver failure
- Head injury
- Poisoning/drug overdose
- Withdrawal from alcohol and other drugs

Investigation

- Test and treat for malaria (blood slide or RDT)
- Blood sugar level
- Screen for infection (LP, urine, blood culture)
- Urine test for sugar, protein and bilirubin.

General management

- Treat the cause
- keep the airway clear, suck out secretions
- Lie patient on side, turn every 2 hours

- Give oxygen if necessary, 4 litres/min by nasal prongs or 4 litres/min by mask
- Give IV fluids if necessary
- Careful observation of vital signs - respiration, pulse, BP and level of consciousness (use Glasgow Coma Scale on page 92).

Treat convulsions

- For acute treatment of convulsions give:
 - diazepam IV slow injection 5-10mg (1-2ml) stat OR*
 - paraldehyde IM 10ml stat*
- Note (1): diazepam should not be given IM
- Note (2): when giving paraldehyde, ensure:
 - freshly opened ampoule is used*
 - glass syringe (if available) is used*
 - it is given IM (not IV)*
- Repeat in 5 minutes if still convulsing and then every 6 hours if necessary.
- If two doses of the first drug fail, try the drug which you have not used (paraldehyde or diazepam) and give:
 - phenobarbitone IM 100mg (1ml) loading dose stat*
- If convulsions have been difficult to control, start:
 - phenobarbitone 90mg (3 tabs) b.d for 1 week*
- If convulsions occur again, then begin phenytoin (see epilepsy below)
 - Control disturbed behaviour*
- Give:
 - chlorpromazine IM 25-50mg (1-2ml) stat and*
 - repeat in 30 mins -1 hour*
 - if necessary and then every 4-6 hours*

Make sure that the patient wakes up between injections and is given water or other fluids to drink. If too drowsy to drink, put up IV fluids.

Refer if

- Convulsions cannot be controlled
- No improvement after 24 hours treatment
- No cause for convulsion is found
- New case of epilepsy

Epilepsy or frequent convulsions

- Use:
 - phenytoin 300 mg (3x100mg caps) daily*
- Tell the patient to return for further supplies of medicine before running out

- Continue until there have been no convulsions for at least 2 years
- If no convulsions during 2 years of treatment then reduce phenytoin dose over a period of at least 2 months, then stop
- If convulsions return after phenytoin is stopped, then restart phenytoin 300mg (3 caps) daily and continue treatment for life
- Phenytoin can cause side effect such as liver impairment, drowsiness and unsteadiness. Refer to medical officer who may start sodium valproate (Epilim) or carbamazepine (Tegretol)
- Adherence to medication is the most common reason for ongoing fits

11.3 Leg weakness

Causes

- Consider TB of the spine if:
 - weakness in one or both legs
 - back pain
 - inability to pass urine
- Poliomyelitis (acute floppy paralysis - on page 72)
- Snake bite (floppy paralysis - on page 9)
- Stroke (on page 76)
- Hypokalaemic paralysis (low potassium level in blood). Ask the patient or the family if this has occurred before.
- Guillaine-Barré syndrome
- Trauma (e.g. falling from tree or sports injury to neck or back)

Treatment

- Transfer to Medical Officer immediately
- Before transfer, do the following:
 - Treat pain (on page 2)
 - Treat any other treatable cause (see relevant disease)
 - Insert INDWELLING URINARY CATHETHER if there is urinary retention
 - Prevent bed sores
- Notify Provincial Health Adviser immediately of any case of AFP
- If hypokalaemic paralysis is suspected give:
 - potassium chloride (Slow K) 2 tabs t.d.s and high potassium foods like kaukau and ripe banana OR*
 - if unable to drink, normal saline and 1.5 grams KCl IV every 8 hours until better*

11.4 Psychosis

General measures

- Calm the patient.
- Always look for a physical cause in all mentally disturbed patients. Take the patient's temperature and think particularly of meningitis, cerebral malaria or typhoid
- Always look for a situation causing stress and anxiety to the patient
- Always admit the patient with a guardian who will help and watch the patient

General management

- Treat any physical illness
- Make sure the patient eats and drinks
- If no physical cause is found after physical examination (including temperature), give chlorpromazine as below

Pharmacological treatment

- For violent or aggressive behaviour give:
*chlorpromazine IM 100-150mg (4-6ml) t.d.s
until behaviour improves (max 48 hours)*
- Then change to:
chlorpromazine 100-200mg (1-2 tabs) orally t.d.s
- If behaviour is still uncontrolled add:
diazepam 5-10mg (1-2 tabs) orally t.d.s for 2-3 days
- For patients who hear voices, have strange thinking or abnormal behaviour, give:
chlorpromazine 100mg (1 tab) orally t.d.s or q.i.d
- Reduce the dose of chlorpromazine when the patient has been well for 1 week:
 - Reduce the daily dose by 100mg (1 tab) each week, then
 - Discharge the patient on 100-200mg (1-2 tabs) each night
 - Stop chlorpromazine after 3 months
 - If psychotic illness comes back, restart treatment, refer to doctor or ask advice from Mental Health Services
- The side effects of chlorpromazine are involuntary muscle contractions, especially of face, rigidity, tremors, protrusion of tongue. If these develop use:
*promethazine 50mg (2ml) IM stat followed by
promethazine 25mg (1 tab) orally b.d OR
benzhexol 5mg (1 tab) orally b.d*

