

ABOUT THE BURMESE BORDER GUIDELINES 2020, 5TH EDITION

The Burmese Border Guidelines (BBG) 2016 has been updated to increase access to medical information for medics treating patients in moderately resourced health clinics and primary hospitals along the Thailand/ Myanmar border. The number of malaria infections has decreased, and patients now present with many other diseases and infections. This means we need increased knowledge and understanding for non-communicable diseases, chronic medical problems, psychosocial issues, infectious disease outbreaks and less common infections.

Specific SMRU guidelines are available such as the Malaria Guidelines, Neonatal Guidelines, Obstetric Guidelines. In the BBG, we refer to these other guidelines when needed.

Each chapter follows the format: EMERGENCY, CONDITIONS, DEFINITION, CAUSES, SIGNS AND SYMPTOMS, DIAGNOSIS, TREATMENT, and PREVENTION. We do not provide translation to Burmese or Karen because the information may not be clear in another language. We have tried to make the English easier to understand.

What has changed in the guidelines compared to the BBG 2016:

1. The SMRU Paediatric Guidelines (from version 2010) have been added.
2. **New sections** have been added. If a section is new, a superscript ^{*new} is added
3. Some sections have been **updated**. If a section has been updated a superscript ^{*update} is added.
4. The **Mae Tao Clinic (MTC) medication handbook** has been updated. The drug guide is now organised in alphabetical order. The WHO category was removed. Maximum doses have been added for some drugs (especially for paediatrics).
5. An **index** was added to make topics easier to find.

RESOURCES used for this update include: Médecins Sans Frontières (MSF) 2019 '*Clinical guidelines Diagnosis and Treatment Manual*'; immunisation, treatment and management guidelines from the World Health Organisation (WHO); UpToDate®; '*Guidelines for the clinical management of HIV infection in Myanmar*' 2017, 5th edition (and amendment from 2018); '*Consolidated guidelines on the use of Antiretroviral drugs for treating and preventing HIV infection, recommendations for public health approach*', 2nd edition, 2016 (and supplement from December 2018). Links to the webpages are provided for photos that are not open source.

CONTRIBUTORS

These guidelines have been updated by physicians and medics working at SMRU from 2016 – 2020. Mae Tao Clinic has contributed their Pharmacy handbook which was created using the '*Clinical Guidelines Diagnosis and Treatment Manual*' (MSF 2013) and the '*British National Formulary*' BNF (2014). We also thank all the contributors to the BBG over the last 30 years. Each version improves because the work builds on the previous work.

Contributors to the original BBG 2007	Contributors to the BBG 2016 update
<ul style="list-style-type: none">• Aide Medicale Internationale (AMI)• American Refugee Committee (ARC)• International Rescue Committee (IRC)• Malteser International (MI)• Médecins Sans Frontières – France (MSF)• Mae Tao Clinic (MTC)• Shoklo Malaria Research Unit (SMRU)• Thailand Burma Border Consortium (TBBC)• United Nations High Commissioner for Refugees (UNHCR)	<ul style="list-style-type: none">• Physicians and volunteers working at SMRU from 2012-2016• Mae Tao Clinic (MTC) contributed their medication handbook and information from the chronic care guidelines• In memory of Dr. Frank Green (MTC) - eye disease• Dr. Rangsun Sitthichai – mental health• Maria Bovill (TBC) - nutrition

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HOW TO USE THE GUIDELINES

These guidelines do not replace clinical decision-making. It can help to increase understanding and knowledge of a disease so you can develop or confirm a diagnosis. These guidelines were adapted from medical reference books and are for basic situations for use in clinics and hospitals on the Thailand/ Myanmar border. These guidelines may not be appropriate for use in other settings (ie. tertiary hospital or field site).

The **treatment options** help you to choose a therapy according to the severity of the disease and the age of the patient. **Treatment schedules** mentioned in this book are just one way to cure a patient; keep in mind that other therapies (suggested by other guidelines or new health workers) could be used to treat your patient.

- Read the **TEXT** for information about the disease. This tells you which signs and symptoms you should expect, which tests you can use to make a diagnosis, which complications or signs of severity to look for, which treatment to use and how to prevent the disease.
- Read the **TABLES** for the medicine that you have chosen in order to find the correct dose according to the age or weight of the patient. Here you will find contra indications and warnings for use of medicines.

Abbreviations used

mg	=	Milligram
g	=	Gram
kg	=	Kilogram
ml	=	Millilitre
cc	=	Cubic centimetre
d	=	Day
mn	=	Minute
X	=	Times
/	=	Per
Tab	=	Tablet

PO	=	per os (oral)
IM	=	intramuscular
IV	=	intravenous
PR	=	per rectum
PV	=	per vagina
SC	=	subcutaneous
STAT	=	single dose
OD	=	one time a day
BID	=	2 times a day/ 12 hourly
TID	=	3 times a day/ 8 hourly
QID	=	4 times a day/ 6 hourly

Note: 1cc = 1ml

Example: '2 tabs TID x 5d' means '2 tablets taken 8 hourly over a period of 5 days'

AFB	=	Acid Fast Bacilli
AIDS	=	Acquired Immuno Deficiency Syndrome
ANC	=	Ante Natal Care
ARI	=	Acute Respiratory Infection
BP	=	Blood Pressure
CRP	=	C - Reactive Protein
D5W	=	Dextrose 5% and Saline/Water
ESR	=	Erythrocyte Sedimentation Rate
Hb	=	Haemoglobin
Hct	=	Haematocrit
HIV	=	Human Immuno-deficiency Virus
IPD	=	In-Patient Department
LRTI	=	Lower Respiratory Tract Infection
MS	=	Malaria Smear
NSS	=	Normal Saline Solution
OPD	=	Out-Patient Department
ORS	=	Oral Rehydration Salts
PFG	=	Plasmodium Falciparum Gametocytes
PFT	=	Plasmodium Falciparum Trophozoites
PR	=	Pulse Rate
PVG	=	Plasmodium Vivax Gametocytes
PVT	=	Plasmodium Vivax Trophozoites
R/L	=	Ringers Lactate
RR	=	Respiratory Rate
SFP	=	Supplementary Feeding Program
TB	=	Tuberculosis

TFP	=	Therapeutic Feeding Program
URTI	=	Upper Respiratory Tract Infection
UTI	=	Urinary Tract Infection

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CHAPTER 1: APPROACHING PATIENTS

Kindness and respect are very important to successful care.

****Treat patients the way you, or your family would like to be treated****

1.1 GENERAL APPROACH TO PATIENTS

When you receive the patient in the consultation room, take the following steps:

- **Greet** the patient.

Make the patient **comfortable**: invite the patient to sit down or lie down if they are very sick.

Give the patient **privacy**:

- Make sure nobody else can overhear or see the patient during the examination.
- If possible, there should be no more than one patient at the same time in the consultation room.
- One medic should carry out the consultation in a private room/ area.
- Take special (privacy) care when doing a gynaecological or genital examination.

Check for **DANGER SIGNS** (see *Figure 1.2, p.3*). If the patient shows any danger signs then assess using DRS AB-CABDE/S (see *p.13*) and provide urgent and immediate treatment, consult the doctor and admit to IPD or refer to hospital.

Take a **history** and look at their record book (lemma):

- Main symptoms
- Ask about any other symptoms
- Medical history – include any illness, treatment (important for antibiotics), menstruation and pregnancies
- Medication history – do they take medications including traditional medicine
- Family history – e.g. if has cough and suspect TB ask if anyone else in the family has been coughing
- Smoking/alcohol – at same time advise them to stop/take less

Examine the patient thoroughly including vital signs (BP, PR, RR, temperature, SpO₂) and weight.

Do any **investigations** that you think are appropriate e.g. CBC, malaria screen, biochemistry etc.

Make a **differential diagnosis** and list the most likely as the first diagnosis and the least likely as the last.

Classify the patient as to whether they need:

1. Referral to Hospital (**DRS-AB-CABDE/S first**, see *p.13*)
2. IPD admission (emergency room or IPD)
3. OPD treatment
4. Home care and education (no medications)

****Note:** If the patient needs **urgent referral**, stabilise the patient before the patient is sent**

Discuss with the doctor if the patient is unwell, condition and treatment are complicated, or if you are uncertain.

Give appropriate **treatment**.

Counsel the patient (or the family) what is wrong with him/her and the treatment you are going to give. If you do not know the diagnosis, tell the patient you do not know (be honest), then explain what can be done to find out.

If the patient needs admission, but they **need to go home**, explain why it is important to stay at the clinic e.g. 'because you need strong antibiotics into the vein.' If they still must go home, then give oral treatment if possible. Explain the danger signs (see *Figure 1.2*) and they should come back to the clinic immediately if they have any. Document the counselling in the lemma and that they have left the clinic against your advice.

Give **preventative** (see *below*) or screening care e.g. for children < 5 years old, check their immunisation status and for signs of malnutrition or anaemia.

If the patient is to receive **OPD medical treatment** and advice:

- Give them practical instructions on how to take the treatment at home (if they understand well they will be able to explain to you how they will take their medication).
- Give the first dose of oral drugs in the clinic if there is treatment given.

- Ask the patient to wait for one hour before leaving the clinic in order to make sure the patient does not vomit the treatment.
- Give advice on foods and fluids during illness, and hygiene (wash hands).
- Consider whether supervised treatment is needed.

Give **follow-up care** (see below). Ask the patient to return for a follow-up OPD visit, if needed, and give a specific date. Also teach the patient and/or the family how to recognise **danger signs** (emphasise the specific danger signs for the disease). If the patient develops danger signs, he/she should return to the clinic immediately.

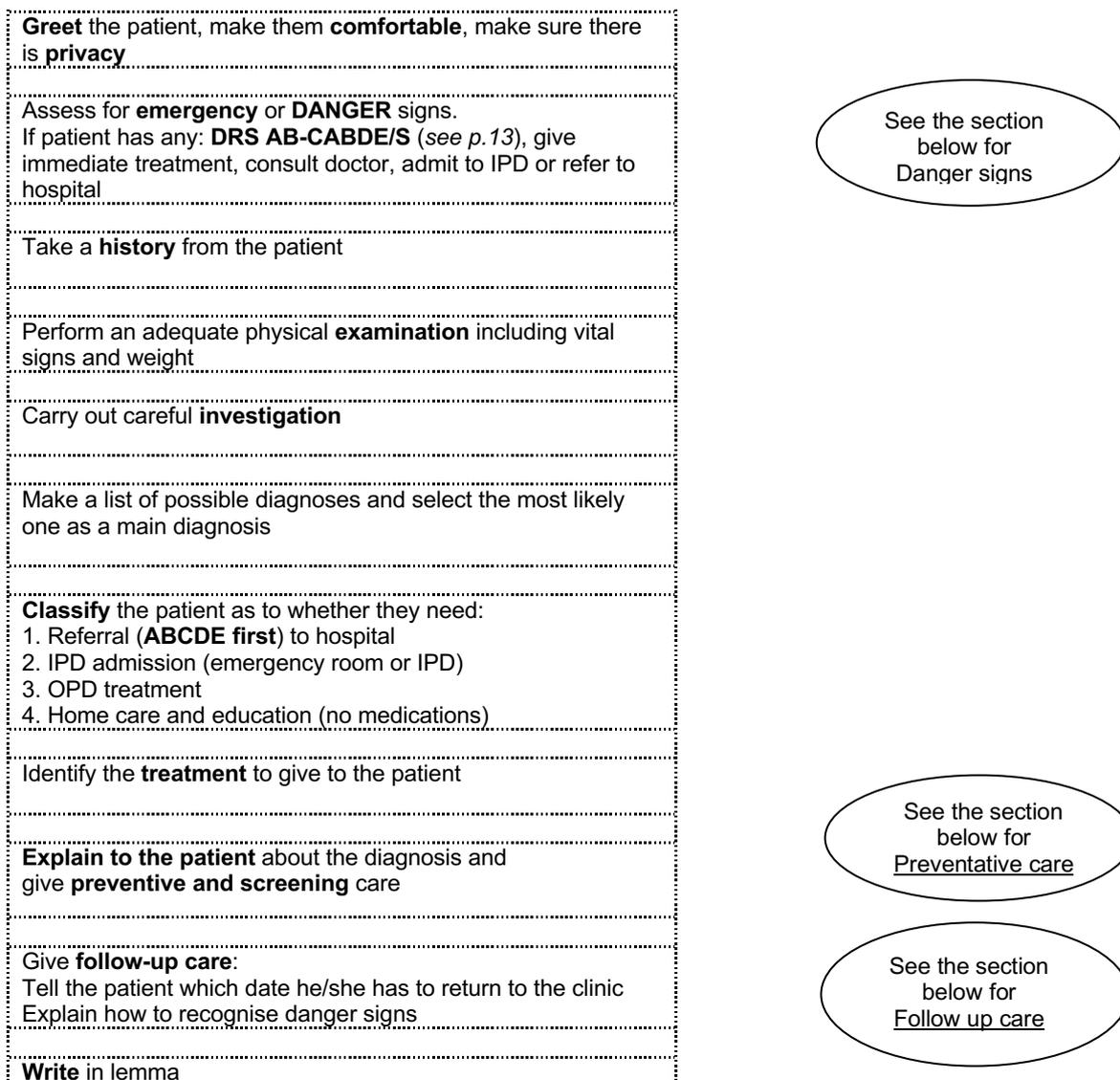
- e.g. if you diagnose a child with common cold or bronchitis, give follow-up care health education to the family. Tell the parents to return to the clinic immediately if the child develops difficulty breathing or fast breathing.

Write down briefly the patient's complaints, examination (including vital signs/weight), and laboratory findings in the lemma. Then write down clearly the diagnosis and the treatment in the lemma. Write if any preventative care/screening given.

When the patient comes back for the **OPD follow-up** visit, ask if your treatment has been effective and ask if the patient feels better. Continue or change treatment if necessary. Assess the patient for any new problems.

The following sections on the next pages give an overview and example for adults of what 'danger signs' 'preventative care' and 'follow-up care' mean.

Figure 1.1 Summary steps to providing patient care



1.2 DANGER SIGNS

Figure 1.2 Danger signs to look for during patient care



Airway: stridor is a sign that the airway is obstructed
Breathing: cyanosis (blue lips), severe respiratory distress
Circulation: weak and fast or slow pulse, low BP or capillary refill >2secs
Disability: confusion, unconscious, convulsions

Specific symptoms

1. **Fever, stiff neck, photophobia = meningitis**
2. **Severe abdominal pain, hard abdomen = peritonitis**
3. **Face droop, speech problem, one sided weakness = stroke**
4. **Chest pain (central (radiation to left arm or jaw), severe, 'crushing', sweating) = heart attack**
5. **Major trauma**
6. **Psychiatric aggression**

1.3 PREVENTATIVE CARE

Some examples of preventative and screening care:

General

- Provide advice to all (malaria) patients on malarial transmission, and how infectious bites can be prevented.
- Advise patients (especially with heart disease, HBP or DM) on lifestyle changes (*see p.44*).
- Advise patients (especially with reproductive tract infections) on sexually transmitted diseases, offer family planning and offer referral to VCT testing.
- Advise patients on the hazards of smoking, chewing betel nut, drinking alcohol or using drugs.
- Screen all adult patients for hypertension and diabetes

For pregnant women

- Check tetanus immunisation status.
- Check for signs of anaemia and provide prophylactic doses of anaemia treatment (*see p.135 and OB guidelines*).

For children

- Ask about developmental milestones
- Check immunisation status (*see Appendix 2*)
- Check height (or length) and weight. Plot on the growth chart (correct chart for age and sex)

1.4 FOLLOW UP CARE

Treating the patient depends on proper diagnosis and a good choice of treatment.

- In IPD you can supervise the treatment.
- In OPD you cannot be sure that the patient completes the full course of treatment.

TO ENSURE PROPER USE OF MEDICINES BY THE PATIENTS, REMEMBER THESE RULES:

1. Do not prescribe more than 2-3 medicines (unless there is a special reason to do so)

- It could be dangerous (some medicines taken together may become toxic).
- It could be useless (some medicines taken together stop working).
- It may be difficult for the patients to remember the dose, the time and the number of days they have to take each medicine.

- 2. For acute diseases/infections give the full course of medicines**
 - Instruct the patient to take the complete course (confirm that the patient understands) and return if no improvement, or if there is any **DANGER SIGN**.
- 3. For chronic diseases, supply medicine based on the frequency you see the patient**
 - For most chronic illnesses you should see the patient at least every three months.
 - Limit medicine supply to 3 months at one time and ensure the patient knows to return before they run out.
 - If the patient is not routinely taking their chronic medication this could be causing more harm than good to the patient so stop prescribing the medication unless you are sure that the patient will take it regularly.
- 4. Prepare the medicine**
 - Cut tablets for children.
 - Write the name of the medicine and dosage on the pill bag.
- 5. Advise the patient on their prescription (and ask them to repeat back what you explained)**
 - When to take the medicines (6 hourly, 8 hourly, 12 hourly).
 - How many tablets to take.
 - How many days.
 - How to use local treatments, prepare ORS etc.
 - When to return to the clinic.

CHAPTER 2: UNIVERSAL PRECAUTIONS

DEFINITION

Universal precautions are simple measures taken to prevent transmission of infection of bacteria and viruses from body fluids from:

- Patient to health care worker
- Patient to patient
- Health care worker to patient

Universal precautions are important because we use them for **ALL** patients and health care workers. All body fluid should be considered infectious, since it is not known who is infected and who is not. A health worker and lab technician are at risk of needle prick injuries and splashes of body fluids into the eyes, mouth etc. A patient is at risk if the health care worker is infected. These areas can be protected some ways (see section 2.2), but awareness and avoidance of the potential risks are the best way of preventing infection.

SUMMARY OF MANAGEMENT

- Hands are the primary source of infections in the clinic. Wash hands with water and soap every time:
 - before and after patient contact
 - before aseptic tasks (e.g. blood culture or IV placement)
 - before and after removing gloves
 - after clinic duties
- No jewellery
- Cover all cuts
- Wear gloves if there is a risk of contact with blood and body fluids
- If there is a risk of splashing of blood or body fluids you can protect yourself further by wearing eye glasses or goggles, mask and/or gown (e.g. during incision and drainage or labour and delivery)
- Use a safe system for health-care waste management and disposal
- Put patients in another area if their body fluids may contaminate surfaces or other patients (e.g. diarrhoea)
- Clean up spills of body fluids immediately – use bleach / chlorine / virkon or ask safety officer
- Health care workers and clinic staff should check and update their vaccines
- Do not perform unnecessary procedures. For example, avoid unnecessary blood transfusions, injections, or suturing



2.1 HANDWASHING

Make sure there is running water or access to water in the clinic.

Wash your hands with plenty of water and soap. If there is visible dirt on the hands, hand wash with soap and water and do not only use alcohol. If alcohol is used after handwashing, alcohol concentration of $\geq 60\%$ needed.

- Wash hands immediately after contact with blood, body fluids, mucous membranes or broken skin, even if you were wearing gloves.
- Wash hands before and after eating or preparing food
- Wash hands after using the toilet
- Wash hands after blowing your nose, coughing or sneezing into your hands
- Wash hands before giving injections or drawing blood
- Wash hands after each patient contact (at least wash hands with alcohol gel)
- Wash hands after handling dirty items
- Wash hands before start shift of patient care and after leaving shift of patient care

2.2 PROTECTIVE CLOTHING

GLOVES

- Wear clean, ordinary thin gloves anytime there is contact with blood, body fluids, mucous membrane, and broken skin
- Change gloves between tasks or procedures on the same patient
- Before going to another patient, remove gloves promptly and wash hands immediately
- Change or remove gloves after handling body fluid collection (e.g. sputum, urine, blood)

GOWNS

- Plastic gowns should be worn when there is a risk of splashes of blood or other fluids e.g. vaginal deliveries, opening abscesses. Clean them after use
- Clean work clothes after use

EYE-COVER AND MASK

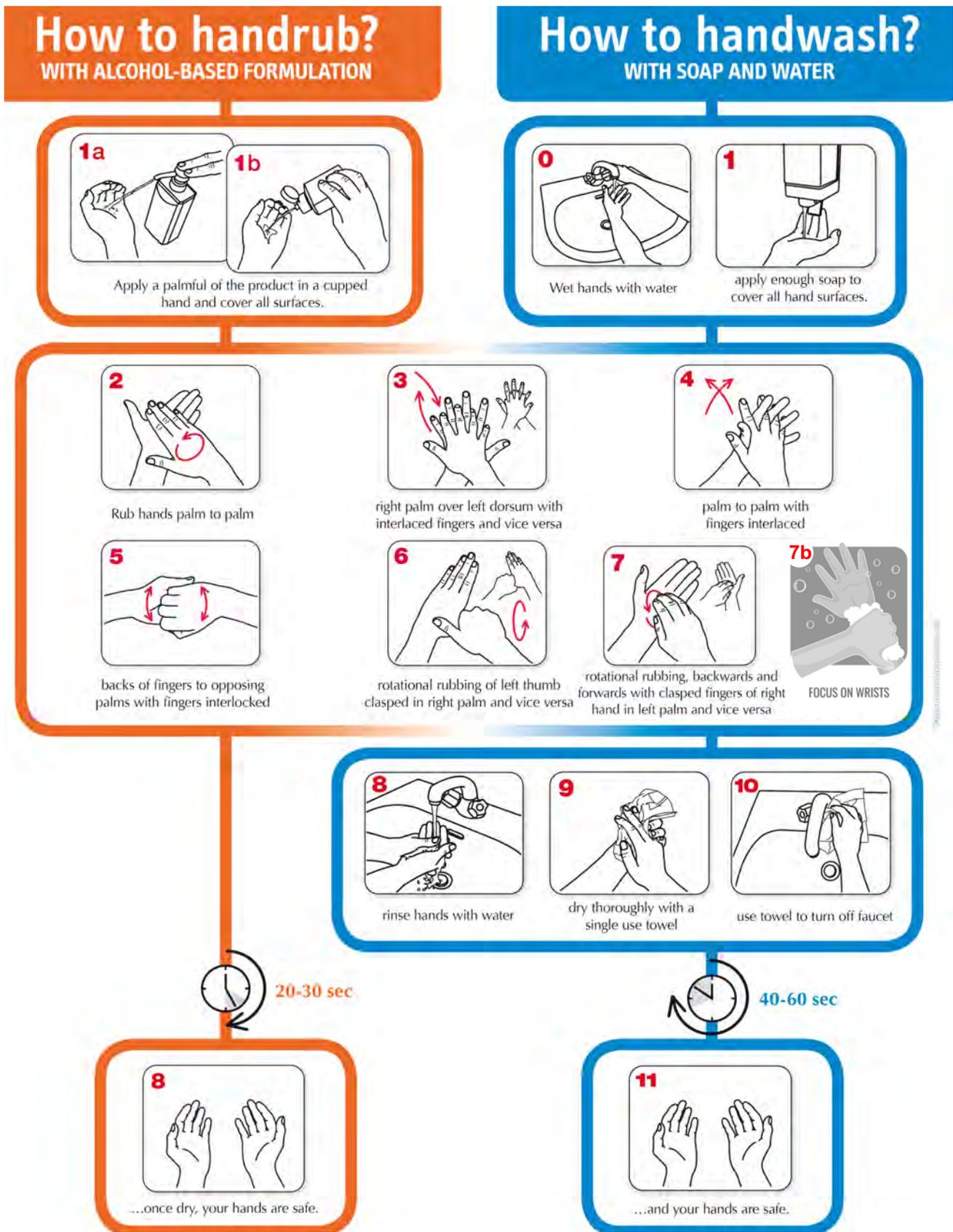
- Eyeglasses or goggles and a mask should be used when there is a risk of splashes of body fluids, for example, vaginal deliveries, opening abscesses

Figure 2.1 Indication for gloves

Gloves not indicated	Non-sterile gloves	Sterile gloves
Performing subcutaneous and intramuscular injections	Speculum examination and taking vaginal swab	Insertion of urinary catheter (in-out and/or Foley catheter)
	Vaginal examination (Before artificial water bag disruption/ fluid leakage)	Any procedure of sterile space (e.g. lumbar puncture, suprapubic tap, paracentesis of abdominal or pleural fluid)
	For finger sticks, blood draws, and IV-lines	
	Touching body fluids (blood, urine, stool, sputum, vomit)	
	Incision and drainage of an abscess.	
	Dressing a wound or burn	
	Preparing chlorine solution; cleaning items with chlorine	
	Disinfecting, cleaning or washing in the clinic	

For more information on infection control please refer to the SMRU infection control manual

Figure 2.2 Hand-wash with water and hand-rub with alcohol



2.3 ISOLATION

For airborne or droplet transmission:

- Place the patient in a separate room away from other patients. The room should be well ventilated. The doors should be closed to the hall and the windows open to the outside. This will reduce the chance of airborne infection. If possible, patients' rooms should have large windows to let in good sunlight
- Wear a mask when working with the patient
- Limit movement of the patient from the room to other areas

For contact transmission:

- Place the patient in an isolation room and limit access
- Wear gloves during contact with patient and with infectious body fluids or contaminated items. Wash hands after each patient contact
- Wear two layers of protective clothing
- Limit movement of the patient from the isolation room to other areas
- Use separate equipment for the patient, if possible. If sharing equipment is not possible, clean and disinfect it before using it with the next patient

2.4 SHARPS

- Never re-use needles. Avoid recapping needles using both hands
- Discard contaminated disposable sharps immediately into a sharps container (puncture resistant and liquid proof containers)
- The location of sharps containers is important. They should be kept as close as possible to where the sharp item is to be used
- Make sure contaminated equipment is not reused until it has been cleaned, disinfected, and sterilised properly
- When washing sharp instruments wear heavy gloves and handle with care to avoid injury

2.5 CLEANING ROUTINE

- Routinely clean and disinfect frequently touched surfaces including beds, bed rails, patient examination tables and bedside tables. Always use gloves when cleaning. Clean the area with disinfectant e.g. bleach, alcohol or virkon.
- Clean and disinfect soiled linens and launder them safely. Avoid direct contact with items soiled with blood and body fluids.
- Cleaning routine should be done daily. When there are outbreaks, cleaning routine may be done BID or more.

2.6 LAB STAFF

- Assume all specimens are contaminated and use universal precaution for all samples
- Wear gloves
- Wear eye protection if there is a risk of splashes
- When cleaning lab equipment wear gloves
- Do not eat or drink in the lab
- Wear a mask if dealing with airborne pathogens, such as TB

In case of exposure of a health worker to infected body materials, refer immediately to Chapter 3 on post-exposure prophylaxis

For more details on isolation, sterilisation, disinfection, and cleaning, refer to the *SMRU Infection Control Guidelines 2018*

CHAPTER 3: POST EXPOSURE PROPHYLAXIS

3.1 GENERAL INFORMATION

DEFINITION

Post Exposure Prophylaxis (PEP) means that after somebody is exposed to body materials that might contain HIV or hepatitis virus, he or she can take prophylactic medicine to try to prevent HIV infection or vaccination to prevent hepatitis B disease. Unfortunately, there is no PEP available for hepatitis C.

Source person e.g. the patient = the person that is the possible source of contamination through potentially infectious blood or body fluids.

Exposed person e.g. the health care worker with needle prick = the person who is potentially at risk of becoming infected with HIV/hepatitis B or C due to contamination with potentially infectious blood or body fluids.

GENERAL TREATMENT

For all exposure to potentially contaminated fluid do immediate first aid and follow the steps below:

1. Immediate first aid

- When there is a wound (e.g. needle prick), do not stop the bleeding, do not squeeze but immediately wash thoroughly with soap and water, and then rinse.
- When the skin is exposed but there is no wound, also wash thoroughly with soap and water, and then rinse
- When eyes or mouth are exposed (e.g. blood/fluid splash), wash and flush with plenty of water or NSS

****For cases of sexual violence, see p.94 Clinical Management of rape in Gender Based Violence****

2. Contact the person in-charge of PEP and complete a needle stick/splash injury reporting form

3. Risk assessment

- Together with the PEP focal or other experienced person, follow the steps below and make an assessment of the risk of infection and if PEP is needed.
- Some exposures have more risk of HIV and hepatitis B or C than others. The level of risk will determine the management. Refer to the PEP Guidelines for further information on risk assessment of exposures.

4. Ask if the exposed person has been fully vaccinated against hepatitis B.

5. Obtain consent from the source person before testing them

- Explain to the patient why it is important to test them. Give pre-test counselling. Test the blood ONLY after getting their consent. Confidentiality must be maintained
- If the patient has already left the clinic, try to contact the patient for the blood test.

6. Pre-test counselling for the exposed person

- During a confidential meeting with the exposed person explain that follow up and testing will be planned (see p.146). The following points should be discussed:

For HIV:

- The risk of transmission of HIV after accidental exposure to blood is estimated at 0.3% (3 in 1000)
- The risk is similar in unprotected sex with a HIV positive partner
- PEP is not 100% effective in preventing HIV infection; it will reduce the risk of acquiring HIV from the exposure but does not eliminate the risk completely
- The side effects of PEP are usually minor but require monitoring

For Hepatitis B:

- The risk of transmission of hepatitis B depends on stage of infection of the source person

For Hepatitis C:

- The risk of transmission after exposure to hepatitis C positive blood is approximately 1.8%

7. If possible and the source person consents do:

- 1) Rapid HIV test (if positive send sample to Mae Sot Hospital for confirmation)
- 2) Rapid HBsAg test for hepatitis B (if positive, send sample to Mae Sot Hospital for confirmation)
- 3) Hepatitis C test – need to send to Mae Sot Hospital
- 4) Pre and post-test counselling must be done

8. Take a serum save from the exposed person (blood sample that is not immediately tested).

- It is important to do a blood test before you start PEP. You can only test this blood if you have given pre-test counselling and received consent from the exposed person. This takes a lot of time and is too long to wait before giving PEP as PEP is more effective if given quickly after the event.
- Only after starting PEP (if required), counselling and getting consent test the serum save blood test (see below)

9. If required give specific PEP treatment (see p.10)

- Ideally within 2 hours
- The HIV/hepatitis test is voluntary. PEP should never be withheld because a serum save test has not been done. If the exposed person does not want to have a HIV/HBsAg test PEP can still be given.