Refer if

- There is no improvement after 3 days on the above treatment
- The patient has committed a serious crime (police are responsible for the transfer)

- The patient needs further assessment or care

Always

- Control the patient's behaviour with drugs before transfer (see above)
- Make sure that a reliable guardian, and an experienced health worker, accompany the patient
- Make sure that the health worker has chlorpromazine tablets, injections, needles and syringes to give another dose during transfer if necessary

11.5 Stroke/cerebrovascular accident

With increasing numbers of lifestyle related diseases (diabetes, high blood pressure, heart attack), stroke is now common in some communities. The risk factors are the same as for heart attack (on page 16).

Stroke is caused by a sudden change to blood circulation in the brain, either blockage (thrombosis or embolism) or bleeding (haemorrhage).

Symptoms and signs

- Sudden loss of consciousness
- Sudden weakness and loss of function of one side of the body
- Sudden onset of difficulty talking
- Blood pressure may be very high

Treatment

- If the patient is unconscious, test and treat for malaria (Blood slide or RDT) and consider LP to exclude meningitis (on page 61)
- Nurse in coma position (general management of unconscious patient)
- Blood pressure should not be lowered aggressively in the acute stage
- Transfer to medical officer
- Physiotherapy
- Stroke rehabilitation is very important

12 Respiratory Diseases

12.1 Asthma

Asthma is a narrowing of the air tubes causing difficult breathing and wheezing or coughing. It may be mild or severe.

12.1.1 Mild Attack

Some wheezing and shortwind, pulse rate less than 100/min, no cyanosis, patient alert.

Treatment

- Give:

*salbutamol inhaler 4 puffs via plastic-bottle-spacer as required OR
if unavailable
nebulised salbutamol solution (1ml) OR
nebule (2.5-5mg) up to 4 hourly*

- Making the nebulised solution:

*mix 1ml of Salbutamol solution or 1 ampoule with 1ml saline
in the nebuliser mask every 3-4 hours using the foot pump OR
using oxygen at 7 litres/min*

- If neither inhaled or nebulised salbutamol available, give:

salbutamol 4mg (1 tab) orally t.d.s until better

- Treat infection if fever or productive cough treat as per mild pneumonia with:

*amoxicillin 500mg (2x250mg or 1x500mg tabs)
orally t.d.s for 5 days OR
doxycycline 100mg (1 tab) b.d for 7 days*

- If responding well to treatment, review in 2-4 hours

- Continue inhaled salbutamol until stable and then change to:

*inhaled salbutamol via spacer (2 puffs as required) OR
if unavailable
oral Salbutamol 4mg (1 tab) t.d.s until quite well*

- If not improving quickly after first doses of inhaled salbutamol, treat for severe asthma

12.1.2 Severe Attack

Asthma is severe if patient:

- Is not improving quickly after first doses of salbutamol
- Has pulse rate more than 100/min
- Has difficulty talking
- Is drowsy or confused
- is cyanosed

Treatment

- Give oxygen 3-6L per minute via Hudson's mask
- Give:
 - nebulised salbutamol solution (1ml) or nebule (2.5-5mg) OR*
 - salbutamol inhaler 8 puffs via*
 - plastic-bottle-spacer (see annex 4)*
- Repeat salbutamol via nebuliser or puffer every 15 minutes if necessary
- In very severe cases give continuous salbutamol with oxygen until the patient reaches hospital
- If salbutamol not available, or if life threatening use:
 - adrenaline 0.5-1ml (½ -1ml) subcutaneous injection*
 - repeat in ½ hour if necessary*
- Steroids are recommended for all cases of moderate to severe asthma. Give:
 - hydrocortisone IV 200mg stat AND*
 - prednisolone 50mg orally, stat*
- If very unwell, a single dose of magnesium sulphate may be given after discussion with medical officer. Use:
 - magnesium sulphate IV 1.2-2g over 20 minutes*
- Alternatively, aminophylline may be used:
 - aminophylline 250mg (<50kg) to 375mg (>50kg) in 1 litre of*
 - dextrose/ saline every 12 hours*
- DO NOT give aminophylline to patients who are already taking aminophylline or similar tablets (e.g. Theo-Dur) for chronic asthma or COPD
- If there is fever or yellow/green sputum, treat as for moderate pneumonia (on page 81)
- When patient improves:
 - stop oxygen
 - oral steroids
 - prednisolone 1mg/kg daily tapering over 1-2 weeks*
 - change salbutamol nebuliser to:*
 - inhaled salbutamol 2 puffs via spacer as required OR*
 - if inhaled salbutamol unavailable,*
 - oral salbutamol 4mg (1tab) t.d.s*
 - change IV aminophylline to:
 - oral aminophylline 100mg (1tab) t.d.s*
- continue salbutamol and aminophylline until patient has been well for 5 days
- if not completely well after 1 month, treat for chronic asthma (see below) and refer to medical officer

12.1.3 Chronic Asthma

Shortness of breath and wheezing most of the time, or wheezing present between acute attacks.

Treatment

- For prevention of asthma attacks use steroid inhaler:
*beclometasone dipropionate (becotide) 100µg via spacer
2 puffs b.d*
- For acute relief of symptoms use:
salbutamol inhaler 2 puffs via spacer as needed

Refer if

- Cyanosis indicates life threatening asthma and all patients should be transferred if possible
- Severe acute attack not improving with treatment (urgent). Continue Oxygen and other treatment during transport
- Chronic asthma
- Many attacks over several months (discuss with medical officer before transfer)
- Not completely well after all the above treatment

12.2 Chronic Obstructive Pulmonary Disease (COPD)

COPD is characterised by chronic cough, often with wheezing, shortness of breath and/ or sputum due to the following:

- Smoking (including passive smoking)
- Exposure to household smoke
- Effects of previous infections (TB, measles, whooping cough)

Investigation

- Exclude tuberculosis by doing sputum smear and chest x-ray

Treatment

- Stop smoking and refer for dental check up (periodontal disease if often associated with COPD).
- Treat chest infection if sputum increases in amount or becomes more green or yellow. Use:
amoxicillin 500mg (2x250mg or 1x500mg) t.d.s for 7 days
- If no improvement, give:
*doxycycline 100mg (1 tab) b.d for 7 days OR
cotrimoxazole (Septrin) 960mg (2 tabs) b.d. for 7 days*

- DO NOT use doxycycline for pregnant women
- If getting worse treat as for severe pneumonia
- Treat wheezing (if present):
 - salbutamol 4mg (1 tab) t.d.s OR*
 - salbutamol inhaler 2 puffs via spacer as needed*
- If wheezing or shortness of breath becomes severe, treat as severe asthma
- Some people with COPD have wheezing most of the time and need long-term treatment as for chronic asthma
- Treat right-sided heart failure (signs: distended neck veins, tender enlarged liver, ascites and oedema). If present, use:
 - furosemide 40-80mg (1-2 tabs) orally daily*
- If very unwell, treat as for severe asthma

12.3 Influenza Like Illness (ILI)

ILI symptoms include: fever, cough, sore throat, nasal congestion, runny nose, headache, muscle pain. They are usually mild and self-limiting. Currently there are no routine facilities for diagnosis of H1N1 ('Swine flu' pandemic Influenza) or H5N1 (Bird flu) and no specific antiviral treatment is recommended for ILI.

General Management

- If fever – test and treat for malaria (blood slide or RDT)
- If cough or breathlessness treat as per pneumonia guidelines
- If diarrhoea/vomiting are present treat as per diarrhoea guidelines
- If none of the above, treatment is supportive only and patient is advised to stay at home for the duration of the illness

12.4 Pneumonia

12.4.1 Mild Pneumonia

Symptoms and signs

- Fever, cough, pleuritic chest pain
- Respiration rate under 30/min
- NO cyanosis or complications

Treatment

- Treat as outpatient (unless it will be difficult to return if they get worse). If there is no improvement after 2 days, admit to hospital or health centre and treat for moderate pneumonia

- Give:
 - amoxicillin 500mg (1 tab) t.d.s for 5-7 days*
- Analgesia for chest pain (on page 16)
- Test for malaria (blood slide or RDT) and treat accordingly

12.4.2 Moderate Pneumonia

Symptoms and signs

- Fever, cough, pleuritic chest pain
- Respiratory distress (in-drawing of muscles between ribs, using neck muscles for breathing) OR
- Respiration rate 30-40/min.
- AND no complications

Treatment

Treat as an inpatient. If getting worse after 2 days treatment, treat for severe pneumonia.

- Give
 - benzyl-penicillin IV 2 MU (1.2g) every 4-6 hours*
- When improved change to:
 - amoxicillin 500mg t.d.s for 5-10 days*
- Analgesia for chest pain (on page 16)
- Test for malaria (blood slide or RDT) and treat accordingly
- Chest physiotherapy/encourage the patient to cough

12.4.3 Severe Pneumonia

Symptoms and signs

- Fever, cough, pleuritic chest pain
- Respiration rate over 40/min
- Respiratory distress (in-drawing of muscles between ribs, using neck muscles for breathing)
- Cyanosis
- Jaundice
- Heart failure (distended neck veins, big liver and oedema)
- Septicaemia or meningitis
- Confusion

Treatment

- Give:

*chloramphenicol IM or IV 1g
(1 whole vial with 4ml sterile water) q.i.d OR
benzyl-penicillin IV 2 MU (1.2g) every 4-6 hours AND
gentamicin IV 5mg/kg daily OR
ceftriaxone IV 1g daily*

- When the patient improves, has no fever and looks better (usually after 3-5 days) change to:

chloramphenicol 750mg (3 caps) orally q.i.d for 10 days

- Oxygen - 2 litres/min by nasal prongs or 4 litres/min by mask
- Analgesia for chest pain
- Test for malaria (blood slide or RDT) and treat accordingly
- Chest physiotherapy/encourage the patient to cough
- If wheezing is present give:

*nebulised salbutamol solution (1ml) or nebule (2.5-5mg) OR
salbutamol inhaler 8 puffs via plastic-bottle-spacer*

- Treat heart failure (on page 17)
- If deteriorating despite chloramphenicol/ceftriaxone, arrange transfer to medical officer and give:

gentamicin IM/IV 5mg/kg and transfer to Medical Officer

- IV fluids

If you suspect atypical pneumonia (e.g. Mycoplasma or legionella)

- Add:

*doxycycline 100mg orally b.d OR
erythromycin 500mg orally q.i.d 6 hourly*

Refer if

- Severe pneumonia not improving after 24 hours of treatment
- Relapse (gets worse again) while still on treatment
- Not cured after 2 weeks of treatment
- Tuberculosis is suspected but sputa are negative for AFB

Always think of tuberculosis, AIDS or malignancy if pneumonia does not improve with treatment.

13 Skin diseases

13.1 Leprosy

Leprosy is mainly a disease of peripheral nerves, but also affects skin and other organs. The number of leprosy cases in PNG is declining.

Diagnosis is made by finding:

- Typical skin lesions and positive skin smear OR
- Typical skin lesions and loss of sensation OR
- Nerve enlargement (superficial peripheral nerves e.g. ulnar, greater auricular & sural nerves)
- Skin biopsy is used to confirm the diagnosis in doubtful cases

Typical skin lesions

- Well defined light coloured (depigmented) patch anywhere on the body (including limbs) with reduced or total loss of sensation of light touch (anaesthetic) (pauci-bacillary - PB)
- Pale coloured skin patch with clearly raised edges that are anaesthetic to cotton wool touch and pinprick (PB)
- Patches of subcutaneous nodules (multi-bacillary - MB)
- Loss of eyebrows and thickened ear lobes (MB)
- Pale patches of skin with poorly defined edges may be due to fungal infection (Tinea versicolor)

Principles of management

- All patients must have skin smears for AFB taken before starting multi-drug therapy (MDT)
- Classification must be done to decide which type of MDT to give
- Patients are classified as either Multi-bacillary (MB), Pauci-bacillary (PB) (see table below).
- If not sure how to classify the patient, ask the local TB/Leprosy or Disease Control Officer.
- Fill in TREATMENT card, and an INDEX card for each new patient
- Also fill in the Treatment Register card and give it to the patient. If you DO NOT know how to do this, check with your local TB/Leprosy or Disease Control Officer
- Contact tracing: examine ALL household contacts for signs of leprosy

Table 17. Classification of leprosy

	Paucibacillary (PB)	Multibacillary (MB)
Skin lesions (macules, papules, nodules)	2-5 lesions well defined borders asymmetrically distributed loss of sensation	more than 5 lesions distributed symmetrically may or may not have loss of sensation
Nerve damage: loss of sensation, thickened nerves, weakness of muscles	only one nerve involved	may be more than one nerve involved
Split skin smear	Usually negative	one or more usually positive

Education

- Teach the patient and their family about leprosy and the need for regular treatment
- Teach the patient to care for their hands, feet and eyes
- Give suitable footwear if necessary

Treatment

The treatment of leprosy is multi-drug therapy (MDT) and depends upon the type of leprosy. Note that only MB patients get clofazimine. The drugs come in 4 types of blister packs: PB and MB for adults, PB and MB for children.

- For adult patients more than 40kg with pauci-bacillary (PB) leprosy use the blister pack containing:
 - dapsone 100mg (1 tab) daily for 6 months (at home) AND*
 - rifampicin 600mg (2x 300mg caps) every 28 days*
 - supervised at treatment centre for 6 months*
- For adult patients more than 40kg with multi-bacillary (MB) leprosy use the blister pack containing:
 - dapsone 100mg (1 tab) daily for 12 months (at home) AND*
 - clofazimine 50mg (1 cap) daily for 12 months (at home) AND*
 - rifampicin 600mg (2x 300mg caps) every 28 days*
 - supervised at treatment centre for 12 months AND*
 - clofazimine 300mg (3 caps) every 28 days*
 - supervised at treatment centre for 12 months*
- If the patient is 40kg or less then ask the local TB/Leprosy Officer what doses should be given
- Single lesion pauci-bacillary (SLPB) treatment is no longer recommended in PNG. For patients with a single lesion treat as paucibacillary leprosy

Adherence to treatment

- Pauci-bacillary PB: The 6 supervised doses of Rifampicin and the 6 months daily dapsons must be completed within 9 months. Patients who miss more than 3 doses of rifampicin within 9 months are DEFAULTERS. These patients should be re-examined for clinical evidence of active leprosy and if present, treatment should be restarted
- Multi-bacillary MB: The 12 supervised doses of rifampicin and clofazimine, and the 12 months of daily dapsons and clofazimine must be completed within 19 months. Patients who miss 3 doses in a row are DEFAULTERS. These patients should be re-examined for clinical evidence of active leprosy and, if present, treatment should be restarted
- All MB patients must stay on treatment until smears become negative for AFB. If an MB patient still has a positive smear at the end of 24 months treatment, then continue treatment until the smears become negative. Refer such patients to the local TB/ Leprosy Officer. Never stop treatment in an MB patient until you get a negative smear result