10. If the exposed person consents test the serum save blood for HIV and HBsAg.

- It is important to test the serum save to know if the exposed person was not already HIV/hepatitis B positive
- If the exposed person cannot make a decision you can wait for a few days
- If positive send to Mae Sot Hospital for confirmation

11. Follow up (see p.11)

3.2 POST EXPOSURE PROPHYLAXIS TREATMENT

3.2.1. PEP FOR HIV*UPDATE

DEFINITION

Post exposure prophylaxis (PEP) for human immunodeficiency virus (HIV) is a 28-days course of antiretroviral therapy (ART) that reduces the likelihood of HIV transmission after exposure to a possible HIV positive person. PEP is an essential precaution in the clinical management of rape and for occupational exposures to potentially HIV infected body fluids. The availability of PEP is not a replacement for effective universal precautions, a continuous supply of protective materials (gloves, sharp boxes) and safe disposal of dangerous materials.

What body materials from a person with HIV can contain the virus?

- Blood
- Sperm, vaginal fluids
- Amniotic fluid (important for midwives)
- Ascites, pleural fluids, pus.

HIV is NOT found in:

- Sweat
- Saliva
- Vomit/stool
- Urine

What kind of contact with these infected fluids can cause HIV transmission?

- Needle prick accidents. (Pricking yourself after you pricked the patient or pricking yourself on a used needle e.g. whilst emptying the needle container)
- A splash of fluid into the eyes or mouth.
- Blood or body fluids contaminated on a large area of skin, or a small area of skin with wounds.
- Rape or sexual violence.
- Unprotected sex with a known HIV positive person (e.g. condom rupture if one of the partners is HIV infected).

**** Note:** HIV is not transmitted by talking, touching, kissing, or using the same toilet **

TREATMENT

Considering the nature of exposure, and the probable HIV status of the source. **Contact the safety officer** about starting PEP.

When in doubt, start PEP. You can always stop if it is not necessary.

The best time to start is **within 2 hours**, but PEP can be started up to 72 hours after exposure.

****The earlier PEP is started, the more effective it will be****

In cases where it is decided not to start PEP, it is important to offer clinical and psychological follow-up for the exposed person.

WHO PEP treatment guidelines (see <https://www.who.int/hiv/pub/arv/arv-2016/en/>)

PEP treatment is a combination therapy of ART given for 4 weeks. The number and type of medications will be decided on the basis of drugs taken previously by the source (if known), and known or possible cross resistance to different drugs. It may also be determined by the seriousness of exposure. It is important to give a full 28 days of PEP treatment. In the clinics a PEP starter kit is available. **Discuss with the safety officer for management.**

- HIV PEP drugs should be offered and started as soon as possible and best if **<72 hours from exposure**.
- A 2-drug PEP regimen is effective, but 3 drugs are preferred (conditional recommendation)
- Treat for 28-days. Give counselling to finish the treatment course even if there are no symptoms.
- Do not use nevirapine (NVP) if >2 years old

Drug name	Abbreviation	Drug name	Abbreviation
Abacavir	ABC	Lamivudine	3TC
Atazanavir	ATV	Nevirapine	NVP
Ritonavir boosted Atazanavir	ATV/r	Raltegravir	RAL
Darunavir	DRV	Ritonavir boosted Lopinavir	LPV/r
Efavirenz	EFV	Tenofovir	TDF
Emtricitabine	FTC	Zidovudine	AZT

Use 3 drug for treatment:

Adults and adolescents	1. TDF 2. 3TC (alternative: FTC) 3. LPV/r or ATV/r (if available use RAL, DRV/r or EFV)	Strong recommendation, low- quality evidence for 1+2 <i>Conditional recommendation, very low-quality evidence</i>
Children ≤10 years old	1. AZT (alternative: ABC or TDF) 2. 3TC (alternative: FTC only if combined with TDF) 3. LPV/r (alternatives: ATV/r, RAL, DRV, EFV, and NVP The choice of alternative drug depends on age.)	Strong recommendation, low-quality evidence for 1+2 <i>Conditional recommendation, very low-quality evidence</i>

Side Effects: Nausea, diarrhoea, muscle pain and headache. These symptoms will only last for a few days. Explain this to the patient, to prevent the patient from stopping PEP treatment. Anaemia, low white blood cells (leucopenia) and low platelets (thrombocytopenia) can also occur after day 10 and would require laboratory follow-up.

3.2.2. PEP FOR HEPATITIS

DEFINITION

Exposure to blood and body fluids also carries a risk for hepatitis B and hepatitis C infection. Hepatitis virus causes inflammation of the liver. Hepatitis B vaccine should be given if the person has not been previously vaccinated. Currently there is no vaccine available for hepatitis C.

TREATMENT

Hepatitis B vaccination:

- If the person's last hepatitis B vaccination was more than 10 years ago a hepatitis B booster vaccination is recommended.
- If the person is not vaccinated against hepatitis B, then hepatitis B vaccine should be given at the time of exposure, then at 1 month and 6 months after the exposure.

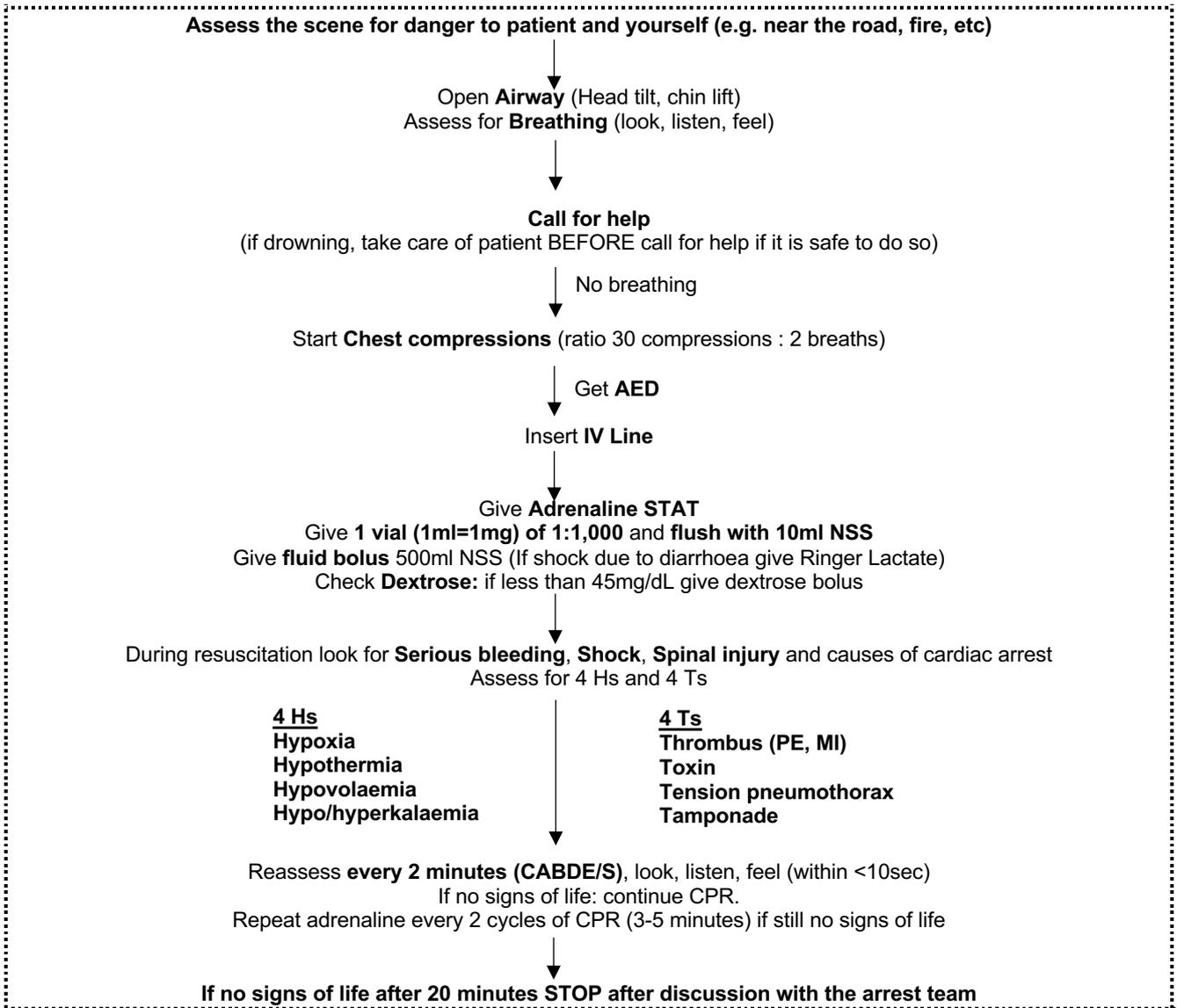
3.3 FOLLOW UP FOR ALL EXPOSED PERSONS

- Providing psychological support is important at this time, as not knowing whether you have become infected with HIV or hepatitis can be very distressing.
- In the weeks following the accident the person should be monitored for signs indicating HIV infection: acute fever, lymphadenopathy, cutaneous eruption (skin rash), sore throat, flu-like symptoms and mouth ulcers. These appear in 50-70% of individuals with primary infection, usually within 3-6 weeks after exposure. Advise the exposed person that if they have any of these symptoms they must come to the clinic.
- Until the result of the last HIV test at 6 months is known, the exposed person should not have unprotected sex, and should not donate any blood.
- HIV follow up testing is required:
 - 3 months after exposure
 - If negative, 6 months after exposure
- If the HIV test after 6 months is still negative, then it is sure that there has been no HIV transmission

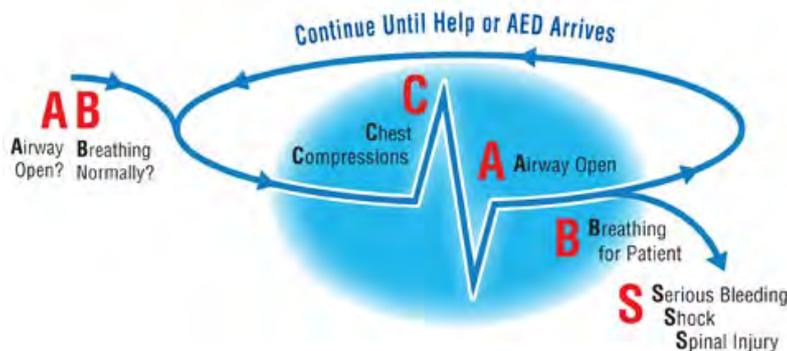
CHAPTER 4: EMERGENCIES

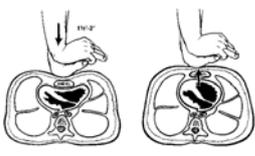
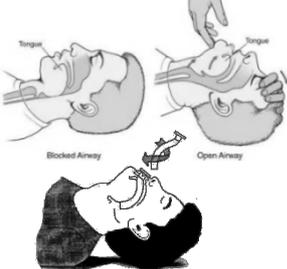
4.1 CPR FOR ADULTS*UPDATE

Figure 4.1 Cardiopulmonary resuscitation (CPR) chart - based on Emergency First Response 2015 guidelines*update



Cycle of Care: AB-CABS™



CHEST COMPRESSION	Middle of the chest, depth 5-6cm, rate 100-120/minute, when giving breaths STOP chest compressions. Chest compressions are the most important part of resuscitation so ensure they are of good quality and minimise interruptions. It is very tiring to give good chest compressions so rotate this task regularly.	
AIRWAY	<p>Head Tilt and Chin Lift – place hand on forehead and tilt head back (head tilt) and place fingers below chin and pull up (chin lift).</p> <p>Oropharyngeal airway (also known as guedel airway) can be used if you think the airway is obstructed. To use insert with the tip towards the top of the head and once you hit the back of the throat then turn upside down.</p>	
BREATH	Use a bag, valve mask attached to high flow oxygen . Make sure there is a tight seal around the mask and face. When giving breaths allow bag to fill up completely before doing next breath, watch that the lungs are expanding when breaths are given.	

4.2 GENERAL APPROACH TO EMERGENCY

****IF UNCONSCIOUS, DO AIRWAY MANOEUVRES, QUICK 10 SECOND ASSESSMENT FOR AIRWAY AND BREATHING. IF NO BREATHING → CALL FOR HELP and START CPR****

Figure 4.2 DRS ABCDE chart

	ASSESS FOR	TREAT
DRS	Danger Response – does patient respond? Send for help	Gloves for you Safe place for patient Call for help
Airway	Any airway obstruction Speaking Stridor Secretions Swelling	Simple airway manoeuvres Suction if available Oral/nasal airway
Breathing	Respiratory rate Oxygen saturations (SpO ₂) Pattern of breathing Cyanosis Accessory muscle use/tracheal tug/chest in-drawing Listen to chest	Position patient sitting up if breathing problem Oxygen 15L reservoir mask Consider nebulisers Consider furosemide
Circulation	Pulse rate Blood pressure Capillary refill time Urine output Temperature	IV line Blood tests Fluid bolus Consider transfusion ECG
Drugs/Dextrose	Check dextrose Seizures Pain	Consider antibiotics Correct blood sugar Control seizures Control pain
Everything Else	Conscious level (AVPU/GCS) All over body examination Neuro - neck stiffness, pupils, limb tone, power, reflexes, facial droop Abdomen Skin - Rash Wounds	Consider left lateral position Review notes and charts Get more history Make management plan Consider what investigations need to be done
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

Figure 4.3 Emergency Fluid chart

<p>Fluid Bolus: NSS: (if shock due to diarrhoea use Ringer's Lactate) Adult: 500ml IV Child: 10ml/kg IV Re-check vital signs before repeating</p>

Figure 4.4 Emergency drug chart

<p>CPR Adrenaline IV: 1 in 1,000 (1mg/ml)</p> <ul style="list-style-type: none"> Adult: give 1ml and flush with 10ml NSS Child and infant: use 0.5ml insulin syringe. Draw up 0.01ml/kg. Add NSS to fill the syringe. Give dose and flush with 3ml NSS. <p>SEIZURES Diazepam IV or IM or PR Adult: Slow 10mg Child: 0.4mg/kg (max 10mg) Can repeat twice if convulsions do not resolve in 10 minutes</p> <p>HYPOGLYCAEMIA = blood sugar <70mg/dL (3.9 mol/L)</p> <ul style="list-style-type: none"> If dextrose 40-70mg/dL: <ul style="list-style-type: none"> Give oral sugar solution (water mixed with sugar) or sweet drink to prevent severe hypoglycaemia. If dextrose <40mg/dL (<2.2 mmol/L): <ul style="list-style-type: none"> If able to drink: give oral sugar solution (water mixed with sugar) or sweet drink If unable to drink e.g. in coma: insert IV cannula and give Adult/Child: 5ml/kg 10% dextrose bolus, Neonate 2ml/kg 10% dextrose 	<p>ANAPHYLAXIS: Adrenaline IM: 1 in 1,000 (1mg/ml) Give undiluted IM in the thigh</p> <table border="1"> <tr> <td>>12yrs/Adult:</td> <td>0.5ml</td> </tr> <tr> <td>6yrs-12yrs:</td> <td>0.25ml</td> </tr> <tr> <td>6m-6y:</td> <td>0.12ml</td> </tr> <tr> <td><6m:</td> <td>0.05ml (use 0.5ml insulin syringe)</td> </tr> </table> <p>Chlorpheniramine IV: Give STAT over 1 minute</p> <table border="1"> <tr> <td>Adult:</td> <td>10-20mg</td> </tr> <tr> <td>12-18yrs:</td> <td>10mg</td> </tr> <tr> <td>6-12yrs:</td> <td>5mg</td> </tr> <tr> <td>6m-6yrs:</td> <td>2.5mg</td> </tr> <tr> <td><6m</td> <td>250mcg/kg (max. 2.5mg)</td> </tr> </table> <p>Hydrocortisone (slow IV or IM):</p> <table border="1"> <tr> <td>>12yrs/Adult</td> <td>200mg</td> </tr> <tr> <td>6-12yrs:</td> <td>100mg</td> </tr> <tr> <td>1-5yrs:</td> <td>50mg</td> </tr> <tr> <td><1yr:</td> <td>25mg</td> </tr> </table>	>12yrs/Adult:	0.5ml	6yrs-12yrs:	0.25ml	6m-6y:	0.12ml	<6m:	0.05ml (use 0.5ml insulin syringe)	Adult:	10-20mg	12-18yrs:	10mg	6-12yrs:	5mg	6m-6yrs:	2.5mg	<6m	250mcg/kg (max. 2.5mg)	>12yrs/Adult	200mg	6-12yrs:	100mg	1-5yrs:	50mg	<1yr:	25mg
>12yrs/Adult:	0.5ml																										
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<6m:	0.05ml (use 0.5ml insulin syringe)																										
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12-18yrs:	10mg																										
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>12yrs/Adult	200mg																										
6-12yrs:	100mg																										
1-5yrs:	50mg																										
<1yr:	25mg																										

Figure 4.5 Communication Tool

ISBAR communication tool (Communication should be done in private place to protect patient confidentiality)	
IDENTIFICATION	Identify yourself and your role ("Hello, I am Paw Say from WPA IPD"). Check that you are speaking to the right person ("I am looking for the lab in charge") Identify the patient and diagnosis ("I am calling about Saw Kyi, 40 year old male admitted 2 days ago with sepsis", "I am calling about Naw Mee, 26 year old G2P1 with the previous neonatal death")
SITUATION	If it is an emergency, say it first ("This is an emergency" or "This is not an emergency") Explain why you are calling ("The patient GCS is 4/15 now", "The PID code is wrong on the CBC form"). This helps the person you are calling to focus attention on the problem.
BACKGROUND	Give the admission date, symptoms or diagnosis, relevant history ("Saw Kyi was admitted 2 days ago with fever and convulsions. Malaria smear was negative 2 days ago. He is on day 2 of Ceftriaxone.") Provide the important information only. Too much information can be confusing.
ASSESSMENT	Report your observations. ("On exam, patient temperature is 40.1C, HR 110. His RR and BP are normal. He responds to pain but cannot talk or follow commands.") Share your idea of the situation ("Very sick, we cannot manage at the clinic", "High fever we should do something") If you do not agree with the person you are calling, you should tell them so there can be more discussion.
RECOMMENDATION or QUESTION	Give your idea for management of the patient (e.g. "I would like to repeat the malaria smear, CBC and blood culture. Can we insert a foley catheter?")

Figure 4.6 Discussion with family during and after and emergency

Discussion with Family
When the patient is stable, it is important to discuss the situation with the family. In some cases, referral to a tertiary hospital (high level) is possible and can help the patient recover. In other cases, referral may not help the patient recover. You may need to consider the family environment when discussing the patient's condition.

Figure 4.7 Normal vital signs by age

Age	Respiratory Rate (RR) (breaths per minute)	Pulse Rate (PR) (beats per minute)	Systolic BP (SBP) (mm Hg)	Urine output
28 days ^a - 2 months	<60	110-160	Use cap refill or PR instead	At least 1ml/kg/hr
2 - 12 months	<50	110-160	Use cap refill or PR instead	At least 1ml/kg/hr
1 - 5 years	<40	100-150 ^b	80-100 or use PR	At least 1ml/kg/hr
5 - 12 years	<30	80-120	90-110	At least 1ml/kg/hr
>12 years	<20	60-100	100-120	At least 1ml/kg/hr
Adults	12-20	60-100 (may be 40-60 in well trained athlete)	90-140 ^c see note below	At least 0.5ml/kg/hr

^a For normal vital signs range in neonates, see neonatal guidelines.

^b PR of 150 may be too high for 5 yo. Check the lema or previous IPD charts to see what the patient's normal PR is.

^c BP can be different in each patient- for some people SBP of 90 is normal. If a patient's SBP is usually 140 and now it is 90 this could be a sign of shock. Check old patient records for baseline BP.

4.3 SHOCK

DEFINITION

In shock, the blood flow (and blood volume) is not enough to keep the person alive. The vital organs (e.g. brain, heart) do not get enough blood and oxygen to work.

CAUSES

1. HYPOVOLEMIC SHOCK (Shock caused by loss of blood or fluids):

Causes:

- Severe bleeding anywhere in the body (e.g. trauma, ectopic pregnancy, ruptured aorta aneurysm)
- Severe fluid loss (e.g. severe vomiting and diarrhoea, burns, severe ascites, severe dengue)

2. VASODILATORY SHOCK (Shock caused by widening of the blood vessels):

Most common causes:

- Bacterial infection (**septic shock**)
- Severe allergic reaction (**anaphylactic shock**)
- Severe brain injury or bleeding (**neurogenic shock**)
- Taking of certain drugs or poisons.

3. CARDIOGENIC SHOCK (Shock caused by weak pumping of heart = heart failure):

Most common causes:

- Chronic severe anaemia
- Vitamin B1 deficiency, beri beri
- Valvular heart disease (damaged heart valve)
- Abnormal rhythm of the heart: too fast (tachycardia) or too slow (bradycardia)
- Lung collapse (pneumothorax)
- Heart attack (myocardial infarction)

4. SEPTIC SHOCK (shock caused by the effects of an infection on the body)

Causes:

- Any severe infection

5. ANAPHYLACTIC SHOCK (Shock caused by a severe allergic reaction):

Causes:

- Severe allergic reaction e.g. penicillin, peanuts

SIGNS AND SYMPTOMS

Signs and symptoms can vary with the different kinds of shock, but some are common in most patients. See Figure 10 for normal vital signs in children.

- **Fast and weak pulse** (>100 bpm in adults).
- **Fast, shallow breathing** (> 30 respirations per minute in adults).
- **Cold, sweaty ('clammy') skin** occurs in most shock patients. An exception is the flushed skin in the early stages of vasodilatory shock (for example, in septic shock).
- **Hypotension** (low blood pressure) – Systolic BP < 90 mmHg occurs in most shock patients.

Low BP is a late sign of shock, do not wait for low BP in treating a patient with other signs of shock. Use pulse rate instead of BP to detect shock in children

- **Low urine output** (= oliguria): urine production less than 0.5ml/kg/hr in adults and 1ml/kg/hr in children
- **Change in mental state:** at the onset patients are agitated, then confused, then drowsy and then in coma.

In **SEPTIC SHOCK** you also find:

- High or low temperature.
- History of chills before the fever started.
- Warm skin.

In **ANAPHYLACTIC SHOCK** you also find:

- Sometimes a history of taking certain medicines (especially penicillins and anti-inflammatories [NSAID, e.g. ibuprofen, diclofenac]), of insect bite, or ingestion of some food (especially seafood and nuts). Symptoms of anaphylaxis can last from 5 minutes to several hours
- Oedema (swelling) of lips and throat which makes breathing difficult
- Wheezing
- High BP before it drops to low levels
- Sometimes an itchy rash quickly spreading over all the body
- Sometimes vomiting and diarrhoea

EMERGENCY TREATMENT

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment (see p.13) should be done. You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step**

Figure 4.8 DRS ABCDE chart for shock

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR SHOCK
DRS	Danger Response Send for help	Gloves Safe place Call for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Simple airway manoeuvres +/- airway if needed Suction if needed (and available) Adrenaline nebuliser 5ml STAT if anaphylactic shock and airway swelling or stridor
B	RR, SpO ₂ , cyanosis Chest indrawing/ tracheal tug Listen to chest	Oxygen (high flow) Salbutamol nebuliser Adult >5yr 5mg; Child <5yr 2.5mg STAT if have wheeze (consider anaphylactic shock) Position patient: If dyspnoea sit up right (but if very low BP raise legs to level above head)
C	HR, BP, Cap refill Urine output, Temp Listen to HS	Put in 2 biggest (16G or 18G) IV cannula – take bloods e.g. Hct, CBC, MS, BC, dextrose etc. If signs of shock give fluid bolus NSS or R/L if diarrhoea (unless cardiogenic shock)
D	Check dextrose Any drugs needed e.g. antibiotics, paracetamol	<i>For details on specific treatment see below</i> Septic shock: ceftriaxone Anaphylactic shock: adrenaline IM, chlorpheniramine, hydrocortisone Cardiogenic shock: furosemide +/- vitamin B1 Give dextrose if low
E	GCS/BCS/AVPU Expose and examine all over body	Review notes and charts History, further investigations, treatment plan
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

Other emergency treatment for shock depends on the cause.

1. HYPOVOLEMIC SHOCK: BLOOD/FLUID LOSS

- If bleeding stop by applying pressure
- Give IV fluids **NSS Adult: 500ml-1L STAT; Child 10-20ml/kg STAT** (or R/L if diarrhoea). If severe hypovolaemia may need to give at least 2L in the first hour in adults or 40 mL/kg in children.
- If there is still bleeding, fluid replacement must include ongoing losses: this could mean giving 2L of fluids per 1 hour in adults.
- Shock from blood loss requires **blood transfusion**, several units may be necessary.

AIM TO REPLACE 2-3 TIMES THE ESTIMATED LOSS
e.g. if loss is 1L then the patient will need 2-3L rapidly

2. SEPTIC SHOCK

- Give IV fluids **NSS Adult: 500ml-1L STAT; Child 10-20ml/kg STAT** (or R/L if diarrhoea). Re-assess vital signs after fluid bolus.
- Give high doses of antibiotics for severe infections: IV **ceftriaxone** (or IM if cannot get IV access). Use ceftazidime if suspect melioidosis, meropenem if high suspicion of ESBL. If possible, take blood, urine, CSF or other body fluid (e.g. pus) samples before starting antibiotics.
- Try to find the source of the infection.

3. ANAPHYLACTIC SHOCK

- Drug or blood infusions should be stopped immediately.
- Give IV fluids **NSS Adult: 500ml-1L STAT; Child 10-20ml/kg STAT**. You may need to give at least 2L in the first hour in adults or 40 mL/kg in children.
- Give **medication** for anaphylactic shock

Figure 4.9 Medications for anaphylactic shock

	ADRENALINE IM: 1 in 1,000 (1 vial = 1ml = 1mg)	CHLORPHENIRAMINE IV or IM (1 vial = 1ml = 10mg)	HYDROCORTISONE SLOW IV OR IM
ACUTE PHASE	>12yrs/Adult: 0.5ml 6yrs-12yrs: 0.3ml 6m-6yrs: 0.15ml <6m: 0.01ml/kg	Adult: 10-20mg 12-18yrs: 10mg 6-12yrs: 5mg 6m-6yrs: 2.5mg <6m: 250 mcg/kg (max. 2.5 mg)	>12yrs/Adult: 200mg 6-12yrs: 100mg 1-5yrs: 50mg <1yr: 25mg
	Repeat dose every 5-15 minutes until BP and pulse are back to normal	Give STAT over 1 minute	(Can also use dexamethasone). IV steroids take time to have effect and are not emergency drugs
AFTER ACUTE PHASE	Not required but keep monitoring for 12-24h because anaphylaxis may have a 2nd phase reaction.	Continue QID, switch to PO chlorpheniramine when improved: >12yrs/Adult: 4mg QID (max 24mg/d) 6-12yrs: 2mg QID (max 12mg/d) 3-5yrs: 1-2mg QID (max 6mg/d) 1-2yrs: 1mg BID (max 3mg/d)	Can repeat hydrocortisone 3-4 times per day if required (e.g. low BP, persistent shock) Switch to PO prednisolone when improved/stable.

4. CARDIOGENIC SHOCK

- Treat the cause (e.g. acute heart failure, anaemia, beriberi).

GENERAL REMARKS

Careful monitoring in all patients of:

- Vital signs (pulse rate, blood pressure, respiratory rate) every 15 minutes.
- Urine output (consider a urinary catheter) – minimum output should be at least 0.5ml/kg/hr in adults and 1ml/kg/hr in children.
- Fluid balance chart: record all fluid input and all fluid losses: urine, blood.
- Lung crepitations and/or rising respiratory rate may indicate too much fluid.

DIAGNOSIS

Determine the cause of shock AFTER the patient is stabilised (use DRS AB-CABDE/S, see p.13)

TREATMENT

Try to identify the underlying cause and treat as above.

LONG-TERM MANAGEMENT

Shock is an acute condition – if you do not manage to improve the patient's vital signs rapidly, he/she will die. If the condition improves and vital signs return to normal (e.g. Adults: pulse <100 bpm, systolic BP ≥90 mmHg, urine output >0.5ml/kg/hr and mental condition improves) adjust the rate of infusion to 1L in 6hrs.

PREVENTION

Once someone is in shock, the sooner shock is treated the less damage there may be to the person's vital organs such as the kidney, liver and brain. Early first aid and emergency medical help can save his or her life.

People who have a history of a severe allergy reaction should carry injectable adrenaline (epinephrine) and chewable antihistamine (if available) to use in case of anaphylaxis. They should wear a bracelet or necklace stating their allergy.

Allergies to medications should be written in the patient lemma and highlighted.

4.4 COMA

DEFINITION

Reduced level of consciousness. There are different degrees of reduced level of consciousness and coma is the most severe.

- Drowsiness Patient can be easily woken up by talking or touching them
- Stupor Patient can be woken up with strong stimulation (e.g. speaking loudly or touching firmly).
- Coma Patient cannot be woken up

CAUSES

It is important to ask a thorough history from family members. This will help find a cause so you can give appropriate emergency treatment. A careful physical examination is needed, especially if there is nobody who can give a history. Think about fever, trauma, chronic problems. Start emergency treatment even if you do not know the cause.

EMERGENCY TREATMENT

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment (see p.13) should be done. You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step**

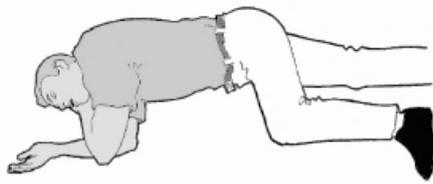
Figure 4.10 DRS ABCDE chart for coma

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR COMA
DRS	Danger Response Send for help	Gloves Safe place Call for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Simple airway manoeuvres +/- airway if needed – be careful if there is a history of trauma or if unknown. Suction if needed (and available)
B	RR, SpO ₂ , cyanosis Chest indrawing/ tracheal tug Listen to chest	Oxygen (high flow) Nebuliser if wheeze Position patient: If dyspnoea sit up right but if very low BP raise legs to level above head
C	HR, BP, Cap refill Urine output, Temp Listen to HS	Put in 2 biggest (16G or 18G) IV cannula – take bloods e.g. Hct, CBC, MS, BC, dextrose etc. Give fluid bolus NSS Adult: 500ml STAT; Child 10ml/kg STAT (or R/L if diarrhoea)
D	Check dextrose Any drugs needed	Give dextrose if low Give medications according to cause (antibiotics, paracetamol)
E	GCS/BCS/AVPU Expose and examine all over body	Review notes and charts History, further investigations, treatment plan Assess for cause of coma, and treat Coma position to prevent aspiration
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

COMA POSITION:

The coma position keeps the airway patent. Put the patient on the right side. (If pregnant turn on to left side for less compression of the abdominal vessels.) One leg is bent at the knee. If the coma follows a trauma e.g. car/motorbike accident do not move the patient to the side (they may have a spine injury).

Figure 4.11 Coma position



Note: This position may be used **only when the patient is breathing normally**

Respiratory rate and pulse must be checked constantly

If heart or breathing stops, put the patient on his back and start CPR

- What is the past medical history of the patient?
- Which symptoms were there before the coma (fever, headache, vomiting, convulsions)?
- Has any medicine been given?
- Did the patient have an accident? If so, when?
- Has the patient taken any poison, medicine, alcohol?

Examine the patient completely and do not forget to check:

- Is the neck soft or stiff?
- Is there a wound or haematoma on the head?
- Neurological exam:
 - Glasgow Coma Scale: There are other scales that measure alertness, such as AVPU (alert, respond to Voice, Pain, Unresponsive) or the Blantyre Coma Scale (BCS – this was designed to assess malaria coma in children).
 - Check the pupils; if they are of different sizes consider cerebral haemorrhage. Refer to hospital.
 - Check that the tonus of the limbs is symmetrical (left/right) and the same in arms and legs (stroke, spine injury).
- Breath: alcohol, smell of fruit (diabetic), smell of urine (uremic coma)
- Skin: rash, cyanosis, jaundice, pallor

Figure 4.12 Coma Scales for adults and paediatrics ^{*new for BCS}

Glasgow Coma Scale (GCS)	Score
1. Eye opening (E)	
- Spontaneous	4
- Eyes open to speech	3
- Eyes open to pain	2
- Eyes stay closed	1
2. Best Motor response (M)	
- Obeys commands	6
- Localises to pain	5
- Pulls away from pain	4
- Flexes abnormally to pain	3
- Extends abnormally to pain	2
- No movement	1
3. Best Verbal response (V)	
- Oriented/Not confused	5
- Confused	4
- Inappropriate words	3
- Sounds but no words	2
- No sounds	1
Total score is between 3 and 15:	
A score below 5 suggests poor outcome depending on cause, especially in trauma.	
A score below 8 indicates severe coma.	

Blantyre Coma Score (BCS)	Score
1. Eye opening (E)	
- Watches or follows (e.g. mother's face)	1
- Does not watch or follow	0
2. Best Motor response (M)	
- Localises painful stimulus (pressure on sternum with knuckles of one hand)	2
- Withdraws limb from painful stimulus	1
- No response or not appropriate response	0
3. Best Verbal response (V)	
- Cries inappropriately with painful stimulus, or if verbal, speaks	2
- Moan or abnormal cry with painful stimulus	1
- No vocal response to painful stimulus	0
Total score is between 0 and 5:	
Minimum score: 0 (poor)	
Maximum score: 5 (good)	
Abnormal score: ≤4	

For example:

Patient opens their eyes when you tell them to open them **E=3**

When you cause them pain e.g. pinch the trapezius muscle the patient touches the area with their hand **M=5**

When you ask them where they are, they say they 'dog' **V=3**

GCS = 3+3+5 = 11/15

DIAGNOSIS

Look for a cause and treat:	Possible Cause
Coma with fever	Malaria, meningitis, encephalitis, sepsis, or other severe infections
Coma with or without fever	Severe hypoglycaemia (dextrose <45mg/dL or <2.5mmol/l) Severe dehydration
Coma without fever	Head trauma (accident), poisoning, stroke, cerebral haemorrhage

TREATMENT

Treat the cause.

If you do not find a cause, or if you find a cause but you do not have the medicine to treat it, consider referring the patient to hospital.

LONG TERM MANAGEMENT OF COMA

1. Re-position the patient every 2 hours from one side to the other to prevent skin ulcers. Show the family how to re-position the patient. **Remind them not to let the patient lie flat on his back.** In that case the tongue might block the airway or vomit may enter the airway.
2. Put in a urine catheter. Monitor fluid balance (input/output) in order to avoid dehydration.
3. If the coma is following a head trauma DO NOT use 5% dextrose during the first 48 hours (sugar can worsen the brain damage) **except** in hypoglycaemic patients.
4. Regularly reassess the patient: check the vital signs every 2 hours.
5. Check GCS on admission and then twice a day.
6. Check dextrose twice a day as the patient cannot eat or drink.
7. Wash the patient all over once a day. Clean the patient whenever urine and/or stools are passed. Wash the affected area and do not just wipe with dry cloth or paper. Help the family to do this.
8. Clean the mouth and moisten lips at least 4 times a day. Vaseline applied on the lips prevents cracking.
9. Clean the eyes with NSS and cotton wool. Apply Terramycin Eye Ointment (TEO) BID to avoid conjunctivitis, drying up of cornea, and injury. Drying up of cornea can lead to blindness. Close the eyes with a plaster/tape if they stay open.
10. Teach the family how to do massages and perform passive limb movements every 4 hours to maintain muscle tone and prevent contractions.
11. In prolonged coma consider NG feeding depending on the cause and prognosis (see malnutrition p.205). This must be discussed with the doctor.
12. Ask the family not to leave the patient alone.
13. If the patient condition does not improve despite full treatment, see palliative care chapter for end of life care.

4.5 CONVULSIONS

DEFINITION

Convulsions are a **sudden loss of consciousness** with or without cyanosis and **strong rhythmic movements** of the face or extremities. Sometimes the patient passes urine or bites his tongue.

When the movements stop, the patient may remain unconscious and breathe deeply up to 30 minutes. The patient slowly returns to normal consciousness. During this time the patient may be confused, asking the same questions many times (e.g. about what happened to him/her, where he/she is etc.).

CAUSES

During the emergency, think about hypoglycaemia, pregnancy, alcohol or drug use, fever, trauma, or chronic diseases. Start emergency treatment even if you do not know the cause.

EMERGENCY TREATMENT

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment (see p.13) should be done. You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step**

Figure 4.13 DRS ABCDE for convulsions

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR CONVULSIONS
DRS	Danger Response Send for help	Gloves Safe place Call for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Simple airway manoeuvres +/- airway if needed Suction any secretions/vomit if needed (and available)
B	RR, SpO ₂ , cyanosis Chest indrawing/ tracheal tug. Listen to chest	Oxygen (high flow)
C	HR, BP, Cap refill Urine output, Temp Listen to HS	Put in IV cannula Take bloods e.g. Hct, CBC, MS, BC etc. (may need to wait till fitting stops)
D	Check dextrose Any drugs needed e.g. antibiotics, paracetamol	If fitting continues <u>for more than 3 minutes</u> give: Diazepam Slow IV or IM or PR Adults: 10mg (1 vial) (if IV max 0.5ml in 30 seconds) Child: 0.4mg/kg (max 10mg) can repeat after 10 minutes if needed **When the patient is moving, it can be easier to give first dose IM or PR but IV is quicker and better.** If dextrose low give IV Adult and Child: 5ml/kg 10% dextrose bolus Neonates: 2ml/kg 10% dextrose bolus Give any other drugs according to cause
E	GCS/BCS/AVPU Expose and examine all over body	History, further investigations, treatment plan. Assess for cause of convulsion and treat. Coma position to prevent aspiration after fitting if no respiratory distress
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

Diazepam IV

1 vial = 10mg / 2ml

Give IV injections SLOWLY (max 0.5 ml in 30 seconds)

Diazepam Rectally (PR) or IM

Diazepam PR or IM is NOT diluted

How to give PR:

Draw up the dose from an ampoule of diazepam into a 1ml syringe

Remove the needle

Insert the syringe into the rectum 4 to 5 cm and inject the diazepam solution

Hold buttocks together for a few minutes

If the patient is still fitting:

- After 10 minutes give a **second dose of diazepam**
- CALL DOCTOR, AND BEGIN **REFERRAL** PROCESS
- After another 10 minutes give a **third dose of diazepam**
- If still fitting after 3 doses of diazepam, we should give IV phenobarbitone but not available so need to refer – the patient is at risk of hypoxia to the brain so referral is urgent.

Remember:

After several doses of diazepam, the patient will be asleep and cannot be woken for a while. Monitor vital signs carefully during this time.

DIAGNOSIS:

Check blood sugar for hypoglycaemia.

Look for signs of infection (meningitis, malaria etc.).

Ask for past and recent medical history, previous convulsion episodes, and medication taken.

When looking for causes, the next list could be helpful: **remember AEIOU**

A: Alcohol, **E:** Eclampsia, **I:** Infections, **O:** Organ failure, **U:** Uraemia (= renal failure)

Convulsions with fever	Malaria, meningitis, hyperthermia, encephalitis
Convulsions with or without fever	Hypoglycaemia, severe dehydration, head trauma, amphetamines, alcohol, renal failure (uraemia)
Convulsions in pregnant women	Eclampsia (HBP + oedema + proteinuria), malaria, hypoglycaemia
Repeated convulsions without fever	Brain tumour, cysticercosis
Convulsions without a clear cause	Epilepsy

TREATMENT

Goals of treatment are:

Stop convulsions quickly.

Treat fever if present especially in children under 5 as it can be the cause of the convulsions.

Find and control the underlying cause.

Prevent complications by protecting the person from injury. Try to prevent a fall. Lay the person on the ground in a safe area. Clear the area of furniture or other sharp objects.

4.6 CHEST PAIN

DEFINITION

Chest pain is any complaint of pain in the chest area.

CAUSES

There can be many emergency causes of chest pain. The cause depends on the description of the chest pain and other signs and symptoms.

Figure 4.14 Causes of emergency chest pain

Location	Substernal pain	Myocardial infarction, oesophageal perforation, esophagitis, severe reflux
	Left sided chest pain	Myocardial infarction, pneumonia
	Right sided chest pain	Pneumonia or other lung related diagnosis, pain from cholecystitis can refer to the right shoulder
	Generalised chest pain	Underlying medical problem (i.e. asthma, gastritis) or musculoskeletal problem
Description	Burning	Usually related to a gastrointestinal diagnosis
	Numbness in left jaw or arm	Myocardial infarction, especially when it also occurs with other symptoms like nausea or chest pain
	Crushing or pressure	Myocardial infarction "feels like someone is sitting on the chest"
	Tearing	A symptom of aortic dissection, a surgical emergency
Association	Worse with exertion	Myocardial infarction, pleural effusion, pneumonia
	Worse with breathing	Rib fracture or contusion, pneumonia
	Worse with moving around	Musculoskeletal

DANGER SIGNS: Chest pain – central (left arm or jaw), severe, 'crushing', sweating, nausea = myocardial infarction (heart attack)

EMERGENCY TREATMENT

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment (see p.13) should be done. You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step**

Figure 4.15 DRS ABCDE for chest pain

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR CHEST PAIN
DRS	Danger Response Send for help	Gloves Safe place Call for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Simple airway manoeuvres +/- airway if needed Suction if needed (and available)
B	RR, SpO2, cyanosis Chest indrawing/ tracheal tug. Listen to chest	Oxygen (high flow) only when oxygen saturation is low. Do not give oxygen if SaO2 is normal if you suspect myocardial infarction because too much oxygen can cause injury to the heart muscle.
C	HR, BP, Cap refill Urine output, Temp Listen to HS	Put in IV cannula Take bloods e.g. Hct, CBC, MS, BC etc. Do ECG
D	Check dextrose Any drugs needed e.g. antibiotics, paracetamol	If danger signs or ECG shows signs of infarction: give 300mg Aspirin to treat for myocardial infarction
E	AVPU/GCS Expose and examine all over body	History, further investigations, treatment plan. Assess for cause of chest pain, and treat /refer
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

****IF POSSIBLE, REFER CHEST PAIN IMMEDIATELY TO TERTIARY HOSPITAL FOR FURTHER TREATMENT****

4.7 DIABETIC EMERGENCIES

DEFINITION

Diabetes can cause emergencies when blood sugar is too high or too low. The patient can present unwell or in a coma. ALWAYS CHECK BLOOD SUGAR ON AN UNWELL PATIENT.

CAUSES

A diabetic emergency can be a patient who has a first visit to the clinic or a patient who already has a history of diabetes. If the patient already takes diabetes medicine and is normally well, you must consider other causes for the emergency (i.e. infection, malaria, drugs). Start emergency treatment even if you do not know the cause.

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment (see p.13) should be done. You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step**

Figure 4.16. DRS ABCDE for diabetic emergencies

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR DIABETIC EMERGENCIES
DRS	Danger Response Send for help	Gloves Safe place Call for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Simple airway manoeuvres +/- airway if needed Suction if needed (and available)
B	RR, SpO ₂ , cyanosis Chest indrawing/ tracheal tug, Listen to chest	Oxygen (high flow)
C	HR, BP, Cap refill Urine output, Temp Listen to HS	Put in IV cannula Take bloods e.g. Hct, CBC, MS, BC, Dextrose etc.
D	Check dextrose Any drugs needed e.g. antibiotics, paracetamol	If dextrose LOW: If dextrose 45-70mg/dL or 2.5-3.9mmol/L: Give oral sugar solution (water mixed with sugar) or sweet drink to prevent severe hypoglycaemia. If dextrose <45mg/dL or <2.5mmol/L: If able to drink: give oral sugar solution (water mixed with sugar) or sweet drink If unable to drink e.g. in coma: insert IV cannula and give Adult/Child: 5ml/kg 10% dextrose bolus (D10W) , Neonate 2ml/kg 10% dextrose If dextrose HIGH give IV NSS: Adult: 1L in 30 min Child: 10ml/kg in 1 hour
E	AVPU/GCS Expose and examine all over body	History, further investigations, treatment plan. Assess for cause of high/low dextrose, and treat /refer
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

Conversion formula for mg/dL and mmol/L (glucose)

$$\text{mg/dL} = \text{mmol/L} * 18$$

$$\text{mmol/L} = \text{mg/dL} \div 18$$

4.7.1. HYPERGLYCAEMIA

DEFINITION

Dextrose >200mg/dL or > 11.1 mmol/L

CAUSES

- Stress, e.g. recent trauma, shock. Stroke, MI, convulsion or burns
- Sepsis or infection
- New diagnosis diabetes or poor control of chronic diabetes
- Non-fasting glucose measurement
- Drugs, e.g. adrenaline, steroids, diuretics

THINK ABOUT DIAGNOSIS OF DIABETES EMERGENCY IF:

- No history but has symptoms of diabetes
- Has history of diabetes and has been unwell recently or does not take medications regularly

SIGNS AND SYMPTOMS

- Poor appetite
- Coma
- Fast RR
- Ketotic breath (smells sweet)
- Dehydration, vomiting, abdominal pain
- Urine dipstick positive for ketones

TREATMENT

- Insert an IV cannula, start **NSS: This is very important in diabetic emergencies due to severe dehydration caused by glucose in the urine.**
 - Adult 1L in 1/2 hour, then 1L over 1 hour, then 1L over 1-2 hours.
 - Add potassium to the IV fluids at a maximal rate of 10mmol/h
 - Patients may need up to 7L fluids over the first 24 hours.
 - Always assess the patient between giving more fluids, look for signs of fluid overload.
 - Children 10ml/kg in 1 hour (the risk of fluid overload is higher in children)
- For Type 1 Diabetes: If insulin is not available, after starting IV fluids discuss with the doctor about referring to hospital. For Type 2 Diabetes: the blood sugar may decrease with IV fluids and may be treated without referring.

4.7.2. HYPOGLYCAEMIA

DEFINITION

Dextrose <70mg/dL or <3.9mmol/L), **Note:** <45mg/dL or <2.5mmol/L is severe hypoglycaemia

CAUSES

- Malaria
- Sepsis
- Severe anorexia
- If there is history of diabetes and patient has anorexia (e.g. vomiting or diarrhoea), and still take medications

SIGNS AND SYMPTOMS

- Sweating
- Nausea
- Tremor
- Dizziness, confusion
- Drowsiness, aggressive/irritable
- Convulsion, coma

TREATMENT

- If dextrose 45-70mg/dL or 2.5-3.9mmol/L:
 - Give oral sugar solution (water mixed with sugar) or sweet drink to prevent severe hypoglycaemia.
- If dextrose <45mg/dL or <2.5mmol/L:
 - **If can drink:** give oral sugar solution (water mixed with sugar) or sweet drink
 - **If cannot drink e.g. in coma:** insert IV cannula and give Adult/Child: **5ml/kg 10% dextrose bolus**, Neonate **2ml/kg 10% dextrose**
- After giving oral/IV dextrose **re-check blood dextrose after 15 minutes** to make sure it is >70mg/dL or 3.9 mmol/L

4.8 GASTRO-INTESTINAL (GI) BLEEDING

DEFINITION

Blood in the vomit or stool.

CAUSES

- Peptic ulcer disease (bleeding)
- Varices (from portal hypertension from liver disease e.g. alcoholism, hepatitis)

SIGNS AND SYMPTOMS

- Will vomit brown liquid (like coffee) or fresh blood and/or will have melaena (black sticky smelly stools). (Remember that patients on iron tablets will have black stools).
- May have signs of shock – tachycardia, low BP, high cap refill, cold peripheries

EMERGENCY TREATMENT

In case of active bleeding:

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment (see p.13) should be done. You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step**

Figure 4.17 DRS ABCDE for GI bleeding

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR GI BLEEDING
DRS	Danger Response Send for help	Gloves Safe place Call for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Suction (if available)
B	RR, SpO ₂ , cyanosis Chest indrawing/ tracheal tug Listen to chest	Oxygen
C	HR, BP, Cap refill Urine output, Temp Listen to HS	2 IV cannulas (biggest size possible 16G or 18G) Take bloods e.g. Hct, blood group, CBC, MS, dextrose etc. Fluid bolus 1L STAT Transfuse if signs of shock
D	Check dextrose Seizures Pain	<i>See below for doses</i> If UGI bleeding and suspect PEPTIC ULCER DISEASE e.g. history of abdominal pain, no risk factors for liver disease: Omeprazole OR Ranitidine If suspect PORTAL HYPERTENSION e.g. high alcohol intake, chronic hep B or C or signs of cirrhosis discuss with the doctor and consider: Ceftriaxone +/- Vitamin K
E	AVPU/GCS Expose and examine	History, further investigations, treatment plan
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

SECONDARY TREATMENT

- No food or drink
- Refer to local hospital urgently. PATIENTS WITH GI BLEEDING ARE AT HIGH RISK FOR VERY FAST AND SEVERE BLOOD LOSS. BE CAREFUL IF YOU KEEP IN IPD.

SPECIFIC TREATMENT

If suspect **peptic ulcer disease** (e.g. history of abdominal pain, no risk factors for liver disease)

- Give **omeprazole** IV 40mg (or PO if no IV) or **ranitidine** 50mg IV (diluted to 20ml given over 2 minutes)
- When stable consider antibiotics for *H. pylori* eradication

If suspect portal hypertension from cirrhosis (e.g. history of high alcohol intake, chronic hep B or C or signs of cirrhosis) discuss with the doctor about also doing the following:

- IV **ceftriaxone** 1g OD for 5-7 days – varices are often associated with bacterial infection
- **Vitamin K** IM 2.5-10mg STAT dose
- When stable start **propranolol** 40mg BID

4.9 NEUROLOGICAL EMERGENCY: STROKE

STROKE IS A LIFE-THREATENING EMERGENCY

Using **FAST technique** can be very helpful:

F - Facial weakness: Has their face fallen on one side? Can they smile?

A - Arm weakness: Can the person raise both arms and keep them there? Is there weakness on one side?

S - Speech and communication difficulties: Is their speech slurred?

T - Time: Time is important, needs URGENT to transfer to the hospital if you see **any single one** of these signs.

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment (see p.13) should be done. You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step**

Figure 4.18 DRS ABCDE for stroke

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR STROKE
DRS	Danger Response Send for help	Gloves Safe place Call for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Simple airway manoeuvres +/- airway if needed Suction if needed (and available)
B	RR, SpO ₂ , cyanosis Chest indrawing/ tracheal tug Listen to chest	Oxygen
C	HR, BP, Cap refill Urine output, Temp Listen to HS	Put in IV cannula – take bloods e.g. Hct, CBC, MS, dextrose etc. Note: Do not give BP medication to reduce the BP as the high BP may be needed to supply the brain with more oxygen
D	Check dextrose Any drugs needed e.g. antibiotics, paracetamol	Give dextrose if low
E	AVPU/GCS Expose and examine all over body	If abnormal neurology exam e.g. facial droop, one sided weakness, high tone, increased reflexes → suggests diagnosis of stroke Review notes and charts History, further investigations, treatment plan
DISCUSS WITH DOCTOR about referral		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

If the stroke is very severe it may be more appropriate not to refer or give treatment and follow palliative care. Discuss with a doctor

TREATMENT

- **Urgent referral to a tertiary (high level) hospital if you see any one of these signs** – the quicker the patient receives treatment the more they are likely to survive and recover from their symptoms. For better recovery of neurologic function, patients need treatment within 4.5 hours of the onset of symptoms.

CHAPTER 5: COMMON SYMPTOMS

5.1 FEVER

DEFINITION

Fever means increase in body temperature. Axillary and tympanic (ear) temperature more than 37.5°C or 38°C rectally is considered as fever. Fever is a common symptom usually related to viral, bacterial or parasitic infection. For fever in infants see *Appendix 15*.

SIGNS AND SYMPTOMS ASSOCIATED WITH FEVER

- Chills: feeling cold even though body temperature is high
- Rigor: a severe chill with chattering of the teeth and severe shivering
- **Signs of serious illness:**
 - Sepsis and shock
 - Systemic illness: meningitis, seizures, rigid abdomen, rash, etc
 - Special general condition: pregnancy, malnutrition, immune suppression, splenectomy, chronic disease, very young or very old

DIAGNOSIS

- Temperatures can be taken in the axilla, oral cavity, ear canal or rectum. Proper measurement of axillary temperature takes 5 minutes. Any temperature less than 36°C needs to be rechecked.
- **Try to find and treat the cause of the fever, see figure 5.1 below**

TREATMENT

- **If fever more than 38°C:**
 - Remove any unnecessary clothing (no extra clothes, no blanket, etc).
 - Wet the patient's skin with tepid (cool not cold) sponging (put water on the whole body). **If available, use a fan to cool the wet skin.**
- Give **paracetamol**

Adults	1g QID (max 4g daily)
Children	15mg/kg (max 2g daily)
- If temperature still high with paracetamol consider giving ibuprofen (if not contraindicated)
- Keep the patient well hydrated (drinking a lot, IV fluids if cannot drink)
- If the patient is comatose and cannot swallow, give paracetamol PR or IV

Never give aspirin to children under 12 years because of the risk for Reye's syndrome

Figure 5.1 Differential diagnosis of infections for common symptoms

SYMPTOMS	POSSIBLE DISEASE
Chills, headache, sweating, consciousness disorders	Malaria (<i>see malaria guidelines</i>)
Headache, neurological signs, neck stiffness, photophobia	Meningitis/Encephalitis
Muscle pain, high fever, rash, headache, nausea/ vomiting	Dengue
Joint pain or swelling, fever, rash	Chikungunya
High fever, red eyes, muscle pain (calves), headache	Leptospirosis
Respiratory signs	Acute respiratory infection
Urinary signs	Pyelonephritis
Diarrhoea with mucus and blood	Bacterial diarrhoea
Abscess, infected skin lesions	Skin infection
Shock, chills	Septicaemia
Painful big liver	Liver abscess
Prolonged high fever	Typhoid fever
Eschar, lymphadenopathy, rash, prolonged fever	Scrub typhus
Prolonged fever with cough and weight loss	TB
Infection not responding to treatment, parotitis (especially children) or prostatitis	Melioidosis
Isolated fever, body pain, running nose	Viral infection
Others	Cancer, HIV/AIDS

MANAGEMENT

- If the patient is well and/or you cannot find a clear diagnosis, send home on paracetamol treatment.
- Counsel to drink fluids.
- Follow up if there is no improvement within 48 hours. If you think the patient cannot come back (e.g. lives too far, does not understand disease) admit to IPD for observation.
- Re-examine the patient after receiving the results of a blood smear, especially when it is negative.

If fever occurring > 2 weeks think about TB, HIV, scrub typhus or typhoid. There are also non-infectious causes of fever (i.e. some types of cancer, autoimmune disease). Discuss with doctor.

5.2 HYPOTHERMIA

DEFINITION

Temperature less than 35.5 °C.

Hypothermia can happen in:

Sepsis	Hypoglycaemia
Neonates, especially preterm	Diabetes mellitus
Severely malnourished children	Alcohol abuse
Drowning	

TREATMENT

Mild hypothermia (32-35.5°C)

Treat with passive warming:

- Keep patients warm with blankets
- Try to keep in a warm room or put patient in the sun.

If **no response** to passive warming (normal temperature increase is 0.5-2°C/hour – can be up to 6°C/hour)
OR

Moderate hypothermia (<32°C)

Treat also with active warming:

- Use hot water bags (be careful about burns)
- Make the blankets warm and then give to patient

Severe hypothermia (<28°C)

Additional treatment:

- Move the patient gently and slowly. Moving too quickly can cause ventricular fibrillation (and death).
- Warm the trunk/abdomen **before** the extremities (so the cold blood from extremities does not suddenly go to central blood circulation and cause worsening hypothermia and hypotension).
- Give warm (heat to 40°C) NSS

Other management:

- Treat the cause. (If temperature increases $\leq 0.67^\circ\text{C}/\text{hour}$ with active warming, consider sepsis diagnosis).
- Use kangaroo method (*This is a recommended method to keep newborns warm, see neonatal guidelines*)

5.3 FATIGUE / TIREDNESS

DEFINITION

Fatigue/tiredness is a common symptom that many of us have experienced at some time in our lives. These symptoms are more common in old age or when lifestyle/work/family life is under/over stressful. When fatigue/tiredness do not go away with normal measures like sleep, rest and good diet, then they may be symptoms of disease.

DIAGNOSIS

History:

- Symptoms: fatigue/tiredness is a non-specific symptom therefore you need to ask lots of questions about other symptoms that they may have. (See table below). Remember to ask about sleeping pattern and caffeine intake.
- Social history, including smoking and alcohol.
- Mental health check: ask directly about feelings of sadness or depression, stress, worries, problems in the family, daily activities and appetite. (*see Mental Health, p.175*)

Examination:

- Physical: Weight, height, check vital signs (pulse rate, BP, temperature, respiratory rate)
- Pallor, lymph nodes, listen to lungs and heart (murmur, irregular rate), thyroid, liver (does it feel enlarged, firm, hard) and spleen, any abdominal masses, observe patient walking (foot drop) and sitting.
- Mental: is the patient giving eye contact, is the patient crying

Figure 5.2 Differential diagnosis for fatigue and tiredness

POSSIBLE CAUSES	SYMPTOMS	INVESTIGATIONS
Infections (viral, HIV, TB etc.)	Enlarged painful lymph nodes, fever, chronic cough/ diarrhoea, rash	NPA, HIV, AFB, CXR
Anaemia (iron deficiency, thalassaemia)	Pallor (enlarged spleen), dyspnoea, heavy menstruation	Hct, CBC, thalassaemia screen, G6PD, GYN consultation
Hypothyroidism	Lethargy, constipation, stiffness, weight gain, dry skin, hair change	TFT
Pregnancy	Tiredness, nausea, dizziness	Urine pregnancy test
Diabetes mellitus	Passing urine very often, weight loss, thirsty	Urine dextrose +/- blood dextrose
Lung disease	Difficulty in breathing, wheeze, cough	CXR, Sputum
Heart problems (heart failure, valvular heart disease, pericardial disease, arrhythmias)	Difficulty in breathing, slow or fast pulse rate, oedema, chest pain	ECG, Echocardiogram (heart ultrasound)
Kidney problems	Oedema, itching, decreased urine	Urine stick and sediment, Creatinine, BUN, kidney ultrasound
Stomach and intestinal problems.	Diarrhoea, vomiting, nausea, epigastric pain	Stool sample
Cancer	Weight loss, enlarged lymph-nodes, pallor, dysphagia	CXR, CBC
Vitamin B1 deficiency (especially in pregnancy)	Numbness or weakness of extremities	-
Psychological problems	Depression, anxiety	Mental health depression scale (DSM IV-SCID); counselling team consultation

TREATMENT

- Treat the cause if you can find it.
- If you cannot find a cause, the physical examination is normal and you cannot find any psychological problems: reassure the patient and reassess in 2 week time. Advise the patient to have a good sleep, decrease caffeine intake, rest and maintain a good diet. If you suspect a mental health problem (see p. 175) explain that such problems can cause fatigue and tiredness. You can ask advice or help from the SMRU counselling team.

PREVENTION

Try to spend time with the patient. Listen kindly and ask questions. Discuss with the patient how to avoid stress, have a healthy diet, and take enough rest. Refer to counselling team if needed. Follow up can also help.

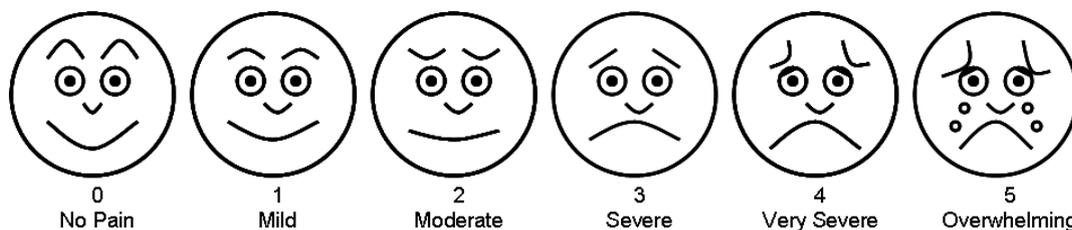
5.4 PAIN

DEFINITION

Pain is an unpleasant subjective sensation that may be a sign of injury or disease. Pain is a reason for a patient to come to the clinic. **Note: Pain is NOT a diagnosis.** Try to find the disease causing the pain (history, clinical examination) and **always** treat the pain (see below).