Follow-up

- Repeat smears every 6 months during treatment
- Watch for side effects of drugs (fever, skin rash, jaundice)

Defaulters Action

- Warn patients that missing treatment means the leprosy will not be cured and treatment must start from the beginning again once too many doses are missed
- To prevent this act early and when the first dose is missed send a verbal message to the patient AND/OR visit the patient's home
- If these DO NOT work, report the patient to the local TB/Leprosy Officer
- Refer all defaulters to the local TB/Leprosy Officer

Complications of Leprosy

Reactions

Any of the following may occur

- Erythema Nodosum Leprosum (ENL) presents with painful, red lumps. These are usually widespread
- Swelling of skin patches, hands or feet
- Swollen, tender nerves
- Sudden paralysis or loss of sensation
- Painful eye or loss of vision
- Pain in testis
- Fever and joint pains

Treatment of reaction

- Continue the full treatment regimen that the patient is on
- Treat any other illness
- Bed rest
- Give:

aspirin 900-1200mg (3-4 tabs) q.i.d for 3 weeks AND prednisolone (20mg for mild, 60mg daily for moderate and 100mg for severe reactions) daily for 1 week then taper dose with improvement

- If prednisolone unavailable or no improvement use:

chloroquine 3 tabs daily for 1 week, 2 tabs daily for 1 week, 1 tab daily for 1 week

- In patients with severe ENL reaction use:

clofazimine 300mg (6 caps) daily until improves FOLLOWED BY 200mg (4 caps) daily for one month, FOLLOWED BY 100mg (2 caps) daily for 1 month, FOLLOWED BY 50mg (1 cap) daily for 1 month

Plantar Ulcer

- Treat simple ulcers with daily soaking, cut off dead or hardened skin and rest the foot
- Treat infection with rest, elevation of the leg, and Normal Saline dressing
- Antibiotics are not usually needed unless there is surrounding cellulitis
- When the ulcer is clean, apply a BELOW-KNEE PLASTER OF PARIS CAST with a rubber walking heel for 6 weeks. If the ulcer has not healed, cut off dead or hard skin and apply cast for another 3 weeks
- Shoes should be supplied to prevent recurrence. Make arrangements for proper footwear as soon as the plaster cast is applied
- If foot drop is present apply a below-knee plaster cast with lots of padding, especially just below the knee, for 6 weeks

Refer if

- Severe reactions in treated patients
- Any reactions affecting vital body parts (tender nerves, painful or red eye or trouble seeing, pain in testis, sudden paralysis)
- Reactions not responding to treatment
- Loss of nerve function (decrease in strength in hands and or feet) within the last 6 months with or without pain
- Patients who develop itchy rash, jaundice or other possible drug reaction
- Assessment for leprosy surgery
- Paralysis longer than 6 months

- Deformity or ulcers that fail to heal
- Patients not responding to regular treatment
- All patients who seem to develop new lesions, new problems, reactions or relapse AFTER completing treatment

13.2 Boils or Abscesses or Cellulitis

If pus is present (fluctuant swelling):

- Incise and drain and pack with freshly opened normal saline dressing
- Change dressing daily
- Give:

flucloxacillin 500mg q.i.d for 7 days

If pus is not present:

- Apply warm soaks to the area
- Elevate affected part
- Give :

flucloxacillin 500mg q.i.d for 7 days

- Incise and drain if pus develops

If no improvement after 5 days of antibiotics consider resistant Methicillin resistant *S. aureus* (MRSA) and give:

septrin 960mg (2 tabs) b.d for 7 days

- Always think of diabetes (on page 23)
- Always think of osteomyelitis (on page 14)

Refer if

- Boil or cellulitis is on the face.
- There are more than 2 boils present.
- Recur frequently (may be diabetes) or MRSA.

13.3 Impetigo

Golden, crusted sores that can occur anywhere on the skin including face and scalp

Treatment

- Clean scabs away with normal saline.
- If mild, topical treatment is gentian violet OR fusidic acid ointment or povidone
- If moderate/severe use:

*amoxycillin 500mg t.d.s for 5 days (for severe infections only) OR
flucloxacillin 500mg q.i.d for 7 days*

13.4 Ulcers or Sores

Causes

- Diabetes (on page 23)
- Venous stasis ulcers
- Leprosy (plantar ulcer - on page 83)
- Tropical Ulcer
- Yaws (on page 91)
- Chronic osteomyelitis (on page 15)
- Kumusi River ulcer (*Mycobacterium ulcerans* – undermined edges)
- Skin cancers