Post-operative pain relief is very important for better recovery of the patient.

Figure 5.3 Pain scale



DIAGNOSIS

Take the **HISTORY** of the pain (ask the pain questions):

TIME:	When did the pain start?
ONSET:	How did it start? (Sudden/slowly increasing) What was the patient doing at the time?
DURATION:	For how long: acute or chronic
QUALITY:	What kind of pain? (Words commonly used for pain: sharp, burning, stinging, intense, shooting, dull, steady, aching, radiating, pricking, pressing, etc. If the patient has these words to choose from, he or she can pick out the ones that apply.)
ASSOCIATION:	What makes it better/worse? What time of day is the worst?
LOCATION:	Where exactly is the pain? Does it radiate to anywhere else? Draw on a picture of the body.
SYMPTOMS:	What symptoms are associated with the pain? (fever, cough, dysuria, diarrhoea, constipation, vomiting)
INTENSITY:	How severe is the pain? Use a pain scale (0 = no pain and 10 = the most severe pain possible e.g. giving birth). For children you can use the pain scale pictures below.

Examination:

- Patients with severe pain might need painkillers before examination.
- Check especially the area where the pain seems to be localised.

TREATMENT

- Treat the cause if you find it.
- If you do not find a cause of pain and the pain is severe and recurrent, admit to IPD. Give pain relief and review the patient regularly.

Figure 5.4 Treatment options of pain relief

Step 1	Step 2	Step 3	Step 4 (consider referral)
Paracetamol	NSAID e.g. Ibuprofen / diclofenac	Weak opioid e.g. Tramadol	Strong opioid e.g. Morphine
(Use Amitriptyline for nerve pain)	AND Paracetamol	AND Paracetamol +/- Ibuprofen	AND Paracetamol +/- Ibuprofen

*Nerve pain = pain described as burning, stinging, shooting, like shock with electricity, often with tingling, numbness, often chronic pain

Step 4 medication may not be available in all clinics – if not available and is required consider referral to hospital

Do not give aspirin (ASA) in children below 12 years because of risk for Reye's syndrome.
Do not give NSAIDs to patients with asthma; it can exacerbate an asthma attack.

Treatment examples:

- Moderate headache, muscle, joint or bone pain: **paracetamol**. If moderate muscle or joint pain does not improve with paracetamol, start anti-inflammatory drugs (NSAID) like **ibuprofen or diclofenac** if not contraindicated.
- **Amitriptyline low dose** (high doses are used for treatment of depression) could be used for tingling pain in feet, leg or arms (commonly from diabetes mellitus or trauma) and for prophylaxis of migraine headache. Amitriptyline can make patients drowsy, very good to take at night.
- For moderate-severe pain you can use **tramadol**
- **If pain not improved with po tramadol then needs step 4 medication. This may not be available so consider referral.**

It is important to tell patients never to give more than the maximum recommended dose of painkillers, because overdose can cause death. If the pain is not controlled they must come back to clinic.

Important points to consider when prescribing:

- Use oral medication when possible.
- Combination of painkillers is better than increasing the dose of one medicine e.g. combining paracetamol or NSAID with stronger medication (e.g. tramadol) provides better pain relief than giving each drug alone.
- Give regular dose of painkillers, not prn. This is very important in post-operative pain management.
- If taking more than one medication for pain then try to spread out the pain medication in the day e.g. paracetamol QID, ibuprofen TID in between (with each meal).
- It is important to tell patients about the side effects and what to do if they happen.
- Do not give ASA, ibuprofen or diclofenac for epigastric pain. These medicines worsen gastritis and peptic ulcer disease.

Additional Therapy

- Pain may be accompanied with other symptoms such as nausea or anxiety. Pain treatment includes management of the side effects of pain.
- Medication to treat nausea: e.g. **metoclopramide**.
- For patients with very severe diseases and for those who are dying, pain medication alone is usually not enough. As a health worker you should keep the patient as comfortable as possible – not just physically. *See Oncology and palliative care, p.219.*
- Corticosteroids (e.g. prednisolone) may have some pain relief effects and reduce anorexia in palliative care patients but have many side effects. Do not start corticosteroids without discussing with the doctor.

Common Side Effects

- NSAIDs e.g. ibuprofen – gastritis, stomach ulcers and renal failure if taken chronically and especially if elderly (avoided by taking with meals, stop if epigastric pain/blood in stool/melaena). If possible avoid in very old patients and use just paracetamol.
- Tramadol – confusion (especially in elderly), drowsiness, constipation.

5.5 CONFUSION

DEFINITION

Confusion is a change in the mental state of a patient. It can be acute or chronic and can be caused by many different things. It is important to rule out any diseases that can be treated to reverse the confusion before diagnosing the patient with a long-term confusion problem e.g. dementia.

CAUSES

1. Infections e.g. meningitis, cerebral malaria, encephalitis, sepsis, syphilis, AIDS
2. Metabolic e.g. hyper/hypoglycaemia, vitamin B1 deficiencies
3. Endocrine disorders
4. Neurological e.g. raised intracranial pressure, head trauma, stroke, brain tumour
5. Electrolyte abnormality e.g. low sodium
6. Drug side effect e.g. steroids, opioids
7. Withdrawal of substances
8. Dementia (slowly developing confusion over years)

DIAGNOSIS

History:

- Important to find out how long the symptoms have been going on for – hours, days, months, years – it is often best to ask the family members as they will be able to give a better history.
- Has the patient taken any medication/drugs, is the patient currently intoxicated?
- Any trauma?
- Any other symptoms e.g. headache, fever.
- **Examine and investigate case by case for above causes of confusion.**

TREATMENT

Treat the underlying cause

CHAPTER 6: CARDIOVASCULAR DISEASES

For emergency management of chest pain see p.23

6.1 HYPERTENSION*UPDATE

DEFINITION

- HYPERTENSION, OR HIGH BLOOD PRESSURE (HBP)** is a Systolic BP (SBP) ≥ 140 mmHg and/or Diastolic BP (DBP) ≥ 90 mmHg ($\geq 140/90$ mmHg).
 - Hypertension is a risk factor for stroke, heart attack, and renal failure.
 - The cardiovascular risks of HBP are greater if there are other risk factors such as age (>60 years), gender (males > females), poor diet, smoking, high blood cholesterol, diabetes mellitus and if the patient already has heart disease or kidney disease.
- MALIGNANT HYPERTENSION** is very high blood pressure (SBP >180 OR DBP >110) that acutely affects one or more organs → **this is an EMERGENCY**.
 - See below for signs and symptoms
- PRE-ECLAMPSIA** is a very severe condition in pregnant women with HBP near the end of pregnancy. It can also occur post-partum. This condition is very different from essential hypertension and treatment is also different. (See *obstetric guidelines*)

CAUSES

Most of the time (95%) the cause of HBP is unknown. It is then called '**Essential Hypertension**

Only rarely (5%) can a cause be found. This is called '**Secondary Hypertension**'. Those causes include:

- High alcohol intake and smoking
- Obesity
- Pregnancy (pre-eclampsia)
- Kidney diseases
- Endocrine disorders of the adrenal gland or other glands
- Medicines and drugs: prednisolone, contraceptives, amphetamines (YaBa), NSAIDs, salbutamol
- Pain and anxiety
- Congenital heart disease

Think of secondary hypertension especially if the patient is young (eg. <30 years old) or have another disease.

See *Appendix 12* for normal blood pressures in children^{*new}.

SIGNS AND SYMPTOMS

Most patients do not have any symptoms. Some patients suffer from headache, dizziness or fatigue.

Remember to assess for complications of HBP.

COMPLICATIONS

Figure 6.1 Complications of ACUTELY high blood pressure (EMERGENCY)

Malignant Hypertension

This is a condition of very high blood pressure (SBP >180 OR DBP >120) AND where there is damage to organs (brain, retina, kidneys or heart) because of the lack of blood flow. This causes:

- General symptoms:** nausea, vomiting
- Brain:** neurological changes e.g. temporary loss of speech or vision, numbness, confusion, restlessness, convulsion, coma or stroke
- Retina:** acute visual problems
- Kidneys:** acute renal failure
- Heart:** acute heart failure, aortic dissection (tear in aorta – causes severe chest pain, may cause different BP measurements in right and left arms)

Complications of CHRONIC high BP and poor BP control:

If patients have high blood pressure for a long time, then they may get complications/symptoms below:

Peripheral blood vessels:

HBP may damage blood vessels causing pain in the legs when walking (**claudication**).

Central Nervous System:

Stroke is a complication of HBP. **Transient ischemic attacks** and **subarachnoid haemorrhage** are more common in patients with HBP.

• Eyes:

Damage to the **retina** which becomes more severe if the HBP is more severe. This leads to **poor vision** but blindness is rare.

Heart:

There is a higher incidence of heart disease associated with HBP mainly because of **ischaemic heart disease**. HBP puts a lot of pressure on the heart and may lead to **left ventricular hypertrophy (thickening of the heart muscle so it doesn't work as well)**. Severe hypertension can cause **left heart failure**. **Atrial fibrillation (irregular heart rhythm)** is common.

Kidneys:

Kidney disease can cause HBP but chronic HBP can also cause **chronic kidney failure**.

DIAGNOSIS

- You can diagnose HBP only after abnormal values on 3 different days. This may be difficult to do if the patient cannot follow up.
- Sometimes high BP is only seen at one visit. Then the next visit the BP is normal. This patient does not have a diagnosis of high BP.
- HBP is a chronic disease and needs daily medicine. Follow up and medication is very important for the life-long management of HBP.
- Healthy adults should have their BP checked every 3 years

If there is severe HBP (systolic BP > 180 OR diastolic BP > 110) AND/OR complications (*see Figure 6.2 next page*). Treatment should be given immediately for severe HBP.

How to take Blood Pressure

The patient should sit quietly for at least 5 minutes before measuring the BP (in the sitting position). Measure the BP always on the same arm for the same patient (write on the chart which arm you use). Measure the BP to the nearest 2mmHg. Do not write measurements so that all readings end 0 or 5.

ASSESSMENT OF HBP

1. Obtain accurate BP measurements 3 times at 3 different days for high BP diagnosis
2. Careful history to identify risk factors/underlying cause
3. Full examination to identify risk factors/underlying cause
4. Urine dipstick for blood/protein/glucose
5. Check a fasting dextrose on all patients
6. If available, check cholesterol (total cholesterol, LDL, HDL and triglycerides)
7. In <40 years old consider investigating for secondary causes of hypertension- discuss with doctor.

TREATMENT

Explain to patient

- Explain to patients that hypertension is a disease that may not have any symptoms, but it puts them at higher risk for problems like stroke and heart attack.
- This risk can be reduced by lifestyle changes and in some cases medication.
- The medication will not cure the problem but will decrease the risk. They will have to take medication and follow up for the rest of their life.

Lifestyle advice for all patients

- Eat less salt
- Healthy diet e.g. avoid fatty foods / eat more vegetables and fruit – *see p.71*
- Lose weight if overweight or obese
- Drink less caffeine and other caffeine containing products.
- Alcohol: Advise the patient to stop or if unable to stop at least decrease.
- Smoking: Advise the patient to stop or if unable to stop at least decrease.
- Exercise at least 30 minutes most days of the week.

When to start medication for HBP (*see Figure 6.2*):

- (If suspect HBP because of anxiety or because patient is unwell wait until the patient is calmer or better and repeat)
- **Discuss with doctor all NEW cases of hypertension and treat using Figure 6.2, see next page.**

- **Only start medication if the patient has HBP 3 times on 3 different days.** This means that the high BP is likely not to be a single episode, and if the patient follows up every week it is a sign that they will be more likely to follow up and take their medications safely.
- The patient needs to take the medication regularly; if they do not take it regularly this can be more dangerous for the patient (especially with beta blockers).
- **Once BP is stable on one or two medications then continue the same dose.**
- If available, check an **ECG** before starting any new high BP medication. If there is a complication from the medicine (e.g. bradycardia from metoprolol) then you can compare pre-treatment ECG.

When following up:

- If the patient is not attending regular follow up then STOP the medication. It is not good if the BP is going up and down because the patient is stopping and starting the treatment.
- Before increasing the dose or changing the medication make sure you check that the patient has been taking the drug every day as instructed.
- Before starting enalapril do a pregnancy test for females and baseline BUN and creatinine if possible.
- If BP too low with medication, then decrease the dose
- Offer annual BP screening for end organ damage and comorbidities

Figure 6.2 Treatment Options According to BP Measurement*update

SBP	DBP	Treatment
135-149	85-94	<p>Stage 1 hypertension: Check for co-morbidities (diabetes, heart problems, kidney disease, previous stroke) Investigate for end organ damage (kidney, heart, eyes). Calculate cardiovascular risk with online calculator. Decide if BP medication should be started (see Figure 6.3, next page) Use protocol if you decide to start medication.</p>
150-179	95-109	<p>Stage 2 hypertension: Check for co-morbidities (diabetes, heart problems, kidney disease, previous stroke) Investigate for end organ damage (kidney, heart, eyes). Calculate cardiovascular risk online calculator. Start BP medications (see Figure 6.4, p.36)</p>
>180	>110	<p>LOOK FOR ACUTE END ORGAN DAMAGE eyes (papilledema, haemorrhage), pulmonary oedema, heart failure, myocardial infarction (ECG) aortic dissection (check BP in both arms), encephalopathy, stroke, rapidly progressive renal failure (urine dip), eclampsia</p> <p>If have acute end organ failure this is a hypertensive emergency. See treatment box below. Consider referral. Discuss with doctor.</p> <p>No evidence of end organ damage</p> <ul style="list-style-type: none"> - This is not an emergency (stage 3 hypertension) - Manage with oral BP medication (see Figure 6.4, p36) - Start oral medication as per protocol and follow up next day. Can admit to IPD if needed.

Hypertensive emergency

If suspect malignant hypertension (BP >180 OR DBP >110 AND signs of damage to organs):

THIS IS AN EMERGENCY – NEED TO REFER PATIENT (Discuss with doctor)

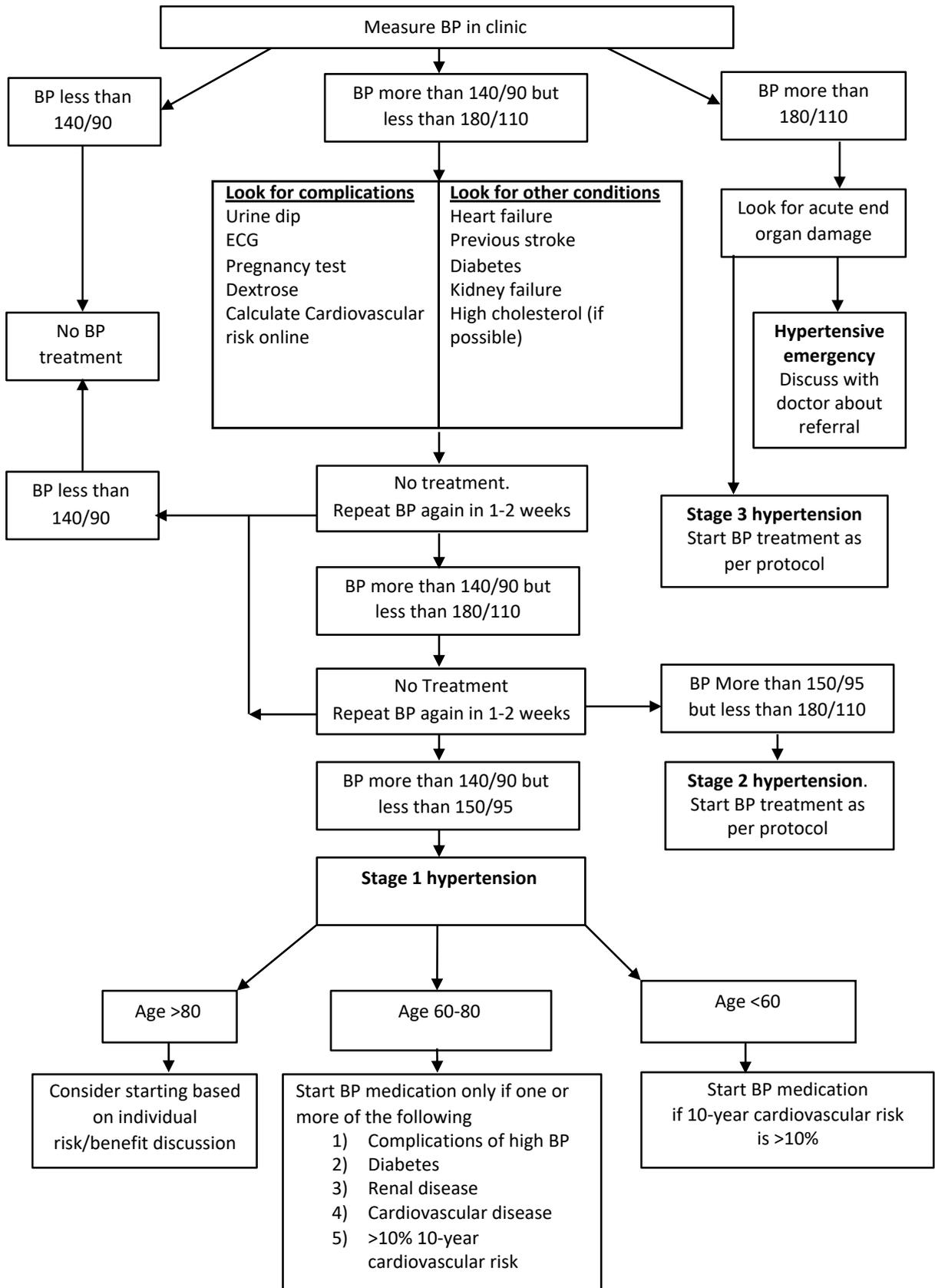
Treatment:

If possible give the patient **furosemide** 20mg PO before referral
 Aim for 25% BP decrease in first few hours then more slow decrease afterwards
 If cannot refer discuss risks of complication with patient. They need IV BP treatment.
 We can only give oral BP treatment at SMRU

****Note:** if suspect patient has had a stroke do not lower blood pressure. This can make stroke worse. Discuss with doctor**

Many high BP medicines are not available at SMRU.
 ACE inhibitors (i.e. enalapril, lisinopril) are first line treatment for patients <55 years old. ACE inhibitors can cause kidney malformation in the fetus, so only give with family planning.
 Calcium channel blockers (i.e **long-acting** diltiazem/nifedipine, amlodipine) are first line for >55 years old.

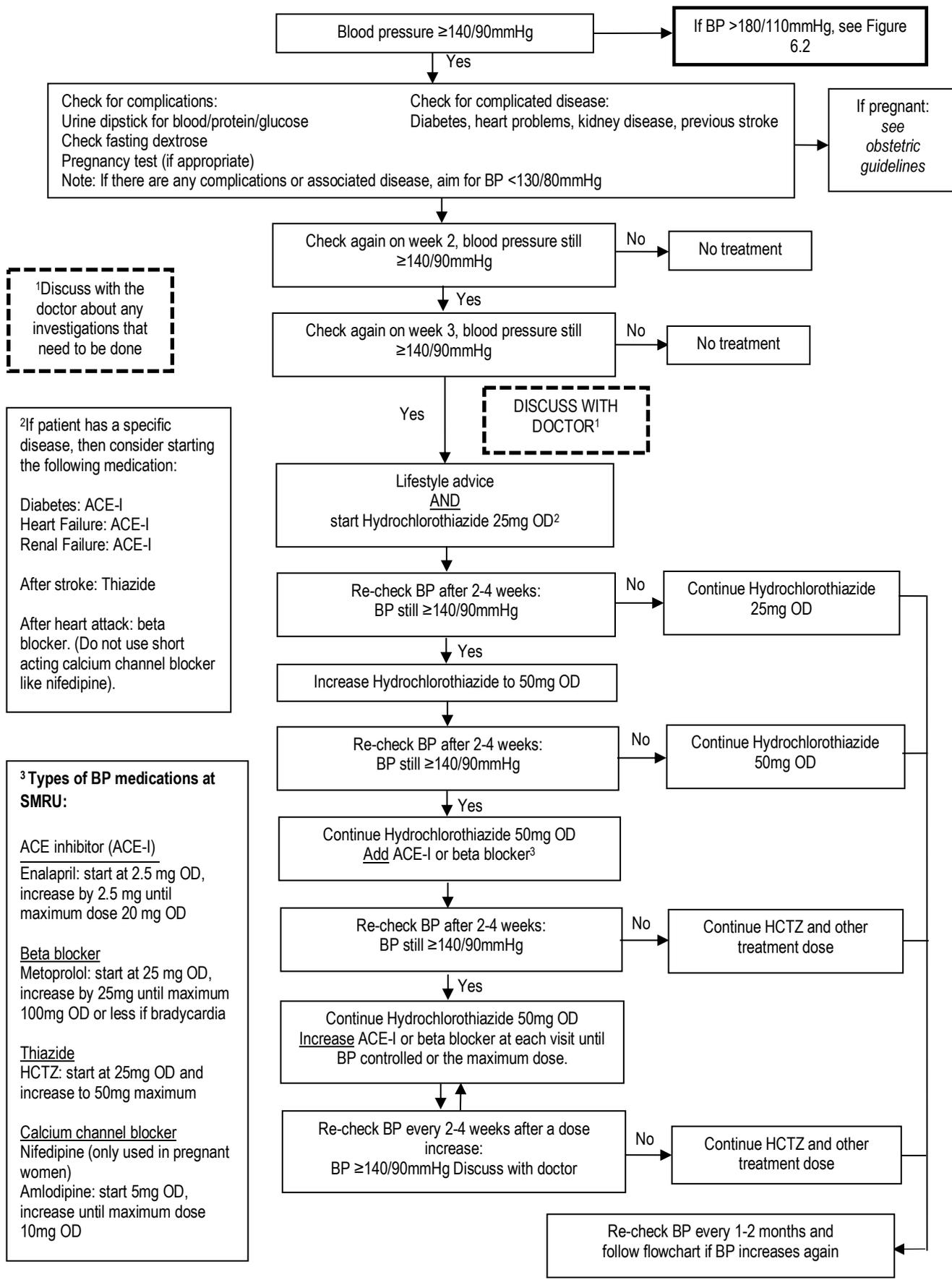
Figure 6.3 BP treatment decision aid (based on NICE clinical guidelines)^{*new}



* Aspirin may not benefit patients with low cardiovascular risk because of the risk of bleeding. The benefit of aspirin is higher if patients have known cardiovascular disease. Consider aspirin for the patient case by case.

Figure 6.4 BP medication protocol for SMRU*^{update}

Other drugs like ace inhibitors and long acting calcium channel blockers are better treatments for high BP but are more expensive. See *Appendix 11* for a different BP medication guideline that can be used if other drugs are available.



¹Discuss with the doctor about any investigations that need to be done

²If patient has a specific disease, then consider starting the following medication:

Diabetes: ACE-I
Heart Failure: ACE-I
Renal Failure: ACE-I

After stroke: Thiazide

After heart attack: beta blocker. (Do not use short acting calcium channel blocker like nifedipine).

³Types of BP medications at SMRU:

ACE inhibitor (ACE-I)
Enalapril: start at 2.5 mg OD, increase by 2.5 mg until maximum dose 20 mg OD

Beta blocker
Metoprolol: start at 25 mg OD, increase by 25mg until maximum 100mg OD or less if bradycardia

Thiazide
HCTZ: start at 25mg OD and increase to 50mg maximum

Calcium channel blocker
Nifedipine (only used in pregnant women)
Amlodipine: start 5mg OD, increase until maximum dose 10mg OD

6.2 ISCHAEMIC HEART DISEASE

DEFINITION

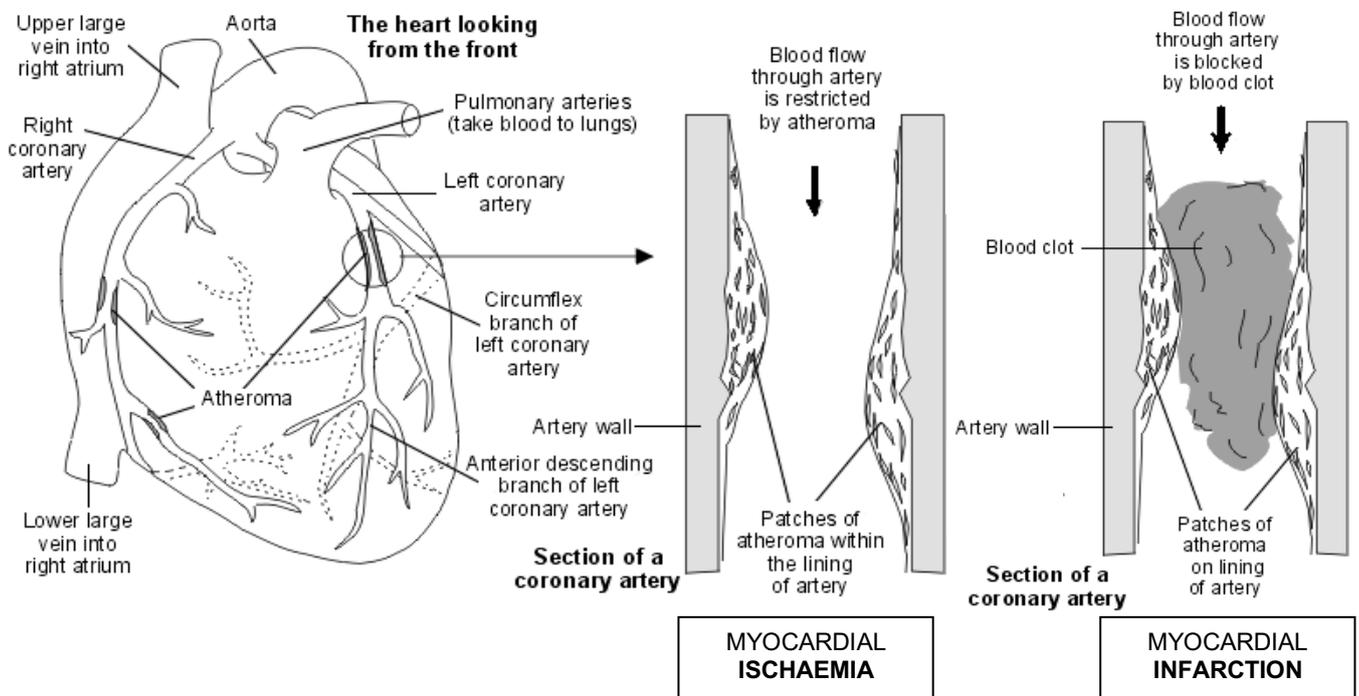
The heart is a muscle which has an important role in pumping blood around the body to make sure that the organs in the body have a good supply of oxygen and remove any waste products. The muscle of the heart is supplied with blood by the coronary arteries, which go around the heart. When there is a problem with the blood supply to the heart the lack of oxygen means that the muscle cannot function normally. The main symptom of this is chest pain.

There are two conditions where this happens: myocardial infarction and Ischaemia.

Infarction (myocardial infarction) = *heart attack*. This is an **EMERGENCY**. Part of the heart muscle has died due to a lack of blood supply e.g. from a clot.

Ischaemia (ischaemic heart disease) lack of blood supply causing pain but not muscle death = *angina*. Poor oxygen supply to the heart muscle due to a narrowing of the arteries in the heart.

Figure 6.5 Anatomy of the coronary arteries



RISK FACTORS

Risk factors are the same for a heart attack and angina

- Smoking
- Obesity
- Family History
- Diabetes
- High BP
- Lack of exercise
- High stress
- High cholesterol
- Age
- Male

6.2.1. MYOCARDIAL INFARCTION

DEFINITION

Heart attack (also known as myocardial infarction (MI)) is when there is a complete blockage (e.g. from a clot) to the blood supply to the heart causing part of the heart muscle to die. After a heart attack the dead tissue is replaced by scar tissue so the heart cannot pump as well.

SIGNS AND SYMPTOMS

- Severe sudden onset central or left sided chest pain that may radiate to the left arm or neck that lasts for more than approximately 15 minutes.
- Pain is heavy or dull
- Associated with nausea, sweating, shortness of breath.

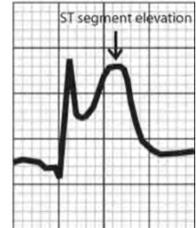
DIAGNOSIS

Clinical

There is a specific blood test (troponin) released by the heart that shows that there is damage to the muscle. This may not be available.

ECG can show ST elevation or depression. Sometimes, the ST segment is normal during an MI.

Figure 6.6 ST segment elevation



TREATMENT

- This is an emergency.
- Chew **aspirin tablet 300mg PO STAT**.
- **Refer immediately to hospital if possible** – this patient needs stronger drugs to break down the clot and may need surgery to open up the arteries.

6.2.2. ANGINA

DEFINITION

Angina is when there is chest pain due to a narrowing of the arteries in the heart, often due to atheroma (fatty patches). This means that there is not enough supply of oxygen to the heart muscle (ischemic heart disease) and this causes chest pain. Patients with angina are at higher risk of having a heart attack (see above). Angina can be stable or unstable (high risk of turning into a heart attack). For risk factors see above.

SYMPTOMS

The patient will complain of chest pain. It is important to classify the angina:

1. **Stable Angina:** chest pain (left or central chest) that comes on with exercise and stops when you sit down/stop exercising.
2. **Unstable Angina:** chest pain (left or central chest) that happens at rest – **This is at very high risk of developing into a heart attack.**

DIAGNOSIS

Clinical

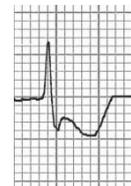
TREATMENT

Lifestyle:

Advise patients to:

- Eat less salt.
- Avoid fatty foods / Eat more vegetables and fruit.
- Lose weight if overweight or obese.
- Alcohol: Advise the patient to stop or if unable to stop at least to reduce.
- Smoking: Advise the patient to stop or if unable to stop at least to reduce.
- Exercise at least 30 minutes most days of the week.

Figure 6.7 ST segment depression



Medications:

Discuss with the doctor about what treatment is appropriate for each case.

If unstable angina discuss with doctor about referral to hospital because there is a high risk of developing heart attack.