Treatment

- Clean with normal saline.
- Dress the ulcer daily with: PARAFFIN GAUZE DRESSING if clean OR NORMAL SALINE DRESSING if pus present OR EUSOL for dirty ulcers
- Give antibiotics if the skin around the ulcer is red, painful or swollen or there are many sores or if the sores are larger than a twenty toea coin and give:

chloramphenicol 500mg q.i.d for 7 days

- If Yaws is suspected give:

azithromycin 30mg/kg (to a maximum of 2g for adults) orally, stat OR benzathine penicillin IM 2.4 MU (1 vial) stat

- If ulcer has undermining edges, suspect Kumusi River ulcer and refer
- If plantar ulcer, check for nerve damage that can occur in leprosy (on page 83) or diabetes (on page 23)

Refer if

- Ulcer is too big to heal by itself (larger than a 1 kina coin). This needs a skin graft when clean
- There is no improvement with the above treatment

13.5 Scabies

Apply scabies topical treatments (either Scabies Lotion [γ -benzene-hexa-chloride (GBHC)] or benzoyl benzoate) as follows:

- Wash all over the body with soap and water and dry skin
- Shake the bottle and apply scabies lotion to all of the body except the face
- Wash off the scabies lotion after 24 hours and put on clean clothes
- Repeat this treatment after 3rd and 6th night (a total of 3 treatments)

- If infection seen, give:
flucloxacillin 500mg q.i.d for 7 days

Also

- GBHC poisoning can occur in small babies and may present with convulsions and haemolysis
- If a woman is breastfeeding, wash scabies lotion off the breasts one hour after application. Breastfeeding can resume afterwards
- Treat all members of the family
- Wash all clothes, sheets and blankets and dry them in the sun after each treatment
- Prevent scabies by encouraging regular washing

If scabies is crusted or covers the entire body think of HIV:

- Refer to Medical Officer
- If crusted scabies is limited give:
ivermectin 0.2mg/kg (12 mg or 4 tabs for 60kg adult) once and then repeat in 2 weeks
- If there is extensive disease give:
ivermectin 0.2mg/kg (12 mg or 4 tabs for 60kg adult) on days 0, 3, 7, 14, 21, 28 and 35

13.6 Head Lice

Use scabies medication (GBHC or benzoyl benzoate). Apply to head, leave for 5 minutes and then rinse. Take care to avoid contact with eyes and mouth.

13.7 White Spot

White spot is also known as tinea versicolor and presents with hypopigmented, scaly patches on shoulders, upper body and arms. The patches may be slightly itchy.

Treatment

- Wash regularly with soap and water
- Apply:
20% sodium thiosulphate solution to the whole body (except head) after washing at night. Wash off with soap and water next morning
- If no improvement use:
ketoconazole 2% cream (apply twice daily) or 2% shampoo (applied after evening shower on wet skin. Leave on the skin overnight before washing it off the next morning

- Repeat these topical treatments twice each week for 6 weeks
- If widespread and not responsive to topical treatment use:
ketoconazole 200mg orally, daily for 10 days

13.8 Dermatitis and other itchy skin conditions

Itchy skin lesions that are not typical of leprosy (on page 83), grille or scabies (on page 88).

Treatment

- For mild cases use moisturising creams (aqueous cream, Vaseline, coconut oil)
- When dermatitis is chronic use an ointment. Otherwise use a cream.
- Treat secondary infection with:
flucloxacillin 500mg q.i.d for 7 days
- Moderate cases use:
*coal tar (3%) topically b.d OR
hydrocortisone (1%) cream or
alternative steroid cream b.d for until improvement*
- Severe cases use:
*coal tar (3%) topically b.d AND
stronger steroid cream (clobetasone 0.2%) b.d until improvement*

13.9 Grille (Sipoma, Tinea imbricata)

Consider grille when you see a patch with a scaly, well-defined edge, with normal skin centrally within the patch.

A leprosy patch can be distinguished by a lack of sensation (on page 83)

Treatment

- Wash with soap and water daily
- Cut off hair if necessary
- Apply:
*benzoic acid compound ointment (Whitfield's) daily OR
grille lotion (salicylic acid 3%) daily*
- DO NOT cover more than $\frac{1}{4}$ of the body each day
- If first line treatment does not work use 'tinea cream':
clotrimazole or alternative and apply as directed on the tube
- Continue treatment until the tinea has gone and then for 2 more weeks
- Oral antifungals can be used if grille is widespread or involving nails and/or hair. Use:
*griseofulvin 500mg orally, daily night with meals for up to 1 month for skin involvement
or up to 1 year for nail involvement*

13.10 Yaws

Yaws is present in many parts of PNG

It is more common in children and young people (6-16 years) from rural and peri-urban areas

It is transmitted person-to-person by skin contact

Secondary yaws occur weeks to months after the primary infection. Many children present with secondary yaws without evidence of primary disease.

Clinical symptoms and signs in primary yaws

- Raised and reddish brown with yellow crust
- Usually on the leg
- Sometimes on buttocks or mouth
- Usually painless
- Heals slowly over a few months.

Clinical symptoms and signs in secondary yaws

- Swollen fingers (dactylitis)
- Multiple raised yellow lesions
- Pain and swelling of long bones (mimicking arthritis)
- Unable to walk
- Nasal bridge swelling (goundou).