Treatments to be considered are:

- **Aspirin** 75-100mg/day (with **anti-ulcer drug** to protect the stomach): makes platelets less sticky so they do not stick to the blood vessel wall and make plaques which block blood flow to the heart. If the patient has a risk for bleeding (haemorrhagic stroke, varices, epistaxis, rectal bleeding), aspirin may cause bleeding so do not use.
- Beta-blocker e.g. **metoprolol**: increase the force and rate of the heart pumping.
- ACE-Inhibitor e.g. **enalapril**: prevent a build-up of fluid.
- Nitrates e.g. **isosorbide mononitrate**: relaxes blood vessels to allow good blood flow to heart muscle.
- Treat underlying diseases like hypertension or diabetes mellitus

6.3 HEART FAILURE

DEFINITION

Heart failure occurs when the heart fails to pump enough blood and provide enough oxygen or energy to the organs. In cases where there is doubt about the diagnosis, response to a therapeutic trial will make the diagnosis clear. Heart failure can be chronic and come on slowly or can be acute and present as an emergency. The two sides of the heart can be affected together or separately (left sided or right sided heart failure). Both have different symptoms.

SIGNS AND SYMPTOMS

Chronic Heart Failure:

Left sided heart failure:

Breathing difficulties when exercising, which get progressively worse, until difficulties are experienced even when at rest.

Difficult breathing when lying on the back. The patient uses more pillows to sleep (orthopnoea).

Dry cough mainly at night +/- pink frothy sputum.

Crackles (crepitations at lung bases).

Right sided heart failure:

Abdominal pain, anorexia, nausea, bloating

Jugular vein distension

Hepatomegaly (enlarged liver) sometimes painful

Lower leg oedema, or lower back oedema if lying flat

Acute Heart Failure: (may not have all symptoms)

- Sudden worsening of breathing or cough
- Increased JVP
- Lots of creps bilaterally
- More oedema
- Low SpO₂, fast RR
- Cannot breathe when lying flat
- May have history of heart failure (or symptoms of heart failure)

Also do not forget to ask about:

- Alcohol/drug use
- Diet (check for B1 deficiency)
- History of chest pain/palpitations

CAUSES

Common causes of heart failure:

1. Hypertension **Check BP**
2. Anaemia **Check Hct/Hb**
3. Beriberi (Vitamin B1 deficiency)
4. Hyperthyroidism **Check lab TSH**
5. Alcohol, drug addiction
6. Myocardial infarction (heart attack) **Check ECG**
7. Arrhythmia (irregular heartbeat) **Check ECG**
8. Congenital heart disease
9. Valvular disease (heart valves too tight or loose)
10. Rheumatic heart fever **Check ASO titre**

INVESTIGATIONS

- For all patients check: Hct, BP, ECG, fasting dextrose, and thyroid tests if available.
- A blood test called BNP and an echocardiogram (ultrasound of the heart) can confirm the diagnosis of heart failure but these tests may not be available.
- You need to diagnose from symptoms and clinical exam.
- An improvement of symptoms with treatment also helps to confirm the diagnosis.
- If not sure if breathing problems are due to other causes then a Chest X-ray may help you, discuss with the doctor to see if appropriate.

TREATMENT

ACUTE HEART FAILURE

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment (see p.13) should be done. You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step**

Figure 6.8 DRS ABCDE for acute heart failure

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR ACUTE HEART FAILURE
DRS	Danger Response Send for help	Gloves Safe place Call for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Oxygen
B	RR, SpO2, cyanosis Chest indrawing/ tracheal tug Listen to chest	Salbutamol or Adrenaline nebulisers if wheeze **Caution: increased heart rate can worsen heart failure** Position patient: If dyspnoea sit up right
C	HR, BP, Cap refill Urine output, Temp Listen to HS	IV cannula (biggest size possible 16G or 18G) Take bloods e.g. Hct, Creatinine, BUN, CBC, MS, dextrose etc. **If signs of heart failure DO NOT GIVE FLUID BOLUS** Insert catheter and monitor fluid balance (fluid IN/OUT) every hour
D	Check dextrose Seizures Pain	Give diuretics e.g. furosemide IV Adults: 40mg Child: 1mg/kg (max 40mg) Repeat the same dose after 30 minutes if no improvement/has not passed urine. Discuss repeat doses with doctor. Consider vitamin B1 100mg IM injection Give digoxin PO only if atrial fibrillation on ECG (irregular pulse >120 per minute)
E	GCS/BCS/AVPU Expose and examine	History, further investigations, treatment plan
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

A treatment dose of **vitamin B1 100mg IM** should be considered. In this area vitamin B1 deficiency is relatively common. Diet advice or vitamin B1 tablets should be given to prevent Beriberi, especially in alcoholics and heart failure patients.

Once the patient is becoming stable, look for the cause of the acute episode and treat it.

Post Emergency Treatment:

Bed rest.
Encourage patient to quit smoking
Weigh every day in IPD, monitor fluid input and output
Continue **furosemide** PO daily
Adjust dose to weight and blood pressure

If oedema still continues consider adding another diuretic e.g. **hydrochlorothiazide**.
If patient on beta blockers e.g. **metoprolol** **do not give when in acute heart failure** Re-start when acute attack better.
If available, start treatment with **enalapril**.
If available start **spironolactone** before discharge

CHRONIC HEART FAILURE

Assessment:

Most of the time, acute heart failure is a complication of a chronic condition. Remember that in the early stages of the disease, the patient will feel OK most of the time. He/she may consider night cough to be bronchitis or lower leg oedema as nothing serious. Once you have made the diagnosis of chronic heart failure you must see the patient regularly (at least monthly) as they will need life-long treatment and care.

Make a detailed clinical exam:

Check heart sounds: listen for new murmur or gallop and compare to previous heart sounds in lemma.

Check BP, pulse, SpO₂, weight.

LHF signs: crackles in lungs. RHF signs: oedema, jugular veins enlarged, enlarged and painful liver.

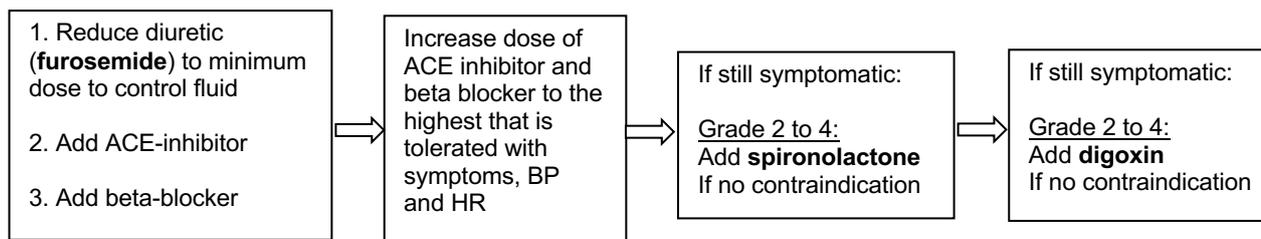
Grade the dyspnoea following the International American Heart Association:

- Grade 1: **no symptoms**
- Grade 2: **dyspnoea for major efforts** (describe the activity which caused the dyspnoea)
- Grade 3: **dyspnoea for minor efforts** (how many meters can the patient walk or how many kilos can they carry before feels dyspnoea?)
- Grade 4: **symptoms at rest** (shortness of breath even when doing nothing)

Furosemide will make the patient feel better but will not increase how long they live but
ACE-I, spironolactone and beta blocker will increase the patient's life

Treatment:

1. Lifestyle advice: stop smoking, lose weight, low salt, healthy diet, decrease/stop alcohol and drugs.
2. Restrict fluid intake e.g. 1.5L/day.
3. Check baseline renal function and discuss with doctor if abnormal.
4. Diuretics e.g. **furosemide** to remove the fluid and improve symptoms – **check electrolytes 2 weeks after starting** and re-check depending on case by case (discuss with doctor).
5. Add ACE-I e.g. **enalapril, lisinopril or captopril**.
6. If no contraindications add cardio-selective beta blocker e.g. **atenolol, metoprolol, or carvedilol**.
7. If still grade 2-4 add **spironolactone**. This can improve the patient outcome.
8. If still grade 2-4 consider adding **digoxin**. This can improve how the patient feels.



CARDIAC MEDICATIONS (you may need to use alternative treatments if these drugs are not available)

1. **Furosemide:** start 40mg PO OD, maintenance 20-40mg, if resistant oedema 80-120mg daily.
2. **Enalapril:** start with 2.5mg OD for 2 weeks, increase the dose every 2 weeks to aim for 10-20mg BID if tolerates (max 20mg BID) (**Note:** enalapril OD for High BP and BID for heart failure) monitor BP closely when giving with furosemide. If enalapril is not available, you should use another ACE-I, but the drug doses will be different.
3. **Metoprolol:** Start at 25mg OD, increase to 50mg BID if HR and BP allow. Monitor HR closely. Do not give if patient has asthma. If metoprolol is not available, you can use atenolol or carvedilol but beta blockers other than these 3 should not be used. Not all beta blocker drugs have the same activity so different beta blocker drugs will be used for different diseases (e.g propranolol for portal hypertension but not for heart failure)
4. **Spironolactone:** if on ACE-I start at 12.5mg, normal maintenance dose 50mg, (if not on ACE-I start 50mg, maintenance dose 100-200mg).
5. **Digoxin:** For heart failure **start** 62.5-125mcg OD (elderly start at 62.5mcg); for atrial fibrillation: 750mcg-1000mcg over 24hrs (given in divided dosages) then maintenance 125-250mcg. Digoxin can cause severe side effects so be very careful when using this drug, especially if there is renal failure.

When to change the treatment? Discuss with doctor if you are not sure.

- **If the weight is increasing and oedema is appearing:** Increase the treatment or add new drug.
- **If the grade of the dyspnoea is rising:** Increase the treatment or add new drug.
- **If the BP is getting low (SBP <90mmHg):** decrease diuretic treatment and/or **enalapril**.
- **If you find digoxin intoxication signs:** stop digoxin for a few days and when signs have disappeared start again with lower dose. Signs of digoxin intoxication are confusion, irregular pulse, decreased appetite, nausea, vomiting, diarrhoea (GI disturbance), hyperkalaemia and life-threatening dysrhythmias with very fast heart beat.
- **High risk for digoxin toxicity** more likely in elderly and patients with renal impairment
- **If there is hyperkalaemia:** stop the enalapril and spironolactone.
- If the patient is improving or stable: **do not reduce the dose** of medication.

PREVENTION

Encourage patients to change their lifestyle. Give aspirin if there was a heart attack. Give all patients diet advice and vitamin B1 supplementation.

6.4 RHEUMATIC FEVER

DEFINITION

Rheumatic fever is an inflammatory disease which sometimes follows a *group A Streptococcus* pharyngeal infection. It follows pharyngitis / tonsillitis by 2 to 6 weeks (average 20 days). It is most common in children between 5 and 15 years old. Only 2% of people who have a *Streptococcus* pharyngitis (non-treated or not well treated) will develop rheumatic fever.

SIGNS AND SYMPTOMS

Rheumatic fever affects four sites (joints, heart, central nervous system and skin) and during an attack the patient can have any combinations of these symptoms: **J** ♥ **N E S** (**J** - joints (arthritis), ♥ - cardiac, **N** – nodules, **E** – erythema marginatum, **S** – sydenham chorea: see below for Jones criteria). It is very rare to see patients with acute rheumatic fever. Usually by the time they come to hospital the fever has ended but they present because of symptoms due to permanent damage to the heart valves. They may remember the symptoms of the acute rheumatic fever (maybe months or years before) so it is important to ask their medical history.

Inflammation of more than one joint (**poly-arthritis**), especially the larger joints (knees, ankles, elbows, wrists)

Pain and inflammation 'travel' from one joint to another (**migratory arthritis**). It is more common in adult patients. There may be only pain, or sometimes swelling, redness, tenderness. No deformity

Heart murmur

Congestive cardiac failure, enlarged heart

Pericardial rub

Chorea: rapid, involuntary, uncoordinated movements (especially of head, face, hands and feet), which disappear during sleep

Nodules under the skin: small (few millimetres to 2cm), mobile and painless nodules especially over bony surfaces and tendons (near the elbows, knees, wrists, ankles, over Achilles tendons, vertebrae)

Erythema marginatum: non-itchy, non-painful rash with a raised edge and clear centre, especially on trunk, thighs and arms. The lesions change frequently

Other symptoms: There can also be fever, abdominal pain, nose bleed or arthralgia (joint pain).

DIAGNOSIS

There is no one single symptom, sign or investigation which is characteristic of rheumatic fever.

Here, the diagnosis is based on the 'Revised Jones Criteria'. This has 3 parts:

1) Evidence of recent Streptococcal infection

- Increase in anti-streptolysin O (ASO) titre
- Positive throat culture for group A beta-haemolytic streptococcus

2) Major criteria:

- Heart symptoms as above: carditis
- Polyarthritis
- Chorea
- Subcutaneous nodules
- Erythema marginatum

3) Minor criteria

- Arthralgia
- Fever
- Increased CRP
- Previous rheumatic heart disease or rheumatic fever
- Prolonged P-R interval on ECG (if available)

To make a **diagnosis of rheumatic fever** there must be:

- 1) Evidence of a recent streptococcal infection AND 2 major criteria,
OR
- 2) Evidence of a recent streptococcal infection AND 1 major criteria and 2 minor criteria.

DISEASE COURSE

The average course of an attack is about 3 months. Less than 5% of the attacks are longer than 6 months.

COMPLICATIONS

Reactivation of rheumatic fever (5-50%).

Chronic rheumatic heart disease (deformity of one or more heart valves). This is the only long-term problem of rheumatic fever. If severe enough, this can lead to chronic heart failure. Chronic rheumatic heart disease usually has no symptoms for years or decades after the initial episode of rheumatic fever.

Death from congestive heart failure.

TREATMENT

- Bed rest for 2 weeks

Benzathine benzylpenicillin

Child: 50,000 IU/kg IM STAT (max 1.2 million IU)
Adult: 1.2 million IU IM STAT

If benzathine penicillin is not available give **penicillin V** 500mg QID or 15mg/kg QID for 10 days. If your patient is allergic to penicillin, give **erythromycin** 2g or 50mg/kg divided TID for 10 days.

Aspirin 50-100mg/kg/day until all symptoms have gone:

Decrease dose if side-effects occur: ototoxicity, hyperventilation, abdominal problems.

Prednisolone

Treat with prednisolone if there are signs of cardiac problems or if aspirin is not enough to control the joint inflammation:

Child: 1-2mg/kg OD for 2-3 weeks, then slowly decrease over 4 weeks.

Adult: 60-120mg OD for 2-3 weeks, then slowly decrease over 4 weeks.

It may be helpful to use CRP or ESR to guide when you should start to decrease.

When decreasing continue aspirin for 2-3 weeks after stopping prednisolone to avoid a relapse.

Consider giving **omeprazole** 20mg OD with the prednisolone to protect the stomach lining.

For **Chorea**: Rest

Diazepam or **phenobarbital**.

Treat **heart failure** if the patient has symptoms.

PREVENTION (= PROPHYLAXIS)

Primary prevention (primary prophylaxis): To prevent development of acute rheumatic fever:

All patients with suspected streptococcal tonsillitis should be treated with PO Penicillin V for a full **10-day course** or a single IM **benzathine penicillin** dose. For treatment in PCN allergy, see *tonsillitis*, p.229.

Secondary prevention (secondary prophylaxis): To prevent recurrent attacks (reactivation):

All patients who had one attack of rheumatic fever should receive IM **benzathine penicillin** (same dose as treatment) every 4 weeks.

How long to continue giving benzathine penicillin every 4 weeks?

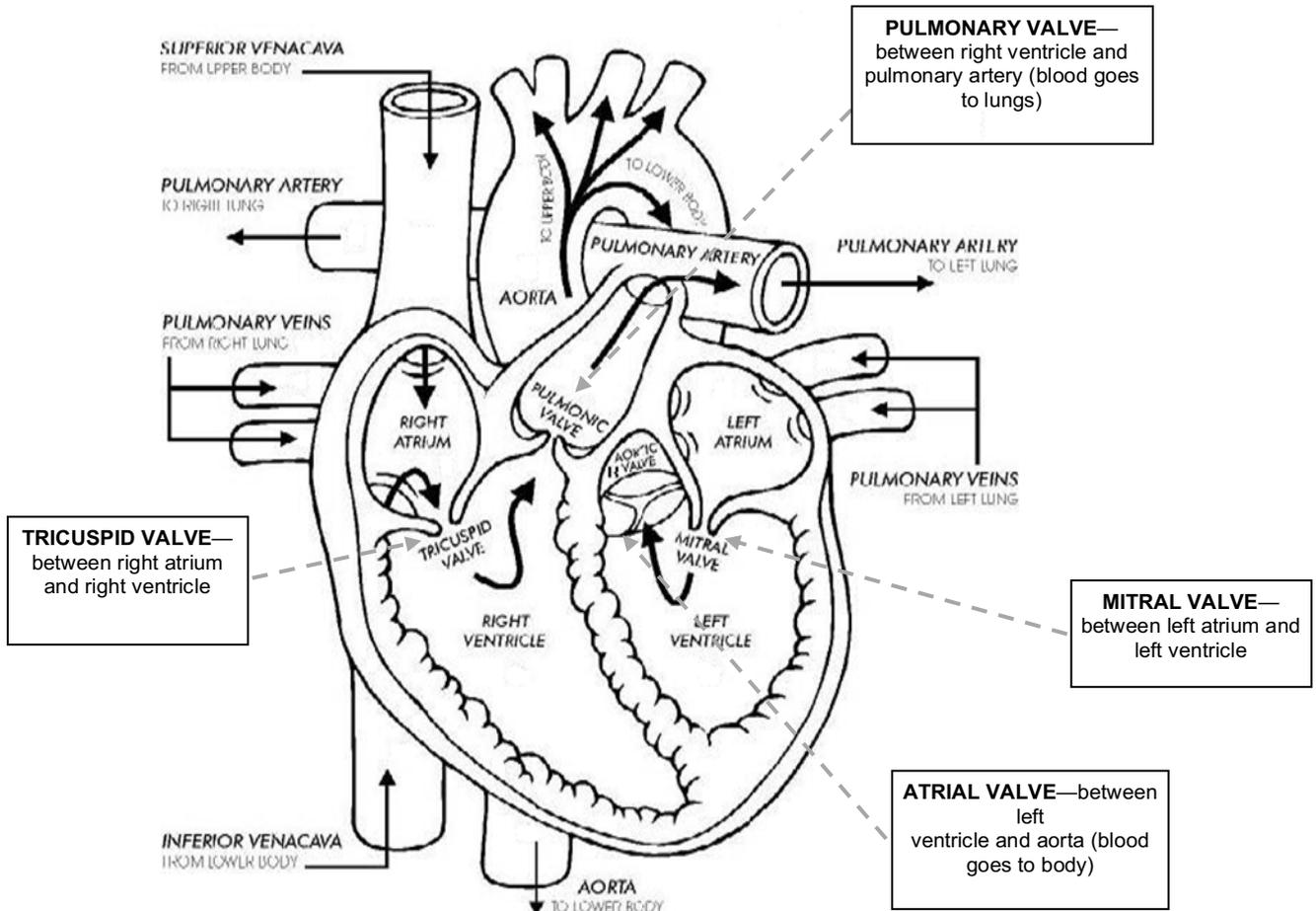
There is no agreement about how long the secondary prophylaxis should be continued. Most guidelines advise continuing at least until the patient is 21 years old and at least 5 years after an acute attack. Some books advise continuing prophylaxis for life if there was heart involvement.

6.4.1. VALVULAR HEART DISEASE

ANATOMY

The heart has 4 chambers – right and left atrium at the top and right and left ventricle at the bottom. Valves connect the chambers and the major blood vessels. The picture below shows the direction of the blood flow of the blood through the heart by the black arrows.

Figure 6.9 Anatomy of the heart



DEFINITION

The valves in the heart can have problems if they are too stiff and block blood flow (**stenosis**) or if they leak (**regurgitation**) meaning that the heart has to pump harder which can lead to heart failure.

CAUSES

1. Congenital abnormalities
2. Infections e.g. Rheumatic fever, endocarditis, syphilis
3. Heart Disease e.g. Angina (ischaemic heart disease), high BP, cardiomyopathy

SYMPTOMS

- Difficult/fast breathing
- Tiredness
- Dizziness
- Chest pain/angina
- Palpitations
- Symptoms of heart failure: oedema, orthopnoea, frothy pink sputum
- Children/infant: poor feeding, sweating, poor weight gain, chest indrawing
- Aortic stenosis: sudden collapse during exercise

DIAGNOSIS

Clinical:

Listen to the heart sounds:

Normal Heart Sounds:

If the heart is normal, when you listen to the heart sounds there should be two separate sounds:

- Normal First heart sound: Caused by mitral and tricuspid valves closing
- Normal Second heart sound: Caused by pulmonary and aortic valves closing

Systole: the period between the first and second heart sounds

- **Systolic murmur:** Murmur heard during systole. Can be caused by **aortic/pulmonary stenosis, mitral/tricuspid regurgitation, or VSD**

Diastole: the period after the second heart sound before the first heart sound

- **Diastolic murmur:** Murmur heard during diastole. Can be caused by **mitral/tricuspid stenosis or aortic/pulmonary regurgitation**

Examine for heart failure e.g. oedema, raised JVP, crepitations both bases, raised RR, low SpO₂, cyanosis

Echocardiogram (heart ultrasound): Is the only definitive way of knowing if there is a problem with the valve.

TREATMENT

Often a valve that is not working needs surgery to replace it. If possible refer to hospital for further management.

Complications of valvular heart disease are congestive heart failure, endocarditis, and heart failure during pregnancy.

6.5 INFECTIVE ENDOCARDITIS

DEFINITION

Infection of the heart which can lead to damage to one of the valves of the heart and lead to complications such as sepsis and death. Infective endocarditis can have a slow onset (subacute endocarditis) or come on quickly (acute endocarditis).

CAUSES

Bacterial cause is most common (most common bacteria is *Staphylococcus aureus*)

- Fungal e.g. candida (more common in immunosuppressed patients)
- Viral (uncommon)

RISK FACTORS

1. Immunosuppressed e.g. HIV, malnutrition, diabetes
2. Intravenous drug use
3. Artificial heart valves
4. Abnormalities of the heart
5. Dental disease

SIGNS AND SYMPTOMS

Think about infective endocarditis if there is a fever of unknown cause (fever DK), and there is a murmur (especially if you know it is a new murmur e.g. not previously written in lemma) and if there are risk factors.

Often symptoms are non-specific:

- New murmur on auscultation
- Fever
- Chills
- Headache
- Muscle pain
- Splinter haemorrhage under nails
- Blood in urine (glomerulonephritis)
- Weight loss
- Shortness of breath
- Cough
- Night sweats
- Joint pains
- Osler nodes/Janeway lesions (bruises on palms and soles of feet)

DIAGNOSIS

Blood cultures should be taken when the patient has fever. Take from 3 different sites at 3 different times.

Echo shows 'vegetation' (lump/cluster of bacteria attached to heart valve).

TREATMENT

- Antibiotics (for many weeks) e.g. IV ampicillin (4 weeks) and gentamicin (2 weeks). Discuss with the doctor about which antibiotics to use. This will depend on the likely organism and also depends on the risk factors.
- If possible, repeat blood cultures so you know when the bacteria is not in the blood anymore. This will help to decide how long to give IV treatment. Do not use oral treatment for infective endocarditis because the drug concentration will not be high enough to treat the heart valves.
- Surgery may be needed.
- If possible do frequent ECGs to monitor for any damage to the heart.

6.6 PALPITATIONS*NEW

To understand this chapter, you may need to ask a doctor for help. It is provided as short and easy to use guide for general clinicians in the SMRU OPD where ECG is available.

DEFINITION

A palpitation is the feeling of an abnormally strong or fast heartbeat. This is a common complaint in patients.

CAUSES

- Abnormal fast rhythms of the heart
- Congenital heart disease
- Anaemia
- Thyroid problems
- Anxiety or harmless extra beats of the heart.

SIGNS AND SYMPTOMS

Palpitations can come and go. You will need to take a careful history. Ask the following questions:

- When the symptoms started
- How often the palpitations occur
- What makes the palpitations worse or better
- Medication history, alcohol and caffeine use, and smoking

Complications from palpitations:

- Loss of consciousness
- Chest pain
- Difficulty breathing

Risk factors:

- Diabetes
- High BP
- Previous stroke or heart attack
- Kidney disease
- Smoking or alcohol use

DIAGNOSIS

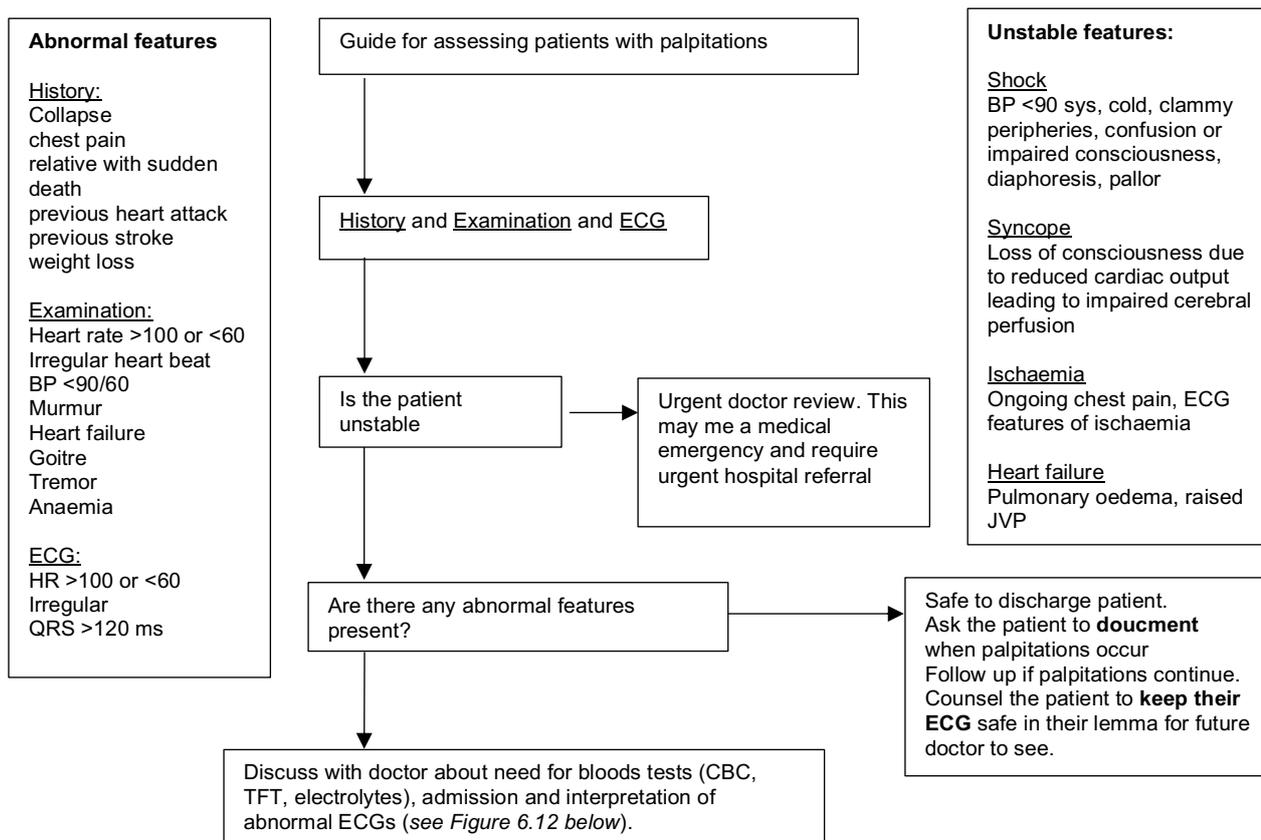
1. Do a careful physical examination. Look for harmful causes of palpitations (see *Figure 6.11, next page*).

Figure 6.10 ABCDE approach for causes of palpitations

A	Normal
B	Hypoxia Basal crepitations
C	Pulse rate (count pulse for 1 minute) Determine if pulse is regular or irregular Blood pressure Peripheral perfusion (Cool and clammy peripheries, capillary refill time) Auscultation for heart murmurs Raised jugular venous pressure (JVP)
D	Cerebral perfusion – new confusion, altered GCS Blood glucose
E	Peripheral oedema Tremor Goitre Anaemia

2. ECG – best way to diagnose heart dysrhythmia or tachycardia. It can be normal if the patient is not having palpitations during the ECG. Try to repeat the ECG when the patient has palpitations.
3. Investigations
 - CBC: look for anaemia
 - Thyroid function tests: Hyper and hypothyroidism can cause palpitations
 - Serum electrolytes (sodium, potassium, magnesium)
 - If possible, echocardiogram: especially if heart murmur is heard on examination

Figure 6.11 How to diagnose and manage patients with palpitations*^{new}



TREATMENT

The management of tachycardia depends on the type of tachycardia diagnosed on ECG (see Figure 6.12 below). These treatment options are in the SMRU medical guidelines for your information. Most of the treatments are not available at SMRU, but we do have some treatments that may help the patient.

Figure 6.12 Classification of tachycardia*^{new}

QRS duration	Regular RR interval	Irregular RR interval
<120 ms (narrow)	<ol style="list-style-type: none"> 1. Sinus tachycardia 2. AVNRT (AV node re-entry tachycardia) 3. AVRT (AV re-entry tachycardia) 4. Atrial flutter with regular AV block 	<ol style="list-style-type: none"> 1. Atrial fibrillation (AF) 2. Atrial flutter with variable AV conduction block
>120 ms (broad)	<ol style="list-style-type: none"> 1. Ventricular tachycardia (VT) 2. Super-ventricular tachycardia with bundle branch block 	<ol style="list-style-type: none"> 1. Ventricular fibrillation 2. AF with pre-excitation 3. AF with bundle branch block 4. Polymorphic VT

The letters (A-D) and numbers (1-4) listed below also refer to Figure 6.12

A. Regular RR interval narrow complex tachycardia

1. Sinus tachycardia:

- This is not an arrhythmia.
- Treat underlying cause (pain, anxiety, shock, sepsis, anaemia, thyroid disorder, etc.)

2-4. Non-sinus narrow complex tachycardias (AVRT, AVNRT, Atrial flutter with regular AV block)

- Start with vagal manoeuvres
 - Try blow into and inflate a syringe or balloon
 - Carotid sinus massage with doctor supervision. DO NOT PERFORM IN CHILDREN.
- If vagal manoeuvres fail give **IV adenosine**, if available
 - **Only do with ECG monitoring and DCCV (Direct current cardioversion) facilities** available because there is risk of causing heart block and death
 - Start with 6mg IV
 - Repeat with 12mg IV if heart rhythm is still tachycardia
- If adenosine is not available give **metoprolol PO 50-100mg STAT**
 - Repeat metoprolol if there is no effect by 2 hours.
- If medical management fails discuss about referral for DCCV

B. Irregular narrow complex tachycardia

1-2. Atrial fibrillation or atrial flutter:

- Treat causes of AF (sepsis, heart failure, electrolyte abnormalities (especially potassium and magnesium))
- Rate control
 - **Beta-blockers** or **calcium channel blockers**
 - **Metoprolol:** initial dose 50mg, increase to 150mg BID depending BP and heart rate
 - Try to keep heart rate of <110 bpm
 - If have heart failure or hypotension, consider **digoxin**. Digoxin can cause severe side effects so be very careful, especially if there is renal failure
- These patients are at risk for blood clots forming in the heart and need life-long anti-coagulation treatment. The risk of anti-coagulation treatment is bleeding. Consider the risk and benefit for each patient before referral.

C. Regular broad complex tachycardia

1. Monomorphic Ventricular tachycardia (VT)

- Refer

2. Supraventricular tachycardia with bundle branch block:

- Follow treatment for regular narrow complex tachycardia
- **Note:** if not sure of diagnosis, then treat like monomorphic VT and refer

D. Irregular broad complex tachycardia

1. Ventricular fibrillation (VF)

- VF will cause death
- Start cardiac arrest management (see p.13)

2. AF with pre-excitation

- There is high risk to become VF
- Refer

3. AF with bundle branch block

- Treat as AF (see above)
- **Note:** if not sure of diagnosis then treat like AF with pre-excitation and refer

4. Polymorphic VT (torsades de pointes)

- Refer

CHAPTER 7: DISEASES OF THE OROPHARYNX

7.1 NORMAL VARIATIONS OF THE OROPHARYNX^{*NEW}

See Appendix 1 for coloured photos.

7.2 DISEASES OF GUMS AND TEETH

The most common problems are infections in the tooth (dental caries) and inflammation of the gums (gingivitis). Both disorders are the result of lack of daily cleaning of teeth and gums and may eventually cause tooth loss.

Note: For most dental conditions it is important to seek trained help from a dentist. DENTAL CARIES

DEFINITION

Cavities in the tooth that can be complicated by local infections.

*For photo, see
Appendix 1*

RISK FACTORS

1. Sugar rich diet
2. Poor teeth strength because of low calcium and/or fluoride.
3. Infrequent or no teeth cleaning.

SIGNS AND SYMPTOMS

- Black colour and tooth erosion.
- Usually pain, especially when eating or drinking cold foods.

TREATMENT

In cases of constant pain, look for a specific source (tooth).

Treat the pain with **paracetamol**.

Treat any swelling with **ibuprofen** and antibiotics (**amoxicillin** and **metronidazole** or **clindamycin**). If swelling is reduced refer to dental team.

If there is no swelling but constant pain, refer to the dental team.

The most effective treatment is to fill the cavity OR to extract the tooth. Refer to trained dental team.

PREVENTION

Daily cleaning of the teeth and gums. Calcium intake and use of toothpaste with fluoride can help to make teeth stronger. Too much fluoride can cause irreversible tooth discolouration, so it is important that children do not swallow toothpaste

New guidelines: patients with heart problems **DO NOT** need antibiotic cover when having dental treatment

7.3 GUM DISEASES

*For photo, see
Appendix 1*

Gum diseases do not cause much pain, so people may not realise that there is a problem.

a) Gingivitis

DEFINITION Inflammation of the gums around the teeth. This is the most common oral disease.

SIGNS AND SYMPTOMS

Red and swollen gums, bleeding while brushing, bad mouth smell.

TREATMENT

Daily cleaning of teeth and gums.

Chlorhexidine 0.2% mouthwash or salt water mouthwash.

PREVENTION

Daily cleaning of teeth and gums.

Removal of calculus (dental plaque) by dental team.

b) Periodontitis

DEFINITION A bacterial infection of the supporting structures of the teeth.

SIGNS AND SYMPTOMS

Pain, fever, swelling of the gums and/or pus
Mobility of the infected tooth.

TREATMENT

Daily oral hygiene.

Oral **amoxicillin** and **metronidazole**

Extraction of the affected tooth.

PREVENTION

Daily cleaning of teeth and gums

Removal of calculus (dental plaque) by dental team.

7.4 STOMATITIS

For photo, see
Appendix 1

DEFINITION

A disorder of inflammation of the oral mucosa. It usually heals in about 10 days after starting treatment or removing the cause. Discuss with doctor if lesions do not disappear or return within 2 weeks, the patient may need investigation for immunodeficiency e.g. HIV.

SIGNS AND SYMPTOMS

- Pain with difficulty eating because of inflammation or ulcers in the mouth.
- Nausea, vomiting.

CAUSES OF STOMATITIS

1. **Fungal** e.g. candidiasis (oral thrush) white patches on tongue, inside cheek (may spread to pharynx) - occurs frequently in infants, malnourished children, diabetic patients and immunosuppressed patients e.g. HIV, cancer. Can also occur if patients who take steroid inhaler e.g. budesonide do not wash their mouth out after using inhaler.
2. **Viral** e.g. herpes stomatitis
3. **Vitamin Deficiencies** – especially if inflammation of corners of the mouth (angular stomatitis)
4. **Trauma**
5. **Systemic diseases**

TREATMENT

- Maintain feeding and hydration. When necessary use nasogastric tube.
- Treat according to the likely cause of the stomatitis:
 1. **Fungal infections:** like thrush (*Candidiasis*): **Nystatin** give 1 lozenge to be sucked QID for 7 days or 1ml of oral suspension (100,000 IU) QID for 7 days (total 400,000 IU per day). Oral suspension should be swilled around mouth and then swallowed.
 2. **Viral infections:** wash the mouth with **warm salty water** and treat with **gentian violet**. If there is secondary bacterial infection, wash mouth with **chlorhexidine 0.2%** and treat with **amoxicillin**.
 3. **Vitamin Deficiencies:** replace deficiencies (see p.215)

Note: Viral infections such as primary and secondary herpes should be treated with supportive care only and these are generally self-limiting, with a two week duration. Chlorhexidine and antibiotics do not help in viral infections and may complicate oral thrush.

PREVENTION

If taking corticosteroid inhaler e.g. budesonide advise to wash mouth out (take water in mouth and spit out water – do not swallow) after each use. Educate about good diet.

7.5 LOWER MOUTH AND NECK INFECTIONS*NEW

7.5.1. SUBMANDIBULAR SPACE INFECTION

DEFINITION

Bacterial cellulitis of the area below the tongue (submandibular and submaxillary area). This is also called Ludwig's angina. The infection is located at the floor of the mouth and can spread rapidly. It is bilateral.

SIGNS AND SYMPTOMS

- Fever and chills
- Mouth pain, painful swallowing, muffled voice
- Swelling of the tongue and submandibular area
- NO lymphadenopathy
- This can be life threatening if the airway is blocked (drooling, stridor, or cyanosis)

RISK FACTORS

1. Infection of dental caries
2. Trauma to the bottom of the mouth
3. Often patients have other diseases like HBP, diabetes or HIV

TREATMENT

- Refer immediately if the patient has stridor or respiratory distress
- Take CBC and blood cultures before starting antibiotics
- **Start treatment with IV antibiotics** (total antibiotics IV and PO is 2-3 weeks):
 - **Ceftriaxone PLUS Metronidazole**. Can use **clindamycin** in PCN allergic patients.

PREVENTION

Maintain good health of the teeth and gums by brushing teeth twice daily with fluoride toothpaste.

7.5.2. PERITONSILLAR ABSCESS

For photo, see
Appendix 1

DEFINITION

Abscess located along the outside of the tonsils. This may look similar to cellulitis of the tonsil and pharyngeal area.

SIGNS AND SYMPTOMS

- Severe sore throat and pain with swallowing
- Muffled voice
- Trismus (neck muscle spasm)
- Neck swelling and pain, pain in the ear on the same side as the abscess
- This can be life threatening if the airway is blocked (drooling, stridor, or cyanosis)

RISK FACTORS

1. Recent tonsillitis or pharyngitis

TREATMENT

- **Needle aspiration and drainage of the abscess is necessary.** If this is not available, the patient should be referred to the hospital. If the patient does not have respiratory distress, you can try to start antibiotics to see if there is improvement (especially if the diagnosis is cellulitis and not abscess).
- If severe, treat with **IV ampicillin** or **IV clindamycin**.
- If moderate, treat with oral **amoxicillin/clavulanate** or **clindamycin**.

7.5.3. RETROPHARYNGEAL ABSCESS

DEFINITION

Abscess located posterior to the pharynx. It can occur between the base of the skull to the mediastinum and it is not visible by physical examination.

SIGNS AND SYMPTOMS

- Fever
- Pain and/or difficulty with swallowing
- Muffled voice
- Neck stiffness, swelling, mass or lymphadenopathy
- This can be life threatening if the airway is blocked (drooling, stridor, or cyanosis)

DIAGNOSIS

- You may see swelling of the posterior pharyngeal wall (in the back of the throat and behind the tonsils), but this is probably not enough to make the diagnosis. If the abscess ruptures, the pus may enter the upper airway so do not palpate the area strongly.
- Diagnosis is made by X-ray of the lateral neck. Discuss with the doctor. (The space in front of the vertebra at C6 should be $\leq 14\text{mm}$ in children or $\leq 22\text{mm}$ in adults).

RISK FACTORS

1. More common from age 2-4 years but can occur at any age, including neonates.

TREATMENT

- Refer immediately if the patient has stridor or respiratory distress
- Consider referral for surgical drainage if the abscess is large ($\geq 2.5\text{cm}^2$, symptoms more than 2 days, or the patient is unstable. If the patient does not have airway obstruction, you can try IV antibiotics first.
- Take CBC and blood culture before starting antibiotics. If available, check a throat culture.
- If severe, treat with IV ampicillin or IV clindamycin.
- If moderate, treat with oral **amoxicillin/clavulanate** or **clindamycin**.
-

7.5.4. LYMPHADENITIS

DEFINITION

- Infection of the lymph nodes around the ears or neck region. Lymphadenitis may be caused by many things. It is important to take a good history.

SIGNS AND SYMPTOMS

- Warm, red or painful lymph nodes. They can be unilateral or bilateral. If the lymph nodes are very large ($>1\text{cm}$) consider other bacterial causes.
- Fever
- Look for skin lesions and dental health because this may help to determine the cause of lymphadenitis.

CAUSES OF LYMPHADENITIS (OR LYMPHADENOPATHY)

- Bacterial: The most common cause is *Staphylococcus aureus*. Other bacteria that commonly cause lymphadenitis are mycobacteria (TB), Group A streptococcus (like strep throat), or *Bartonella henselae* (cat scratch disease)
- Viral: Epstein-Barr virus (EBV), Herpes simplex virus
- Other: non-painful lymphadenopathy can be caused by cancer (lymphoma)

DIAGNOSIS

- The diagnosis of lymphadenitis is made clinically. Ultrasound can help to see if the lymph node contains fluid.
- Ask about immunisation status, ill contacts (e.g. viral infections or tuberculosis), exposure to animals. This can help determine the cause of lymphadenitis and what antibiotic to use.

TREATMENT

- In mild cases, no bloodwork is needed.
- If the patient appears unwell, take a CBC, CRP, and blood culture. Consider checking the patient for tuberculosis.
- Treat with Cloxacillin (oral or IV). Clindamycin is an alternative treatment in severe cases or if a patient has a PCN allergy.
- If there is no response to the above treatment, discuss with a doctor for advice on management.

7.6 PAROTITIS

See Causes and treatment of parotitis, p.174.

7.7 TRAUMA

7.7.1. TOOTH TRAUMA

DEFINITION

If a permanent tooth is knocked out it should be replaced (pushed back into the socket) as quickly as possible. Do not replace children's milk (primary) teeth that have been knocked out.

TREATMENT

Treat the pain with **paracetamol**.

Put permanent tooth back. Make sure that patient can close his mouth in normal position. If not, align the tooth in place. Advise the patient to avoid solid food for 2 weeks so must have soft food only.

7.7.2. TRAUMA TO THE ORAL MUCOSA

DEFINITION

Laceration of the oral mucosa or tongue

DIAGNOSIS

- Check for trauma to the teeth, base of the teeth (skull fracture), and facial or orbital bones.
- You should also look for foreign bodies.

TREATMENT

- If there is both tooth trauma and laceration, first treat the laceration. After the laceration is treated, then treat the tooth trauma.
- The oral mucosa is very vascular (a lot of blood flow) so any laceration of the tongue or oral mucosa will bleed a lot. This can cause respiratory distress or blocked airway. Refer immediately if there is respiratory distress or stridor or bleeding cannot be controlled.
- The mouth has salivary glands, parotid duct and other ducts. If there is clear fluid leaking in the mouth, there may be injury to the glands or ducts. If possible, refer immediately to a hospital. If possible, refer to a hospital where there is a specialist for mouth injuries.
- **Most oral lacerations do not need to be sutured.** They will heal well because of the high blood flow in the mouth.
- **Indications for suture:** lacerations > 2cm, presence of a flap of tissue that does not stay flat, or if food can become stuck inside the wound.
- Use absorbable suture for wound repair.
- To reduce inflammation after repair, the patient can put ice in the mouth. **Eat soft food until the wound is healed.**
- **After each meal and before bedtime, rinse the mouth with water.**
- Follow closely for signs of infection. The saliva and gums have a lot of bacteria.

CHAPTER 8: EAR DISEASE

8.1 OTITIS

DEFINITION

Otitis is an infection of the ear. There are two areas of the ear that can be affected:

1. Otitis Externa (outer ear)
2. Otitis Media (middle ear)
3. Labyrinthitis (inner ear) – usually viral and causes vertigo (not reviewed in this medical guideline)

Babies and small children cannot explain that they have ear pain. Check the ears each time they have fever, vomiting, crying, agitation or diarrhoea.

8.1.1. OTITIS EXTERNA

For photo, see Appendix 1

DEFINITION

Skin infection of the ear canal (the outer ear).

CAUSES

- Often no cause
- Trauma to ear canal
- Foreign body
- Skin disease e.g. eczema

SYMPTOMS

Pain or itching of ear

Ear feels full

May have discharge that is clear or pus

SIGNS

Ear canal is red, swollen

Ear drum: looks normal

Sometimes fungus in the external ear canal

Look for foreign body

TREATMENT

1. **If can see the ear drum well and there is no perforation:** clean the ears with **sterile water** or **NSS**, especially when there is pus or fluid.
2. **If cannot see the ear drum well: Dry mop the ear**
 - a. Educate the mother that is important to dry the ear.
 - b. Use a clean, absorbing cotton cloth or soft strong tissue paper for making a wick. Do **NOT** use a cotton-tipped applicator, a stick or paper because little pieces can fall in the ear and make the infection worse.
 - c. Place the wick in the child's ear until the wick is wet.
 - d. Replace the wet wick with a clean dry one.
 - e. Repeat these steps until the wick stays dry. Then the ear is dry.
 - f. Repeat this process 3 times per day; continue until the ear is dry.
3. Explain need to avoid getting the ear wet e.g. no swimming, be careful when washing
4. If a foreign body is present, do not push it with cotton, but clean gently with oil until it comes out (sometimes this will need to be repeated for 2-3 days).
5. Apply **cadexin** or other topical antibiotic drop with a cotton bud. Some ear drops, like cadexin, have steroids to decrease swelling. If not available, you can use **prednisolone** 20mg PO stat dose to decrease severe swelling.
6. Repeat this local treatment every day until cured (usually 3 to 5 days).
7. Treat the fever and the pain with **paracetamol**.
8. If no improvement after 5 days, give PO **cloxacillin**.
9. If it is difficult to clean the ear (especially with severe fungal infection) consider referral to an ENT specialist.

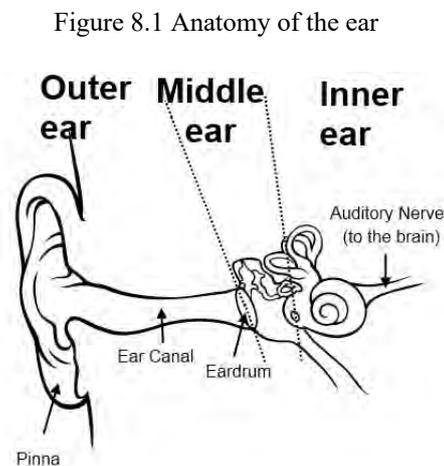


Figure 8.2 How to make wick for drying ears

8.1.2. LOCALISED OTITIS EXTERNA*^{NEW}

DEFINITION

A boil, furuncle or abscess at the entrance of the ear canal.

CAUSES

Infection of a hair follicle, gland or sebaceous cyst, most often from *Staphylococcus aureus*

SIGNS AND SYMPTOMS

- Pain
- Localised swelling or abscess
- Redness
- Pus from a perforated tympanic membrane can cause otitis externa

TREATMENT

1. Apply antiseptic ointment daily (gentian violet or povidone)
2. Incision and drainage of abscess
3. If the infection is severe, give cloxacillin PO or IV depending on the severity of infection
4. Use paracetamol or ibuprofen for pain control
5. Counsel the patient not to pick the ears with pins, toothpicks or fingernails. Avoid getting water into the ear.

8.1.3. ACUTE OTITIS MEDIA

For photo, see
Appendix 1

DEFINITION

Acute bacterial or viral infection of the middle ear (behind the ear drum). Not common in adults.

SIGNS AND SYMPTOMS

Rapid onset of severe pain (mostly at night), fever, ear discharge.

Ear drum: red, bulging (swollen), may be perforated with pus discharge.

Red ear drum without bulging perforation = viral otitis if have URTI symptoms e.g. sore throat, runny nose

Air bubbles and intact ear drum without signs of acute infection = otitis media with effusion

TREATMENT

- Treat the fever and pain with **paracetamol**
- **Note:** Do not clean the ear with NSS if the ear drum is perforated or the ear drum cannot easily be seen and cannot confirm if normal. The NSS may enter the middle ear if the ear drum is perforated.

Antibiotics:

- Most cases of acute otitis media are caused by viruses so not everyone needs antibiotics.
- **Do not give antibiotics on first presentation*** if NO RISK FACTORS. Often, symptoms improve without treatment, If possible, re-examine the ear within 48-72 hours before decide to give antibiotics.

Give antibiotics to all with RISK FACTORS:

- Children <2 yrs
- Severe infection e.g. vomiting, fever >39°C, severe pain
- Special circumstances e.g. malnutrition, ear malformation, immunodeficiency e.g. HIV
- If antibiotics not given initially, re-assess at 48-72 hours, prescribe antibiotics if no improvement or worsening of symptoms
 - 1st Line: **Amoxicillin**, use dose for severe infection (Adult: 1gm TID, Child: 80-100mg/kg/day divided BID)
 - Treat for 5 days, continue for longer if severe infection or not better.
 - If not better in 72 hours (3 days) and the fever and/or ear pain is continuing, then switch to **co-amoxiclav**.
 - If allergy to amoxicillin, treat with **erythromycin** or **doxycycline**
- It will take 4 weeks for the ear drum to look normal on physical examination.
- Parents of children with otitis media should stop smoking

If concerned that the child will not follow up or the family will try to buy antibiotics or traditional medicine, then give antibiotics on first presentation

COMPLICATIONS

Same as for acute mastoiditis (see next page)

8.1.4. ACUTE MASTOIDITIS*NEW

For photo, see
Appendix 1

DEFINITION

Necrosis and infection of the air cells in the mastoid bone.

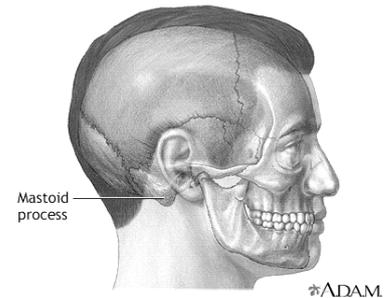
CAUSES

An acute mastoiditis can develop after persistent or inadequate treatment of acute otitis media, if patient has low immunity or if the bacteria is very virulent (strong and spreads easily in the body). The most common bacterial causes in children are *S. pneumoniae*, *S. pyogenes*, and *S. aureus*. In adults the most common bacteria are *Pseudomonas aeruginosa* and *S. aureus*. When hygiene is poor, *E. coli*, *K. pneumoniae*, *Proteus species*.

SIGNS AND SYMPTOMS

- Persistent or increasing fever or pain when on otitis media treatment
- Pain, especially over mastoid area, infants may have only irritability
- Redness or swelling
- Otitis media on examination of the tympanic membrane
- Swelling of the posterior superior part of the ear canal in front of the tympanic membrane
- Sometimes patients have no symptoms

Figure 8.3 Anatomy of mastoid bone



TREATMENT

- Antibiotics:
 - **Ciprofloxacin** 500mg BID or **Ceftriaxone** 1gm IV daily (high dose for severe infection)
 - OR
 - **Benzylopenicillin** (50,000 units/kg IV QID) and **Chloramphenicol** (25 mg/kg IV or IM QID)
 - If there is not improvement or if you suspect *P. aeruginosa*, discuss with doctor to use a different antibiotic
- Refer to hospital if possible. An ear nose throat (ENT) specialist doctor should perform a mastoidectomy
- If referral is not possible, perform an incision and drainage of the abscess. If needed, change the antibiotics after you have the pus culture and sensitivity results.

COMPLICATIONS

- Osteomyelitis
- Facial nerve palsy
- Labyrinthitis
- Hearing loss
- Meningitis
- Brain abscess
- Venous sinus thrombosis (blood clots in brain blood vessels)

8.1.5. CHRONIC OTITIS MEDIA

For photo, see
Appendix 1

DEFINITION

Chronic suppurative otitis media is chronic discharge from middle ear with ear drum perforation.

SIGNS AND SYMPTOMS

Pus discharge for more than 2 weeks
Often associated hearing loss or deafness.
No fever, no pain.
Perforated ear drum with pus discharge

TREATMENT

- If fever and pain: treat for acute otitis media

If no fever or pain, oral antibiotics are NOT the best treatment for chronic suppurative otitis media. The best treatment is to dry mop and clean the ear (with or without antibiotic ear drops)

- **Dry mop the ear** (see Figure 8.3 above)
- **Do not send ear swab**
- **Apply antibiotic drops** (this may not be needed)
- **Ciprofloxacin**
 - Child: 2 drops BID until no more pus/discharge usually 2-4 wks
 - Adult: 4 drops BID for 2-4 wks

- If no other options consider: **chloramphenicol** (2-3 drops 2-3 times per day)
- Apply drops after cleaning ear
- After applying drops get the patient to lie on their side with infected ear upwards, press down on the tragus of the ear (bit of ear at front of ear canal) several times.
- If no local treatment is available, use amoxicillin oral for 2 weeks.

Cadexcin (dexamethasone and neomycin) is another option – it can cause **ototoxicity (deafness)**.

Do not use more than 2 weeks.

Discuss with doctor before using, may need to try oral antibiotics before giving cadexcin.

COMPLICATIONS

Mastoiditis

Other complications same as for mastoiditis (*see previous page*). **Note:** Think of tuberculosis if the symptoms are chronic and do not respond to treatment.

PREVENTION

Early treatment of acute ear infections may decrease the risk of chronic otitis media and mastoiditis. Parents of children with otitis media should stop smoking.

8.1.6. CHOLESTEATOMA*NEW

DEFINITION

A mass made of epithelial cells in the middle ear or mastoid. The epithelial cells come from the external canal.

RISK FACTORS

- Eustachian tube dysfunction (tympanic membrane is retracted)
- Recurrent otitis media
- Tympanic membrane perforation and chronic suppurative otitis media
- Downs syndrome (often have eustachian tube dysfunction)
- Cleft palate

SIGNS AND SYMPTOMS

- White mass behind tympanic membrane which can grow for many years. Can grow into the bone.
- Some patients have no symptoms
- Hearing loss (especially if unilateral/one side or in children)
- Pus from ear >2 weeks after appropriate treatment

TREATMENT

1. The main treatment is surgical, so these patients need referral to an ENT specialist if possible
2. Antibiotics if infection suspected. Discuss antibiotic choice with doctor

COMPLICATIONS

- Infection of the cholesteatoma (*S. aureus*, *P. aeruginosa*, *Proteus* species, *Bacteroides*, TB)
- Hearing loss
- Cranial nerve palsy (Abducens and Facial nerves)
- Brain abscess
- Meningitis

8.1.7. AURICLE AND PINNA PROBLEMS*NEW

Leprosy can cause painless nodules on the auricle. (*see p.266*)

CELLULITIS (also called perichondritis)

DEFINITION

Infection of the auricle (*see Figure 8.1*) caused by skin flora and sometimes *Pseudomonas*. The auricle is mostly cartilage so there is not much blood flow to the area. This can slow down the healing process.

SIGNS AND SYMPTOMS

- Warm
- Red
- Swelling
- Pain

TREATMENT

- **Cloxacillin** PO x 7 days. There is a risk for treatment failure because of the low blood flow to the cartilage.
- Follow up daily until there is improvement
- If symptoms are moderate to severe or if there is no improvement, start **cloxacillin** IV.
- If not improving, consider adding antibiotics that treat pseudomonas (e.g. ciprofloxacin).

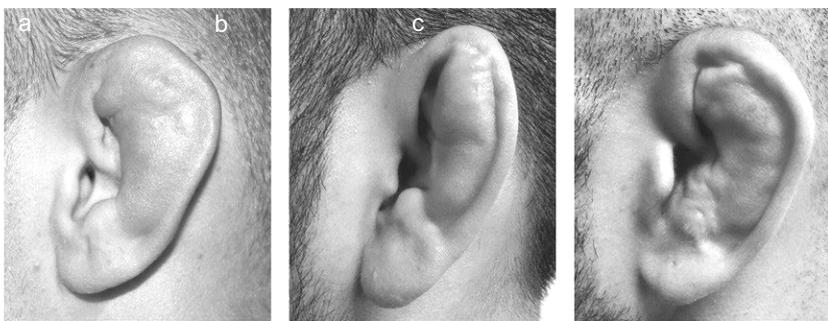
TRAUMA TO THE AURICLE

DEFINITION

Haematoma or laceration of the auricle. Chronic trauma to the ear can cause chronic haematoma which becomes a painless 'cauliflower ear'.

SIGNS AND SYMPTOMS

Figure 8.4 Haematoma of the auricle



- (a) Acute haematoma.
- (b) Without treatment, the haematoma becomes chronic and
- (c) may develop into 'cauliflower ear'

TREATMENT

1. Lacerations:

- a. Clean well.
- b. Suture using a small sized suture and needle (e.g. 5.0 or 6.0).
- c. Do not use anaesthetics that contain adrenaline (epinephrine). This can cause decreased blood flow from vasoconstriction and necrosis of the auricle.
- d. **REMEMBER** to consider tetanus vaccination. If the wound is contaminated you may need prophylactic antibiotics or close follow up without antibiotics. For bites, think of rabies vaccine, antibiotics, and additional investigations (e.g. Hepatitis B, HIV)

2. Hematoma

- a. If <2cm and <48 hours from time of trauma, do needle aspiration.
- b. You may refer if the hematoma is >2cm or >48 hours from time of trauma. If possible, you can do incision and drainage. If there is still bleeding, put an 18 gauge catheter inside to let the hematoma continue to drain. Remove the catheter when there the bleeding has stopped.
- c. If trauma was >7 days ago, only observe the patient. They may develop 'cauliflower ear'.

CHAPTER 9: ELECTROLYTE ABNORMALITIES

DEFINITION

Our bodies carefully control the amount of electrolytes in our body. If the level is too high or too low, this can be dangerous. This can happen because of underlying diseases (e.g. hyperkalaemia (high potassium) from renal failure). It can also happen because of medication (e.g. hypokalaemia (low potassium) from furosemide). Sometimes abnormal electrolytes can be an emergency. HYPO = too low HYPER = too high

Suspect electrolyte problem if:	Investigations
• Dehydration	CBC
• Sepsis	Creatinine - used to calculate the glomerular filtration rate (GFR) for kidney function
• Shock	BUN – used for hydration status of the patient
	Na ⁺ (sodium), K ⁺ (potassium), Mg ⁺ (magnesium), PO ₄ (phosphorus), Ca ⁺⁺ (calcium), albumin
	ECG (if available)
	Follow fluid balance

Note: Reference ranges in children may be different from adults.

9.1 POTASSIUM

Potassium is important for the heart and other muscles to work. The reference range is 3.5-5.1mmol/L.

For potassium, mmol/L is the same as mEq/L. A conversion formula is not needed.

9.1.1. HYPERKALAEMIA

High potassium can be an emergency because it can cause abnormal rhythms in the heart. Do ECG if available.
>6.5mmol/L is an emergency or >6 mmol/L with changes on the ECG

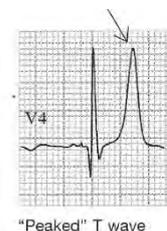
DEFINITION

High potassium is >5.1mmol/L

CAUSES

1. Renal Failure
2. Medications e.g. ACE-inhibitor (e.g. enalapril), spironolactone, NSAID's
3. Endocrine diseases e.g. Addison's disease (failure of adrenal gland with low cortisol)
4. Haemolysis (breakdown of red blood cells that release potassium)
5. Burns, heat stroke, rhabdomyolysis (break down of muscles)
6. Metabolic acidosis e.g. severe shock
7. Pseudohyperkalaemia (if red blood cells break down when taking blood then the level of potassium can be falsely high)

Figure 9.1 Peaked T wave



SIGNS AND SYMPTOMS

- Asymptomatic, sometimes non-specific tiredness, muscle weakness
- Abnormal heart rhythm – may cause tachycardia, palpitations, chest pain
 - If severe may cause death
- ECG can show peaked T waves

TREATMENT

- Stop any medications that may be causing the problem. Treat the underlying cause.
- If renal function is normal and no other obvious cause consider repeating the potassium as it may be falsely high from the breakdown of the red blood cells when taking blood.
- If potassium >6.5 or >6 with changes on ECG, there is a high risk of sudden death. If available, try the treatments below and refer immediately.
 - **Calcium Gluconate** 10% 10ml SLOW IV over at least 10 minutes (this protects the heart)
 - **Salbutamol** nebuliser 5mg (this helps to lower the potassium)
 - **Insulin** (this helps to lower the potassium). 10 IU of insulin should be added to 125 cc of glucose 20% infusion fluid. This should be given in 30 minutes which will decrease the potassium 1 mmol/hour. This effect starts after 10-20 minutes after infusion and will last approximately 4-6 hours. **BE CAREFUL** this can cause hypoglycaemia and you must check the dextrose every hour.