Investigations

Yaws should be confirmed with a VDRL (syphilis) test. In yaws, this test is positive because the germ causing yaws is similar to syphilis. Notify Provincial Disease Control Officer.

Treatment

- For primary yaws, give:

*azithromycin 30mg/kg (to a maximum of 2g for adults) orally, stat OR
benzathine penicillin IM 2.4 MU (1 vial) stat*

- For secondary yaws, give:

*azithromycin 30mg/kg (to a maximum of 2g for adults) orally, stat OR
benzathine penicillin IM 2.4 MU (1 vial) weekly for 3 weeks*

- Treat all household contacts even if they have no symptoms.
- For patients allergic to penicillin AND/OR azithromycin use:
doxycycline 100mg (1 tab) orally, b.d for 7 days

Annex

Annex 1. Glasgow Coma Scale

Use this scale for severe malaria, drug overdose, head trauma, patient who is semi-conscious or unconscious from any cause.

Give the patient a score for each category and add the scores together to give the total score. The minimum score is 3 (patient unlikely to live) and the maximum is 15.

A state of unrousable coma is reached at score less than 10. This scale can be used repeatedly to monitor improvement or deterioration.

Table 18. Glasgow coma score

	Sign	Score
Eyes open	Spontaneously	4
	To call name	3
	To pain	2
	Never	1
Best verbal response	Oriented	5
	Confused	4
	Talking nonsense	3
	Incomprehensible sounds	2
	None	1
Best motor response	Obeys commands	6
	Localises pain	5
	Flexes to pain	4
	Abnormal flexion	3
	Extension to pain	2
	None	1
	Total	3 - 15

Annex 2. Dosing of anti-tuberculosis drugs when given as a single drug rather than fixed dose combination

Table 19. Dosing of anti-tuberculosis drugs when given as a single drug rather than fixed dose combination

Weight	Rifampicin (R)	Rifampicin (R)	Pyrazinamide (Z)	Ethambutol (E)	Pyridoxine	Streptomycin
21-30kg	2 caps (300mg)	3 tabs (300mg)	1½ tabs (750mg)	1 tab (400mg)	0	0.5ml (500mg)
31-45kg	3 caps (450mg)	3 tabs (300mg)	2 tabs (1000mg)	1½ tabs (600mg)	0	0.75ml (750mg)
46-49kg	3 caps (450mg)	3 tabs (300mg)	3 tabs (1500mg)	1½ tabs (600mg)	1 tab (25mg)	0.75ml (750mg)
50kg & over	4 caps (600mg)	3 tabs (300mg)	4 tabs (2000mg)	2 tabs (800mg)	1 tab (25mg)	1ml (1000mg)

Annex 3. Reference intervals for haematology/biochemistry values

The reference intervals for children aged 1-10 years old are derived from healthy children from Madang, PNG. They DO NOT necessarily represent optimal healthy values. Reference intervals for adults are derived from Caucasian adults.

Table 20. Reference intervals for haematology and biochemistry tests

Analyte	PNG Reference interval for 'healthy' children aged 1-10yrs 2.5th-97.5th centile	Adults 2.5th-97.5th centile
Haematology		
Haemoglobin (g/L)	71-131	130-170 m 120-150 f
Ferritin (mg/L)	12-166	12-300 m 12-150 f
Vitamin B12 (pmol/L)	160-830	150-450
White cell count		3.9-10.0
Platelet count		150-450
Electrolytes		
Sodium (mmol/L)	127.5-141	135-145
Potassium (mmol/L)	3.2-4.9	3.6-5.0
Bicarbonate (mmol/L)	12.2-20.7	18-23
Calcium (mmol/L)	1.97-2.65	2.1-2.8
Phosphate (mmol/L)	1.27-2.29	0.8-1.5
Kidney Function		
Creatinine (µmol/L)	18-45	60-90 m 50-90 f
Urea (mmol/L)	1.0-5.1	3.0-7.0
Liver Function		
ALT (IU/L)	5-45	5-21
ALP (IU/L)	104-259	53-128 m 42-98 f
GGT (IU/L)	6-19	5-40
Bilirubin (µmol/L)	1.5-7.8	2-17
Plasma proteins		
Total Protein (g/L)	60-89	60-82
Albumin (g/L)	32.5-46	35-48
CRP (mg/L)	0-32	<6
Other		
Cholesterol (mmol/L)	2.2-4.7	3.6-6.5
Triglycerides (mmol/L)	0.37-2.7	0.7-1.7
Vitamin D (nmol/L)	44-138	20-150
Creatine kinase (IU/L)	15-215	24-200

Annex 4. Making a spacer for inhaled asthma medications

Make a spacer from a 750ml plastic cordial bottle by cutting a hole in the bottom to exactly fit the mouthpiece of the puffer.

Shake the puffer and insert the mouthpiece into the bottle. Put the other end in mouth and close lips around it, as shown.

Press down on the puffer once then take 2 or 3 normal breaths.

If you need more than one squirt, shake the puffer again and repeat Step 3.