9.1.2. HYPOKALAEMIA

DEFINITION

Low potassium is <3.5 mmol/L

CAUSES

1. Medications e.g. furosemide, hydrochlorothiazide, insulin
2. Gastrointestinal loss e.g. diarrhoea (also vomiting)
3. Metabolic alkalosis
4. Low intake in diet e.g. malnutrition
5. Endocrine diseases e.g. Conn's syndrome (too much aldosterone production)
6. Low magnesium (can be caused by too much penicillin)

SIGNS AND SYMPTOMS

- Usually asymptomatic
- Severe hypokalaemia will cause muscle weakness, myalgia, muscle cramps and constipation
- Paralysis can occur
- If severe can cause death

TREATMENT

- Stop any medications that may be causing the problem. Treat the underlying cause.
- Encourage patient to eat bananas, tomatoes, leafy green vegetables, coconut water, lemons, limes, oranges. These foods have high potassium content.
- Potassium can be replaced by tablets (swallow tablets whole during meals with lots of fluid) or IV depending on level of potassium:

Mild Hypokalaemia	3.0-3.4 mmol/L	PO one tablet* BID for 1 week and re-check potassium
Moderate hypokalaemia	2.5-3.0 mmol/L	PO two tablets* TID for 3 days and re-check potassium If not increasing, give magnesium and try two tablets QID and consider admission for IV potassium
Severe hypokalaemia	<2.5 mmol/L	**Note: IV replacement can be dangerous and should be done with cardiac monitoring. Refer patient immediately if possible** **All the potassium IV replacement is to be supervised/instructed by the doctor. Use a pulse oximeter to monitor the pulse during the IV infusion** See Figure 9.2 for IV potassium treatment

*Dose for Slow K (600mg tablet = 8mmol or mEq potassium)

Figure 9.2 IV Potassium treatment and warning^{*update}

<p>IV POTASSIUM SHOULD ONLY BE DONE AFTER CAREFUL CONSIDERATION BY THE DOCTOR AND MEDICAL TEAM</p> <p>IV potassium for adults</p> <ul style="list-style-type: none"> • Put 40mmol potassium chloride (KCl) (3 x 1.34mmol/ml 10ml Ampoules) in 1 litre 0.9% NSS (or 1.5 KCl ampoules in 500ml NSS) and mix bag well. • Maximum rate is 250ml per hour (10mmol K+ per hour). • If magnesium is low or unknown, add 1g IV magnesium for each 500ml NSS (Magnesium and KCl can be added to same bag NSS). • If possible use paediatric metaset or burette so do not accidentally give faster than 10mmol/ hour. • IV potassium given too quickly can cause cardiac arrest and the heart to stop. • IV potassium should only be done with close and excellent medical supervision (even continuous ECG monitoring). • Maximum rate = 10mmol/hour and maximum concentration for peripheral IV is 40mmol/litre (to prevent cardiac arrhythmias and minimise phlebitis (inflammation of the vein)).

.....
If cannot correct the potassium, then the magnesium may be low. You need to increase the magnesium first before the potassium can be corrected
.....

9.2 CALCIUM

Calcium is important for muscles to work. The reference range is 2.15-2.55mmol/L. The calcium level should be corrected in patients with low serum albumin levels, using the following formula: Corrected calcium (mg/dL) = measured total Ca (mg/dL) + 0.025 (40 - serum albumin [g/dL]), where 4.0 represents the average albumin level.

Conversion formula for mg/dL and mmol/L (calcium)

$$\text{mmol/L} = \text{mg/dL} * 0.2495$$
$$\text{mg/dL} = \text{mmol/L} \div 0.2495$$

9.2.1. HYPERCALCAEMIA

DEFINITION

High calcium is a calcium >2.55mmol/L or 10.5mg/dL. If albumin level is low, need to correct the calcium.

Mild Hypercalcaemia	10.5-11.9mg/dL	2.6-2.9mmol/L
Moderate Hypercalcaemia	12-13.9mg/dL	3-3.5mmol/L
Severe/Crisis	>14mg/dL	>3.6mmol/L

CAUSES

1. Medications e.g. hydrochlorothiazide
2. Renal failure
3. Tuberculosis
4. Cancers e.g. bone, lung
5. Endocrine disorder e.g. hyperparathyroidism.

SIGNS AND SYMPTOMS 'Stones, Bones, Abdominal Moans and Psychic Groans'

- **Stones** – kidney stones or gallstones
- **Bones** – bone pain
- **Abdominal moans** – constipation, nausea and vomiting, abdominal pain
- **Psychic groans** – depression, confusion

TREATMENT

- Stop any medications that may be causing the problem. Treat the underlying cause.
- The most important treatment is to rehydrate with IV fluids (NSS 0.9% bolus until diuresis >20cc/hour) – be careful of fluid overload if the patient has renal failure.
- Diuretics e.g. furosemide can also help to decrease the calcium – do **NOT** give if the patient is dehydrated
- Other medications e.g. bisphosphonates can be used but may not be available

9.2.2. HYPOCALCAEMIA

DEFINITION

Low calcium is a calcium of <2.15mmol/L or 8.6mg/dL. If albumin level is low, need to correct the calcium.

CAUSES

1. Low oral intake of calcium
2. Medications/toxins e.g. diuretics, gentamicin, alcohol
3. Low vitamin D (or not enough sun exposure e.g. rickets), hypoparathyroidism
4. Sepsis
5. Other electrolyte disturbances: High phosphate, low magnesium

SIGNS AND SYMPTOMS

- Tingling around the mouth and lips and in the hands and feet
- Tetany (strong contractions of the hands and large muscles)
- Positive Chovstek (muscle spasm when tapping the facial nerve just before the ear) and Trousseau (arm cramps when getting the BP)

TREATMENT

- Stop any medications that may be causing the problem. Treat the underlying cause.
- Increase dairy products e.g. milk, yogurt
- Calcium PO replacement
 - Calcium carbonate (**Calcium carbonate** 500 mg/1000 mg tablets) OR
 - Calcium carbonate combined with Vitamin D3 (**Calcium carbonate** 500mg +**Vitamin D3** 200IU)
- If severe low calcium (<1.9mmol/l) OR patient has symptoms, discuss with doctor
 - **Calcium Gluconate** 10% 10ml SLOW IV over 10 minutes – can repeat until patient symptoms stop

9.3 SODIUM

Sodium is important for maintaining fluid balance in the body. The reference range is 136-145mmol/L.

For sodium, mmol/L is the same as mEq/L. A conversion formula is not needed.

9.3.1. HYPERNATRAEMIA

DEFINITION

High sodium is >145mmo/L

CAUSES

1. Dehydration
2. Endocrine disorder e.g. diabetes insipidus (problem with controlling water balance in the body)
3. See *Figure 9.3* for differential diagnosis of hypernatraemia

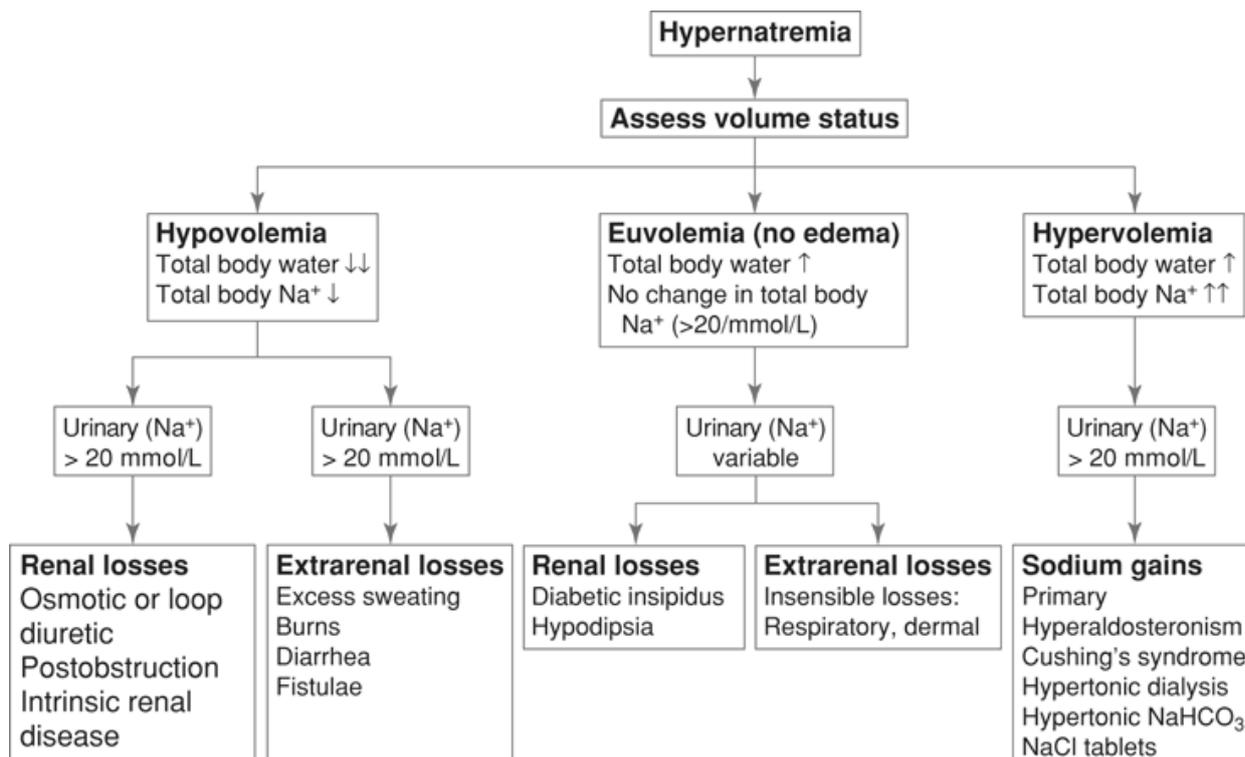
SIGNS AND SYMPTOMS

- Lethargy, weakness, irritable
- Oedema
- Seizures, coma

TREATMENT

- Treatment depends on the cause. Discuss with doctor
- See *Figure 9.4, next page* for hypernatraemia treatment

Figure 9.3 Differential diagnosis for hypernatraemia



Leema IV, Berns JS, Nissenson AR. CURRENT Diagnosis and Treatment: Nephrology and Hypertension, The McGraw-Hill Companies, Inc.

Figure 9.4 Treatment for hypernatraemia and warning*^{update}

TREATMENT FOR HYPERNATRAEMIA SHOULD ONLY BE DONE AFTER CAREFUL CONSIDERATION BY THE DOCTOR AND MEDICAL TEAM

Correction should be based on how fast the hypernatremia developed:

- Acute (<48 hours): 1-2 mmol/l/hour until symptoms disappear or until the daily limit of 8mmol/l/day
- Chronic: upper limit of correction speed is 8 mmol/l/day
- Best way to correct is to let the patient drink water or give by NGT. If IV D5W must be used, monitor for hyperglycaemia.

If serum sodium level is available, calculate the water deficiency using an online tool or use the equations below:

- Total Body Water (TBW): [0.6 (male) or 0.5 (female)] x weight
- Water deficiency = TBW x ([serum Na]/140-1)
- Give the amount of water calculated for water deficiency

It is very important to correct the sodium to normal very slowly. A rapid decrease in the sodium can cause brain damage

9.3.2. HYPONATRAEMIA

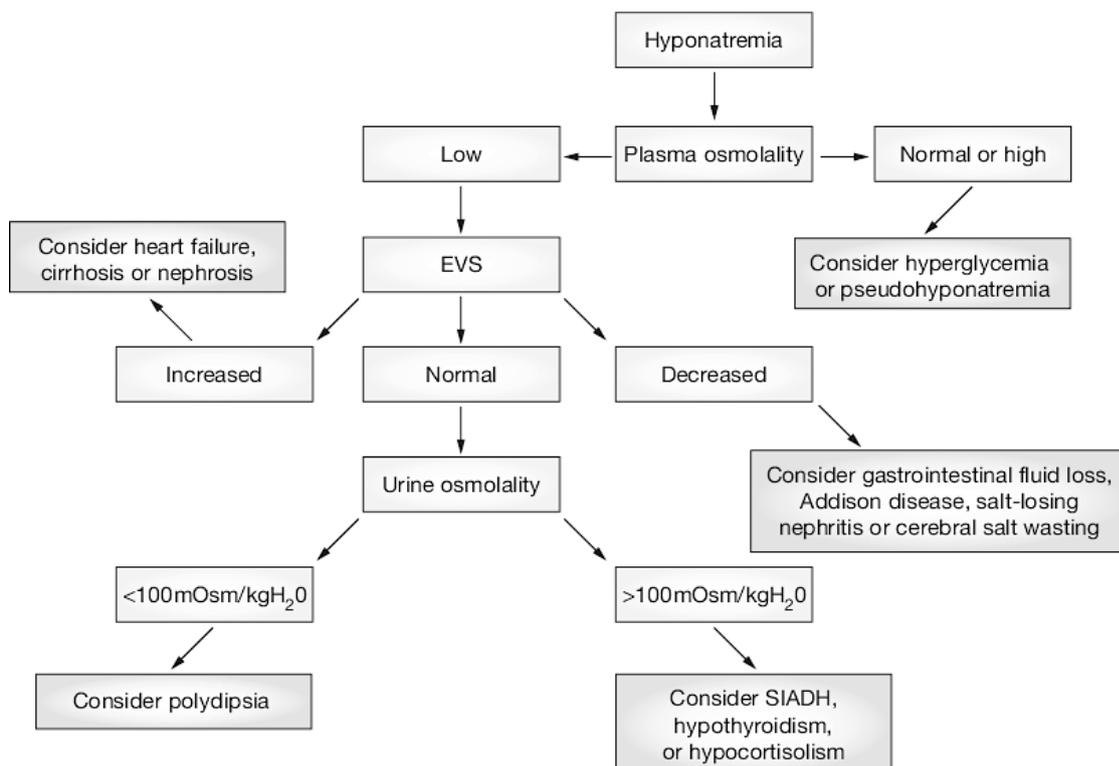
DEFINITION

Low sodium is <136mmol/L.

CAUSES

1. Fluid overload e.g. heart failure, ascites
2. Medications e.g. furosemide, ACE inhibitors
3. Endocrine problems e.g. SIADH, hypothyroidism
4. Tuberculosis
5. Prolonged vomiting & diarrhoea
6. Drinking too much water (psychogenic polydipsia)

Figure 9.5 Differential diagnosis for hyponatraemia



For urine osmolality you can use the specific gravity (SG) on the urine stick.
An SG < 1005 g/ml is equal to osmol <300.

SIGNS AND SYMPTOMS

- If not severe can be asymptomatic
- Nausea, vomiting, headache, loss of appetite
- Lethargy, confusion, memory loss
- Convulsions, coma

TREATMENT

- Stop any medications that may be causing the problem. Treat the underlying cause. Discuss with doctor.

Figure 9.6 Hyponatraemia treatment and warning^{*update}

**TREATMENT FOR HYPONATRAEMIA SHOULD ONLY BE DONE AFTER
CAREFUL CONSIDERATION BY THE DOCTOR AND MEDICAL TEAM INVOLVED**

Treatment depends on the cause and includes:

- Fluid restriction and/or
- Sodium replacement

Sodium levels should not increase more than 8-9mmol/L per 24 hr or 1mmol/L per 1 hr.

It is very important to correct the sodium to normal very slowly. A rapid increase in the sodium can cause brain damage.

CHAPTER 10: ENDOCRINE DISEASES

10.1 DIABETES MELLITUS

DEFINITION

Diabetes Mellitus is a syndrome caused by lack of insulin from the pancreas or reduced effectiveness of insulin in the body. This causes high blood sugar levels (hyperglycaemia).

There are two types of diabetes: **Type 1** (about 10% of cases) usually starts in childhood and can only be treated with insulin (oral tablets do not work).
Type 2 usually starts in adult life (>30 years), often have risk factors (see below), can usually be managed with tablets. If severe, may need insulin treatment.

Risk Factors associated with type 2 Diabetes are: positive family history, BMI > 23 and obesity (see p.213), history of diabetes in pregnancy, history of malnutrition or low birth weight in the first year of life.

SIGNS AND SYMPTOMS

Increased thirst
 Increased urine output
 Tiredness
 Weight loss

Increased infections: especially skin infections, UTIs, vaginal infections (candidiasis) and TB
 Symptoms of diabetic complications (see below)

Figure 10.1 Signs and symptoms of diabetes



DIAGNOSIS

If someone has the above symptoms, you should check dextrose the urine dipstick for glucosuria. To confirm the diagnosis, check glucose level in the venous blood.

Figure 10.2 How to diagnose diabetes in non-pregnant persons or > 4 weeks postpartum

TEST		PATIENT HAS DIABETES IF:
RANDOM BLOOD GLUCOSE	Check Glucose level at any time of the day. It is NOT important if the patient has eaten or not.	≥ 200mg/dL (≥ 11.1mmol / L*)
FASTING BLOOD GLUCOSE	Check Glucose level in the morning: advise patient not to eat food or sugary drink in last 8 hours (can have water).	≤ 126mg/dL (≥ 7mmol / L)
ORAL GLUCOSE TOLERANCE TEST	Check glucose 2 hours after drinking 75g of glucose	≥ 200mg/dL (≥ 11.1mmol/l)

*Conversion formula for glucose: mmol/L = mg/dL ÷ 18, mg/dL = mmol/L * 18 (see p.25)

INVESTIGATIONS (if available)

1. Fasting blood glucose
2. Oral glucose tolerance test (for pregnant women only)
3. Urine dipstick – protein, glucose
4. Biochemistry – BUN, Creatinine
5. Examine for foot pulses and sensation

COMPLICATIONS

EMERGENCY COMPLICATIONS:

A diabetic patient can present unwell or in coma because the blood sugar is **too high** or **too low**.

****Remember that patients may present as an emergency without history of diabetes****

HYPOGLYCAEMIA <70mg/dL (3.8mmol/l), <45mg/dL(2.5mmol/l) is severe

SIGNS AND SYMPTOMS

- Sweating, hunger, tremor, dizziness, drowsiness, aggressive/irritable, confusion, convulsion, coma

TREATMENT

- If dextrose 45-70mg/dL:
 - Give oral sugar solution (water mixed with sugar) or sweet drink to prevent severe hypoglycaemia.
- If dextrose <45mg/d
 - **If able to drink** give oral sugar solution (water mixed with sugar) or sweet drink
 - **If unable to drink e.g. in coma:** insert IV cannula and give Adult/Child: **5ml/kg 10% dextrose bolus**, Neonate **2ml/kg 10% dextrose**
- After giving oral/IV dextrose **re-check blood dextrose after 15 minutes** to make sure it is >70mg/dL

HYPERGLYCEMIA

There are two conditions that occur if the dextrose is high. Both conditions are emergencies:

Diabetic Ketoacidosis (DKA)

DEFINITION: An emergency complication that occurs in **type 1 diabetes** (rarely in type 2 diabetes). It can be caused by infection, not using enough insulin, or other illnesses that put a stress on the body. DKA can be life-threatening.

SIGNS AND SYMPTOMS:

- Nausea, vomiting, ketones smell (fruity smell on breath), dyspnoea, abdominal pain, confusion, coma, death

DIAGNOSIS: To diagnose DKA there must be:

1. **Hyperglycaemia: blood dextrose >200mg/dL (>11.1mmol/L)**
2. **Ketones** on urine dipstick
3. **Metabolic acidosis** (bicarbonate <15) (if available).

TREATMENT:

- Give **NSS**:
 - Adult 1L over 1 hour
 - Children 10 ml/kg over 1 hour (the risk of fluid overload is higher in children)
- Need **insulin**: discuss with doctor about referral to hospital
- Treat any underlying infections as a precipitating factor

Hyperosmolar Hyperglycaemia State (HHS)

DEFINITION: An emergency complication that occurs in **type 2 diabetes**. It can be caused by illness, dehydration or not taking normal diabetes medication e.g. because of illness. It causes severe dehydration of the cells of the body, and can be life threatening.

SIGNS AND SYMPTOMS:

- Generalised weakness, leg cramps, visual problems, nausea/vomiting (less than in DKA)
- Progresses to confusion, neurological signs, seizures, coma

DIAGNOSIS: To diagnose HHS there must be:
Hyperglycaemia: very high blood dextrose e.g. >600mg/dL (>33mmol/L)

TREATMENT: As per DKA

NON-EMERGENCY (CHRONIC) COMPLICATIONS:

Diabetes Mellitus causes long-term damage to the body if it is not treated well:

- **Blood vessel (vascular) disease:** stroke, heart disease, heart attack, peripheral vascular disease (poor blood supply causing cold or painful feet), ulcers that heal slowly.
- **Kidney failure:** protein positive on urine dipstick.
- **Eye disease:** cataracts, glaucoma, damage to the retina (patient complains of blurred vision).
- **Nerve damage:** numbness, tingling and sometimes pain in the hands and feet (worse at night).
- **Feet problems:** due to poor blood supply and numbness, diabetic feet are at increased risk of infections and wounds.

TREATMENT OF CHRONIC SYMPTOMS

The aim of diabetes treatment is to lower the blood sugar to normal levels, which will make the patient feel better and prevent long term damage. **Note:** Diabetes mellitus is a chronic disease. The patient will need to take life-long treatment. They must be able to follow up regularly for chronic care.

Normal random blood sugar levels are between 70 – 140 mg/dL (3.8 – 7.8 mmol/L)

1. Explanation and advice

When you have made the diagnosis of diabetes, explain to the patient what diabetes is. Tell them that there is no cure for diabetes and that they will have this disease for life (except diabetes in pregnancy – *see obstetric guidelines*). Diabetes can be controlled with diet, exercise and medications. There are drugs which can lower the blood sugar and there are also life style changes that the patient can do to help lower the blood sugar level.

2. Life style treatment

It is important for all diabetic patients to change their lifestyle. Some diabetics can bring their blood sugar level back to normal just by lifestyle treatment.

Diet:

Carbohydrate

- Eat starchy foods (lentils, beans, oats) instead of rice, sticky rice, bread or noodles
- Be aware that rice and noodles raise the blood sugar.
- If you can, choose wholegrain varieties (like brown rice if available or not expensive), or eat potatoes with their skins on

Vegetables and Fruit

- Eat lots of vegetable e.g. cabbage, pumpkins, cauliflower, mushroom, watercress
- Eat fruits that are less sweet e.g. pomelo, apples, lime

Eat less Fat

- Try to steam instead of fry
- Use chicken > beef > pork – remove fatty part and skin, remove fat from soup

Eat less Sugar

- e.g. sweets, biscuits, fruit juices, soft drinks like coca cola, sugar cane, honey, 3 in 1, sweet tea, Ovaltine/Milo
- **Eat less Salt**
 - Reduce salt in cooking, less dry salty fish

Alcohol: Advise the patient to stop or if unable to stop at least to reduce

Smoking: Advise the patient to stop or if unable to stop at least to reduce

Exercise: Advise the patient to do some exercise – try to do at least 30 minutes every day: e.g. walking, playing football, gardening.

At the time of diagnosis, if the random blood sugar is mildly elevated, **140-200 mg/dL (7.7-11.1 mmol/L)**, you could try lifestyle treatment first. If it does not work after one month, then start medication.

3. Foot care advice

People with diabetes often have problems with the nerve and blood supply to their feet. This causes decreased sensation in the feet. This means that they may not be able to feel if they have trauma to their feet. Therefore, it is **important for patients to check their feet each day** to look for sores, cuts, redness or any signs of infection. It is difficult to treat trauma/infection in diabetic patients and the skin may heal very slowly. If there is any trauma that is not healing or any signs of infection, they should come to the clinic so that any infection can be treated early. To prevent trauma, make sure nails are cut, **wear shoes**, especially comfortable ones, if possible.

4. Diabetic Medication

Start diabetic medication if the dextrose stick is **>200 mg/dL (11.1 mmol/L)**, or lifestyle treatment is not working. The diabetic medication will need to be started by a doctor or senior medic.

Check that the creatinine and BUN is normal before starting metformin – discuss with the doctor if it is abnormal. The aim is to make sure that the random blood sugar levels are brought within the normal range.

There are many diabetic medications. If you have other medications available, discuss with the doctor how to use them. The diabetic medications available at SMRU are:

Name of Drug	START DOSE	MAX. DOSE	NOTES	Contraindications	Side effects
METFORMIN	500mg BID	2500mg within 24 hours	Give with meals. Preferable for patients who are overweight	Liver disease, renal failure, hypoxia (risk of lactic acidosis)	gastrointestinal side effects better if taken with food. Can give TID to decrease side effects.
GLIBENCLAMIDE	5mg OD Elderly: 2.5mg OD	15mg OD	Give with breakfast	Patients who do not eat meals regularly, liver/renal failure, pregnancy	can cause hypoglycaemia if the patient does not eat 3 regular meals

1. Start with **metformin** 500mg BID
2. After 1-2 weeks if glucose still high, increase to **metformin** 1g BID (or 1g in the morning and 500mg in evening). Follow up again in 1-2 weeks to see if the metformin should be increased. Continue until you have reached the maximum dose for metformin. If the total daily dose is $>2g/day$, you can divide TID to decrease side effects.
3. If the blood sugar is not normal on the maximum dose of metformin, **ADD glibenclamide** 5mg OD with breakfast.
4. After 1-2 weeks, if the blood sugar is still high, increase to **glibenclamide** 7.5 mg or 10mg OD. Follow up every 1-2 weeks to see if glibenclamide should be increased. Continue until you have reached the maximum dose for glibenclamide.
5. If blood sugar is not controlled, refer to a hospital or clinic where insulin can be given.
6. If they cannot go to another hospital or clinic, continue the oral medication, but advise the patient that they are at risk for complications of diabetes because their dextrose is poorly controlled.

If the patient takes diabetic medication but does not eat (e.g. unwell, vomiting), or does not eat regularly, he will be at risk of hypoglycaemia (too low blood sugar): explain this very carefully to the patient, teach them and the family how to recognise symptoms of hypoglycaemia and how to treat it (eat sugary drink/food). If the patient is unwell and cannot eat normally, they should seek medical care as soon as possible.

BLOOD PRESSURE MEDICATION

- In diabetic patients SBP should be less than 130 and DPB less than 80 (BP $<130/80$ mmHg)
- ACE inhibitor e.g. enalapril is recommended first line anti-hypertensives in diabetes (beta blockers are not recommended because it decreases the symptoms of hypoglycaemia)

ASPIRIN (ASA) THERAPY

Consider aspirin therapy (75mg/day) as a primary prevention strategy in patients with increased cardiovascular risk (men >50 years or women >60 years and have >1 major risk factor (see, p.40). **Note:** Avoid ASA if recent history of gastritis, bleeding problem or less than 16 years.

5. Follow up consultation

The aim is to educate, achieve good blood sugar levels (normal range 70-140mg/dL) and check for complications that are treatable.

- When starting medication review the patient every 1-2 weeks until blood sugar level is stable. Continue to inform the patient about diabetes and remind him/her about diet and medication.
- When blood sugar level is stable, review every month.
- Educate the diabetic patient about eating frequent meals with solid foods to avoid hypoglycaemia.
- Warn every patient who is on medication about the symptoms of hypoglycaemia and how to treat at home.
- Educate the patient how to treat low blood sugar (drink a sugary drink/water mixed with sugar)
- Educate the patient on foot hygiene, make sure nails are cut, wear shoes particularly comfortable ones if possible.
- Examine feet daily for wounds, infection, if there is any trauma that is not healing or any signs of infection they should come to the clinic so that any infection can be treated early.

Ask if:

Symptoms: have they improved?

Complications: cold feet, numbness, vision problems (if present: show to doctor).

Have they had hypoglycaemia? Describe the symptoms (see below) and explain this is because of low blood sugar.

Examine:

Every month:

BP, start anti-hypertensive medication if high

Look at feet for infection, wounds. Test for numbness and check lower limb pulses. Dorsalis pedis (anterior foot) and posterior tibial pulses (behind the ankle).

Figure 10.3 Examination of dorsalis pedis pulse

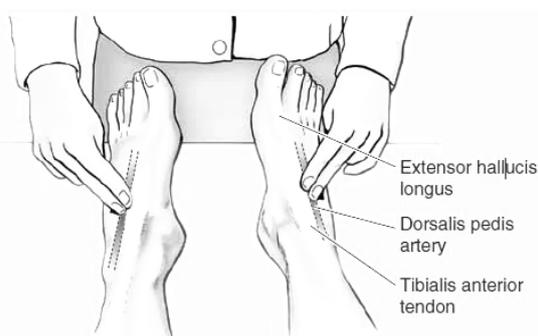
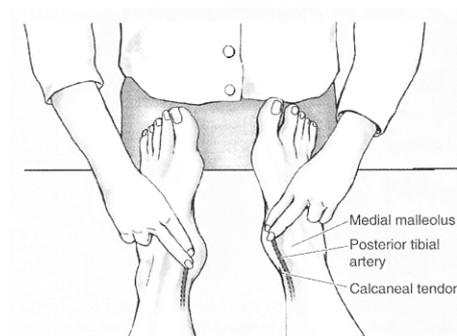


Figure 10.4 Examination of posterior tibial pulse



Every 12 months:

- Urine dipstick for protein (kidney damage)
- Look for signs of heart failure.
- If possible test vision in Eye Clinic to look for cataract.
- Fasting lipid profile

Figure 10.5 Random blood sugar level assessment

	VERY GOOD	GOOD	TOO LOW	TOO HIGH
BLOOD SUGAR LEVEL	70 - 140mg/dL (3.8 - 7.7mmol/L)	< 180mg/dL (< 10mmol/L)	< 70mg/dL (< 3.8mmol/L)	> 180mg/dL (> 10mmol/L)
WHAT TO DO	Continue same treatment		Treat hypoglycaemia Check if patient is eating regularly. If yes: reduce medication If not: give education	Consider if patient has diabetes emergency Increase medication. Find and treat Infections (e.g. UTI) Give diet education

Note: Post prandial (after eating) dextrose should be <180mg/dL. If high, need to confirm with fasting level.