Figure 2. Making a spacer for inhaled asthma medications



Annex 5. Performing a rapid diagnostic test for malaria

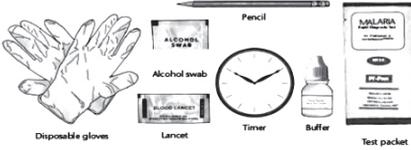
How To Do the Rapid Test for Malaria

Modified for training in the use of the Generic Pf-Pan Test for falciparum and non-falciparum malaria



Collect:

- a. NEW unopened test packet
- b. NEW unopened alcohol swab
- c. NEW unopened lancet
- d. NEW pair of disposable gloves
- e. Buffer
- f. Timer
- g. Sharps box
- h. Pencil or pen



READ THESE INSTRUCTIONS CAREFULLY BEFORE YOU BEGIN.

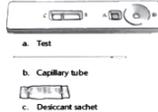
1. Check the expiry date on the test packet.



2. Put on the gloves. Use new gloves for each patient.



3. Open the packet and remove:



4. Write the patient's name on the test.



5. Open the alcohol swab. Grasp the 4th finger on the patient's left hand. Clean the finger with the alcohol swab. Allow the finger to dry before pricking.



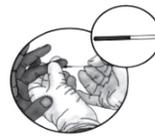
6. Open the lancet. Prick patient's finger to get a drop of blood. Do not allow the tip of the lancet to touch anything before pricking the patient's finger.



7. Discard the lancet in the Sharps Box immediately after pricking finger. Do not set the lancet down before discarding it.



8. Use the capillary tube to collect the drop of blood.



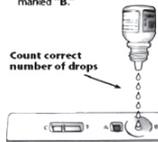
9. Use the capillary tube to put the drop of blood into the square hole marked "A."



10. Discard the capillary tube in the Sharps Box.



11. Add buffer into the round hole marked "B."



12. Wait 15 minutes after adding buffer.

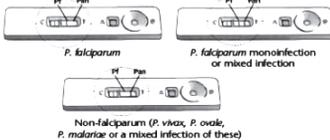


13. Read test results. (NOTE: Do NOT read the test sooner than 15 minutes after adding the buffer. You may get FALSE results.)

14. How to read the test results:

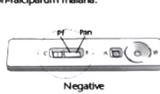
POSITIVE

A line near letter "C" followed by **ONE OR TWO LINES** near letter "T" means the patient is positive for malaria as shown below. (Test is positive even if the test lines are faint.)



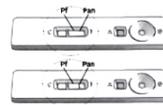
NEGATIVE

A line near letter "C" followed by **NO LINES** near letter "T" means the patient **DOES NOT** have either falciparum malaria or non-falciparum malaria.



INVALID RESULT

NO LINE near letter "C" and one or two lines or no line near letter "T" means the test is **INVALID**.



Repeat the test using a new RDT if no control line appears.

If no line appears near the letter "C," repeat the test using a **NEW unopened** test packet and a **NEW unopened** lancet.

15. Dispose of the gloves, alcohol swab, desiccant sachet and packaging in a non-sharps waste container.



16. Record the test results in your CHW register. Dispose of cassette in non-sharps waste container.



NOTE: Each test can be used ONLY ONE TIME. Do not try to use the test more than once.



Prepared on December 22, 2009. V1.0. Since manufacturer's instructions may have changed after this job ad was produced, all details should be cross-checked against manufacturer instructions in the product insert of the test in use.

Annex 6. Preparation of artesunate injections

Each pack of artesunate injection should contain:

- Artesunate 60mg vial;
- Sodium bicarbonate 1ml;
- Sodium chloride 5ml

Preparation Notes

Artesunate powder for injection is difficult to dissolve and care must be taken to ensure that it is completely dissolved before IV or IM use.

For Intravenous Use:

- Add 1ml of sodium bicarbonate to the artesunate powder for injection and SHAKE WELL until the solution becomes clear
- Add 5 ml of sodium chloride and SHAKE WELL again
- This gives a concentration of 60mg in 6ml
- The required amount should be given by slow IV injection over 2 - 3 minutes

For Intramuscular Use:

- Add 1ml of the sodium bicarbonate to the artesunate powder for injection and SHAKE WELL until the solution becomes clear
- Add 2ml of the sodium chloride and SHAKE WELL again
- This gives a concentration of 60mg in 3ml

Important points in using artesunate injection:

- The prepared artesunate injection should always be used immediately
- Partially used vials should be discarded
- If the solution is cloudy or a lump is present, it should be discarded

Annex 7. Calculation and interpretation of Body Mass Index (BMI)

BMI represents overall fatness. It is derived from the following formula, using the patient's weight in kilograms (kg) and height in meters (m):

$$\text{BMI} = \text{Weight (kg)} / \text{Height (m)}^2$$

For instance, for a man who weights 60 kg and is 160 cm (1.6m) tall, the BMI = 60 divided by (1.6)² (squared) = 23.4

Table 21. Classification of obesity using Body Mass Index (BMI)

Classification of BMI	BMI (kg/m ²)
Underweight	< 19.0
Normal weight	19 – 24.9
Overweight	25 – 29.9
Obesity	≥ 30