DIABETES IN PREGNANCY

Pregnant diabetic women have higher rates of stillbirth, pre-eclampsia, premature labour and very large babies (or less commonly, very small babies) – see *Obstetric guideline* for treatment and management.

PREVENTION See lifestyle treatment.

10.2 HYPOGLYCAEMIA

DEFINITION

Hypoglycaemia: blood dextrose <70 mg/dL (< 3.8mmol/L)

Severe hypoglycaemia: blood dextrose <45mg/dL (2.5mmol/l)

Note: for severe malaria, dextrose < 40mg/dL (2.2mmol/L) is diagnosed as hypoglycaemia. (See *malaria guidelines*).

CAUSES

1. Diabetic medication dose is too high especially **glibenclamide and insulin** because both increase insulin in blood.
2. A diabetic person took his/her medication but then did not eat.
3. Malaria (especially in pregnant women and/or undergoing quinine treatment).
4. Other infections.
5. Non-diabetic medications e.g. beta blockers, aspirin poisoning, quinine
6. Liver failure
7. Adrenal gland failure (Addison's disease – patients have hypotension, hypotension and electrolyte imbalance – common in advanced HIV and /or TB patients)
8. Tumour in pancreatic cells (Islet cell tumours cause increased insulin in the blood)

SIGNS & SYMPTOMS

Sweating, feel hungry, tremors, dizziness, palpitation

More severe: drowsiness, confusion, aggressive or irritable behaviour, convulsions and coma.

DIAGNOSIS

Check blood sugar to confirm diagnosis.

Find the underlying cause (e.g. malaria).

TREATMENT

- If dextrose 45-70mg/dL:
 - Give oral sugar solution (water mixed with sugar) or sweet drink to prevent severe hypoglycaemia.
 - Example: Glucose powder (15-20 g) as glucose drink or 150-200 ml of fruit juice or 3-4 teaspoons of sugar dissolved in water.
- If dextrose <45mg/dL:
 - **If can to drink:** give oral sugar solution (water mixed with sugar) or sweet drink
 - **If cannot drink e.g. in coma:** insert IV cannula and give Adult/Child: **5ml/kg 10% dextrose bolus**, Neonate **2ml/kg 10% dextrose**

After giving oral/IV dextrose **re-check blood dextrose after 15 minutes** to make sure it is >70mg/dL.

If on diabetic medication review the dose with a doctor

Treat any other cause e.g. malaria, infection.

Note: 15 g of sugar is needed to increase blood glucose approximately 36 mg/dl within 20 minutes.

PREVENTION

Educate diabetic patients about eating frequent small meals of solid food to avoid hypoglycaemia.

10.3 THYROID DISEASE

DEFINITION

- The thyroid is a small gland located in the neck.
- It makes two thyroid hormones (thyroxine/T4 and triiodothyronine/T3). The thyroid hormones control metabolism.
- Thyroid hormones affects almost every organ in the body. They tell the organs how fast or slow they should work.
The Thyroid-Stimulating Hormone (TSH) is made by the pituitary gland. TSH controls how much thyroid hormone is made.

Figure 10.6 Thyroid function test assessment

TSH	FT4	Conclusion
Normal	Normal	No thyroid problem (euthyroid)
↑	↓	Hypothyroid
↑	Normal	Sub clinical hypothyroid
↓	↑	Hyperthyroid
↓	Normal	Sub clinical hyperthyroid
↓	Normal or ↓	Non-thyroidal illness

10.3.1. HYPOTHYROIDISM

DEFINITION

Underactivity of the thyroid gland.

SIGNS & SYMPTOMS

Constipation
Tiredness and depression
Dry and cold skin
Hoarse voice
Hair loss
Oedema of the face.
Increased frequency of menstrual periods (menorrhagia)

DIAGNOSIS

Clinical: Feel the thyroid gland (goitre, nodules), pulse, look for dry skin, oedema

Laboratory test: TSH, FT4 for diagnosis, TSH only for follow up of treatment.

TREATMENT

Hypothyroidism is a chronic disease. The patient will need to take life-long treatment. They must be able to follow up regularly for chronic management.

SUB CLINICAL HYPOTHYROID (high TSH, normal FT4):

Wait and see

Repeat blood tests every year

There is a risk of progression to clinical hypothyroid, especially if the TSH rises above 10 mU/L.

In patients with non-specific symptoms and TSH greater than 10mU/L, it is better to treat the subclinical hypothyroid early because there is risk loss to follow-up and to develop severe hypothyroidism.

1. HYPOTHYROID (high TSH, low FT4):

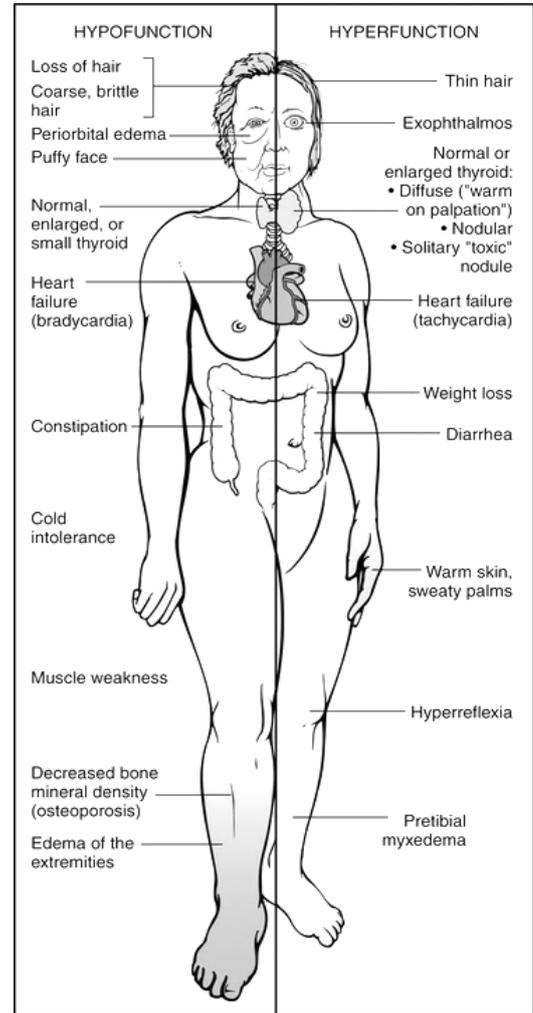
If <50 years AND no history of ischaemic heart disease (angina):

- Start thyroxine 50mcg OD
- Increase after 4 weeks to 100-150mcg OD if still have symptoms
- Re-check the TSH after 4 weeks and change the dose according to the results

If ≥50 years OR history of ischaemic heart disease (angina):

- Start thyroxine 25mcg OD
- Increase after 4 weeks to 50mcg OD depending on improvement in signs and symptoms
- Re-check only the TSH after 4 weeks (total 8 weeks after starting thyroxine) and change the dose according to the results

Figure 10.7 Signs and symptoms of thyroid disorders



Note: thyroxine dose is micrograms (mcg) not milligrams (mg) e.g. 50mcg = 0.05mg

Do not give thyroxine with aluminium hydroxide or ferrous sulphate. It can delay absorption of thyroid drug.

Follow up TSH check:

- **If TSH high: increase the dose by 25-50mcg**
 - Re-check the TSH in 4 weeks
- **If TSH normal: continue the same dose**
 - Re-check TSH in 6 months OR in 12 months if 2nd time TSH is normal
 - If symptoms begin again check before
- **If TSH is low: decrease the dose by 25-50mcg**
 - Re-check the TSH in 4 weeks.

Thyroid medication will take at least 4 weeks to work. When changing medication dose, check thyroid tests after 4 weeks.

Note: Hypothyroidism in pregnant women should be monitored carefully, with frequent thyroid function tests.

Delivery should be at SMRU and observe the neonate carefully for signs of thyroid disease.

For neonatal hyper or hypo thyroid diagnosis and treatment, please see *Neonatal guidelines*.

PREVENTION

Patients should take their medication regularly and come to the clinic for consultation.
They should be able to recognise the signs or symptoms of too much or not enough thyroid hormone.
They should be made aware that some other medications could interact with their thyroid medication.
They should discuss all new medications with their doctor.

10.3.2. HYPERTHYROIDISM

DEFINITION

Overactivity of the thyroid gland

SIGNS AND SYMPTOMS

- Diarrhoea
- Nervousness
- Weight loss
- Feeling warm
- Sweatiness
- Exophthalmia (protruding eyes)
- Tachycardia, palpitations or atrial fibrillation (in some patients)
- Tremors in the hands
- Reduced frequency of menstrual periods (Oligomenorrhea)

DIAGNOSIS

Clinical: check pulse rate, (ECG – check for atrial fibrillation) feel thyroid gland (goitre, nodules), tenderness
Laboratory test: TSH and FT4. If the TSH is abnormal and FT4 is normal, you may need to check T3.
Hydatidiform molar pregnancy can cause symptoms that look like hyperthyroidism (*see Obstetric guidelines*).

TREATMENT

- For treatment in pregnant women, *see obstetric guidelines*. Hyperthyroidism in pregnancy can cause irreversible cognitive delay (mental retardation) in the fetus/infant.
- If the patient is in thyrotoxic crisis or you are not sure, discuss with the doctor.

Check CBC and liver function tests (ALT, ALP, Bili) before starting propylthiouracil because this drug can cause low WBC (agranulocytosis) and liver toxicity. These are not common but you should check at each visit how the patient is feeling.

Propylthiouracyl (PTU) 50mg tablet (this is an anti-thyroid drug which will stop the thyroid malfunction)

- Start **PTU 200-400mg** per day in divided doses e.g. 2 tablets BID – 4 tablets BID
- Check TSH, CBC and liver function tests after 4 weeks, then every 3 months.
- When TSH and clinical signs are becoming normal: slowly decrease dose by 50mg every 2 months to 50 - 150mg daily in divided doses.
- Continue maintenance treatment for 12 to 24 months, then discontinue treatment to see if the patient is not hyperthyroid anymore. Follow clinical symptoms (*see follow up below*).
- There is a risk of hepatotoxicity. Counsel patients how to recognise symptoms of liver disease (anorexia, nausea, vomiting, fatigue, abdominal pain, jaundice, dark urine, itching)
- There is a risk of agranulocytosis (low neutrophils). This most commonly will occur in the first 6 months of treatment. Agranulocytosis can result in severe bacterial infections.
- For rapid symptomatic treatment of tachycardia and palpitations give **propranolol 40mg OD then increase to 40mg TID if needed**. Propranolol should not be used for long-term treatment but is useful in the short term.

FOLLOW UP

For the first 3 months: follow every month.

- Every month check:
 - TSH every month to adjust medication
 - CBC to check for low WBC. If decreasing from baseline, stop PTU.
 - Liver function tests (AST, ALP, Total bili). If more than 3x normal, stop PTU.

Agranulocytosis most commonly occurs within 3 months of starting treatment. If the patient has a fever or infection in the first 3 months, check CBC and stop drug until the CBC results can be reviewed with the doctor.

After monthly follow up for 3 months, then follow up every 2 -3 month, then every year

- Check TSH every 3-4 months. When TSH is stable, check TSH every 6 months, then can check every year.
- When change drug dose, always check after 4 weeks.

Counsel the patients to:

- Take medication regularly
- Follow up regularly. If the patient cannot follow up regularly, do not start treatment. Wait until the patient can follow up regularly.
- Know the signs or symptoms of too much or not enough thyroid hormone.
- Know that other medications could interact with their thyroid medication.
- Discuss all new medications with their doctor.

Note: Hyperthyroidism in pregnant women should be monitored carefully, with frequent thyroid function tests. Delivery should not take place at home and the neonate should be observed carefully for signs of thyroid disease. For neonatal hyper or hypo thyroid diagnosis and treatment, please refer to SMRU neonatal guidelines.

10.3.3. GOITRE

DEFINITION

A goitre is an enlargement of the thyroid gland. Endemic goitre occurs in areas where iodine in the diet is deficient. Our body needs iodine to make thyroid hormone. When there is not enough iodine in the food, the thyroid gland gets bigger. Hyper- or hypothyroidism may occur. Some foods can cause goitre: cassava, cabbage or turnips. Goitre is work with smoking and pregnancy.

Iodine deficiency causes: foetal and perinatal mortality in pregnancy
and
physical and mental retardation in children

SIGNS AND SYMPTOMS

Swelling of the thyroid (at the front of the neck)
Hypo or hyperthyroidism symptoms (see p.75)

Clinical (WHO classification):

- Group 0: normal thyroid, no palpable or visible goitre.
- Group 1: palpably enlarged thyroid, but not visible with the neck in a normal position.
- Group 2: thyroid clearly visible with the neck in a normal position.

DIAGNOSIS

Clinical findings
TSH and FT4 if patient has symptoms of hyper or hypothyroidism.

COMPLICATIONS

Pain or a sense of fullness in the neck is common. Frequently, there is no pain. Compression of the trachea and/or oesophagus leading to dyspnoea and/or dysphagia (rare) is a reason for surgery.

TREATMENT

- Encourage eating **iodised salt**.
- If available, you can give iodised oil

In children, goitre disappears slowly after several months. In adults, it disappears more slowly or never, even if improvement to normal thyroid function.

A few patients will develop hyperthyroidism and require treatment for that condition.

Surgery is only needed if the goitre makes local compression on the neck (airway or blood vessels).

DANGER SIGNS: If the swelling is irregular, you can feel one solitary nodule, there is a change in the voice or there is also cervical lymphadenopathy then these may be signs of thyroid cancer – discuss with a doctor.

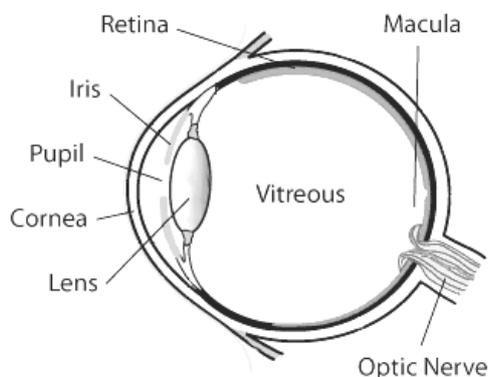
PREVENTION

The best way to prevent goitre or iodine deficiency is to eat of iodized salt. If there is no iodised salt available, provide people living in iodine deficient areas with iodised oil.

CHAPTER 11: EYE DISEASES

Note: Some eye diseases can be treated at all clinics, and some diseases need treatment from centres that have specially trained medics and doctors such as Mae Tao Clinic or Mae Sot Hospital

Figure 11.1 Anatomy of the eye



11.1 POOR VISION

POOR VISION ALL OF THE TIME

Poor vision is a common problem. A person with poor vision may have a disease of the eye or needs eyeglasses. Some causes of poor vision can be diagnosed by careful examination of the eye (cornea scars, cataracts, obvious infections etc.).

Children with poor vision may have strabismus or “lazy eye” when only one eye is affected. If the poor vision is not treated with eyeglasses, the strabismus will become permanent. If both eyes are affected, there may not be any strabismus, but they should still be diagnosed and treated. (see *Strabismus 11.5.4*)

POOR NEAR VISION (LONGSIGHTEDNESS)

The patient cannot see close objects (poor near vision). Usually gets worse with age.

Longsightedness can be divided into two groups depending on age:

People under the age of 40 with poor near vision are diagnosed with **Hyperopia**. This can be corrected with plus power lens eyeglasses.

Almost all people over the age of 40 will have poor near vision. Activities such as reading and sewing become difficult or not possible. Poor near vision from old age is normal and is called **Presbyopia**. This can be helped with reading glasses (plus power lens eyeglasses).

POOR LONG-DISTANCE VISION (SHORTSIGHTEDNESS)

The patient cannot see far away objects. Close objects can be seen clearly e.g. schoolchildren who cannot read the blackboard. This is called **Myopia** and can be corrected with minus power lens eyeglasses.

POOR VISION AT DUSK AND AT NIGHT

Night blindness is one of the early signs of vitamin A deficiency. On the Thailand-Myanmar border this is often referred to as ‘chicken blindness’. Night blindness is more common in young children but can also occur in adults. People with this condition suffer from particularly poor vision at dusk, when it is just getting dark. For treatment, see the Vitamin A Deficiency section of these guidelines.



Figure 11.2 Pinhole test to check if need eyeglasses

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A **PINHOLE** test can help to know if a person needs eyeglasses. First test patient's vision (Snellen chart or read a paper). Then make a very small hole in a piece of paper. Test vision again with the PINHOLE. If vision improves with the pinhole, then the patient needs eyeglasses.
.....

11.2 EYE INFECTIONS

11.2.1. CONJUNCTIVITIS

For photo, see
Appendix 1

DEFINITION

Can be caused by a bacterial or viral infection, or an allergic reaction of the conjunctivae of one or two eyes. It is sometimes difficult to diagnose if an eye inflammation is due to infection (bacterial or viral), allergy, irritation or other causes.

SIGNS AND SYMPTOMS

Red eye

Bacterial conjunctivitis: often pus discharge, eyelids stuck together on waking up, infection of one eye at the beginning, usually responds to Terramycin Eye Ointment (TEO).

Viral conjunctivitis: watery secretions, no itching, does not respond to TEO, usually disappears within one week without complications. In the rainy season there are often outbreaks of viral conjunctivitis. For example, this may affect up to 20-30% of the camp population.

Allergic conjunctivitis: usually both eyes, lots of tears, eyelid oedema, itching, does not respond to TEO, reduce symptoms by washing eyes with clean water.

Congenital conjunctivitis: due to *Neisseria gonorrhoea* or *Chlamydia* if child born to infected mother (if suspect discuss with doctor)

Viral and allergic conjunctivitis do not respond to treatment with Terramycin Eye Ointment (TEO) but the ointment will relieve symptoms and will prevent secondary bacterial infection

DIAGNOSIS

The diagnosis of conjunctivitis is based on the clinical examination

Bacterial and viral conjunctivitis can be very contagious.
Wear gloves when examining and/or wash hands well afterwards

TREATMENT

- First choice medication for conjunctivitis is **Terramycin Eye Ointment (TEO)**
- Although TEO contains tetracycline (similar to doxycycline), it is safe to use ointment in children, pregnant and breast-feeding women.
- Antibiotic ointment **TEO:** apply QID until two tubes are finished.
- If do not have or no response to TEO: use **chloramphenicol (1 drop 6 times per day)**.
- Hot compresses may help reduce swelling.
- Show your patient how to put ointment or drops in the eye. Mothers may need to help their children putting eye ointment or drops in the eyes.
- Tell the patient to wash their hands and face before and after touching the infected eye
- Ask the patient to return if the eye is not better after finishing treatment.
- Never patch an infected eye.

Refer If serious eye infections, infections involving the cornea and infections not responding for treatment refer to an eye specialist, e.g. Mae Tao Clinic, Mae Sot Hospital

PREVENTION

The patient should not touch the face or eyes with their hands
Wash hands regularly

11.2.2. TRACHOMA

For trachoma grading card,
see Appendix 3

DEFINITION

Trachoma is a highly contagious eye infection caused by the bacterium *Chlamydia trachomatis*. It is no longer common in the SMRU area. However, occasionally active infections are found in children, and adults who care for children. Most people will not be aware that they are infected. Trachoma is more common when sanitation and hygiene are not good. Health education and prevention are an important part of controlling infection.

With repeated infections over a lifetime, trachoma can cause blindness.

SIGNS AND SYMPTOMS

There are different stages of infection:

- Follicles (small bumps) → eye lid becomes inflamed → scar tissue forms → scarring of the cornea.
- This scarring can cause loss of vision and make the eye more likely to get infected by bacteria or viruses.

DIAGNOSIS

Made by external eye examination and checking the patient's medical history.

Look underneath the upper eyelid for the presence of follicles, signs of inflammation, the direction of the eyelashes and at the cornea. (See *WHO Trachoma Grading Card, Appendix 3*).

Diagnosis should be made by a medic who has been trained in eye care so refer the patient to a facility such as Mae Tao Clinic or Mae Sot Hospital.

TREATMENT

Treatment of (Acute phase) follicles and inflammation:

- Clean eyes and face several times per day.
- **Azithromycin:** Adult: 1g STAT, Child: 20mg/kg STAT give dose for patient and all of family
 - Can also use TEO in early stage to make eyes more comfortable
- If not better, give **TEO** BID for 6 weeks

Check all other family members for possible infection.

Advise the patient to return to the clinic when treatment is finished for re-assessment, because sometimes the treatment needs to be repeated.

Treatment of (Late phase) scarring:

- In the later stages of trachoma, the primary infection may be gone but there is damage underneath the eyelid (scarring) and the eyelashes may turn in (trichiasis), causing damage to the cornea (corneal opacity).
- In most cases surgery is helpful. These patients should be referred to a medic who has had eye training
- While waiting for surgery, you can tape eyelashes to eyelid using thin strip of sticking plaster. This protects the cornea but it is important that the patient can blink and the eyelid can open and close perfectly. Replace the plaster when it starts to peel off (usually once a week), continue for 3 months. If the eyelid cannot close completely when the patient blinks, the cornea will become too dry and have risk for ulceration and infection.

Note: Do not remove eyelashes with forceps. This is now not recommended

SAFE STRATEGY: TREATMENT AND PREVENTION

The **SAFE** Strategy is a public health approach to try to educate on treatment and prevention of trachoma.

- **Surgery**
- **Antibiotics** (to treat the infection)
- **Facial cleanliness** (hygiene)
- **Environmental change** (increase access to clean water and sanitation)

PREVENTION

The patient should not touch the face or eyes with their hands

Wash hands regularly

Health education on hygiene and sanitation

11.2.3. CELLULITIS OF THE EYE^{NEW}

DEFINITION

Infection of the skin around the eye (periorbital/pre-septal cellulitis) OR of the orbit (orbital cellulitis). Periorbital/pre-septal cellulitis occurs in the area anterior to the orbital septum (Figure 11.2). Orbital cellulitis occurs in the fat and ocular muscles posterior to the ocular septum (Figure 11.2). Both can cause eyelid swelling and redness but the prognosis and treatment are different. Orbital cellulitis is less common than periorbital cellulitis but is more severe and can cause vision loss.

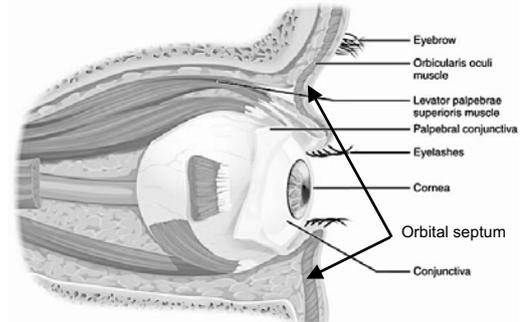
CAUSES

Trauma (including orbital fracture), insect or animal bites, foreign body, upper respiratory infection, infection of the tear duct, or sinusitis. Sinusitis is the most common cause of orbital cellulitis.

SIGNS AND SYMPTOMS

1. Periorbital (pre-septal) cellulitis – anterior to orbital septum
 - Fever
 - Eye pain
 - If there is pain with eye movements, think of orbital cellulitis (see below)
 - Swelling and redness of the eyelid or skin around the eye
2. Orbital cellulitis – posterior to orbital septum
 - Fever
 - Swelling and redness of the eyelid or skin around the eye may or may not be present
 - Double vision
 - Pain with eye movement
 - Eye muscle weakness causing strabismus
 - Proptosis (eyeball is pushed forward)
 - Swelling of conjunctivitis

Figure 11.3 Anatomy of the orbital septum



TREATMENT

- Take routine blood samples (e.g. CBC, CRP, blood culture)
- If suspect periorbital/pre-septal cellulitis, treat mild infection with **Augmentin (amoxicillin-clavulanate)**. Follow up should be scheduled regularly until the patient is improving. If moderate infection, admit to IPD and start **Ceftriaxone** and **Metronidazole**.
- If suspect orbital cellulitis admit to IPD and start **Ceftriaxone** or **Cefotaxime**, and **Metronidazole**
- Ask every day about change in vision, double vision, eye pain
- Daily examination for visual acuity, pupil light reflex
- If the patient is admitted, discuss the case with the doctor. The doctor may add or change antibiotics and may want to take other investigations.

Complications are more common with orbital cellulitis (abscess of eye or periosteum, loss of vision, thrombosis, brain abscess). There is a risk that periorbital/pre-septal cellulitis can become orbital cellulitis. **If the examination becomes worse or the symptoms are not improving with treatment, think of TB, discuss with the doctor, or refer to the hospital.**

11.3 EYE INJURIES

Injuries or trauma to the eye can cause blindness or loss of the eye.

Once the injury has occurred, you must prevent secondary infection.

IMMEDIATE FIRST AID

Clean the eye carefully with a large amount of NSS or clean water.

If there has been alkali in the eye e.g. cement this can cause a very severe eye problem so wash with at least 5 litres of water and make sure all the objects are removed.

DIAGNOSIS

Need to examine the eye for any foreign bodies

- The eye will be very painful so ideally need to use anaesthetic eye drops e.g. **Tetracaine 0.5%**.
- If do not have special anaesthetic eye drops can use local anaesthetic e.g. 2-3 drops lignocaine instead.

(**Note:** if only have lignocaine/adrenaline combination use with caution: adrenaline will cause the pupil to dilate (get bigger) which could cause an attack of angle closure glaucoma. If you use this then you must warn the patient if they get severe pain in the eye after a few hours to come back to the clinic immediately.)

If have fluorescein dye then look at the eye under a blue light for any corneal scratches: these will show up in yellow.

TREATMENT

- Remove any foreign bodies. Look carefully at all areas of the eye especially the cornea and under the upper eyelid as this is where most foreign bodies attach to the eye.
- Apply a large amount of antibiotic ointment (**TEO**).
- If the cornea is scratched apply a pressure patch to the eye.
- Remove the patch and re-evaluate the next morning.
- Continue treatment with ointment and patching as needed.
- Never leave a patch on longer than overnight.

If an infection develops, STOP patching. A patched eye is a good place to grow bacteria.
NEVER PATCH AN INFECTED EYE

Serious injuries, where the eyeball has been opened or penetrated, should be referred to hospital. Use an eye shield (not a patch) if a patient with an open eye injury needs to be transported to another location. Mostly, these serious injuries result in blindness or loss of the eye.

11.4 CORNEAL ULCERS

*For photo, see
Appendix 1*

DEFINITION

An ulcer on the cornea of the eye.

CAUSES

Corneal ulcers may be caused by damage to the eye. This might be very small like a foreign body in the eye (most common cause)

They may be bacterial, or fungal, and can be very difficult to differentiate between the two causes clinically. The history is important: if the injury is caused by vegetable material it is likely that the infection is fungal.

SIGNS AND SYMPTOMS

Very painful eye, red and watering, and often the ulcer can be seen in the cornea as a greyish area.

DIAGNOSIS

If a drop of fluorescein dye is put in the eye and the eye examined with a blue light, the ulcer will stain yellow.

TREATMENT

- If possible, refer to an eye doctor.
- Bacterial corneal ulcers may respond to antibiotic treatment but fungal ulcers are very difficult to treat as there are no very effective antifungal agents.
- Corneal ulcers need to be treated very intensively with topical antibiotics e.g. chloramphenicol drops every hour.

11.5 DISEASES OF THE EYE

11.5.1. CATARACT

*For photo, see
Appendix 1*

DEFINITION

A cataract is a condition of the eye that affects the ability to see. It can affect all or part of the lens (the part of the eye that we see through). Cataracts are probably the leading cause of blindness on the Thailand-Myanmar border.

DIAGNOSIS

When looking through the pupil: the affected lens will be cloudy white in colour. It will be difficult to see the back of the eye with an ophthalmoscope.

TREATMENT

Refer to an eye doctor who can do cataract surgery. There are no medicines that can treat cataract. Only surgery will help.

11.5.2. PTERYGIUM

For photo, see
Appendix 1

DEFINITION

Pterygium is the name for special tissue growth on the **cornea**. It is usually triangular in shape with the point pointing towards the centre of the cornea. Most of the time the pterygium will grow onto the cornea from the nasal (nose) side of the eye. A pterygium can be white in colour, although it can also present like conjunctiva or muscle tissue. It is not known why people develop pterygium. Long exposure to sunlight is a risk factor and most patients with pterygium have a family history (genetic influence). Once a pterygium is present, it will not go away.

Pterygium is **not** an infection, there is no need to provide treatment with TEO

TREATMENT

Surgery is the treatment and is done depending on the size of the pterygium.

- **Small pterygium:** does not need removal, because it often comes back again after surgery (in these cases it will grow back faster). Treatment for a small pterygium is to reassure the patient that this is not an infection or serious (tumour) growth.
- **Large pterygium:** can reach the pupil and affect vision. This requires surgery. When a pterygium reaches 2 or 3 millimetres from the edge of the pupil, the patient should be referred to an eye surgeon.

11.5.3. GLAUCOMA

DEFINITION

Glaucoma is a disease of the **optic nerve where it gets damaged because of increasing pressures inside the eye (called intra-ocular pressure (IOP))**. The damage is irreversible.

There are two types of glaucoma:

1. **Acute (Closed Angle) Glaucoma:** when the pressure of the eye suddenly increases which can lead to blindness within a few months. This type is much more common on the Thailand-Myanmar border. (see below)
2. **Chronic (Open Angle) Glaucoma:** when the eye progressively gets damaged by **high intra ocular pressure**. Some types of glaucoma are painless and progress slowly and silently

ACUTE CLOSED ANGLE GLAUCOMA = EMERGENCY	
<u>SYMPTOMS</u>	Rapid onset severe pain of the eye and surrounding the eye, blurred vision, nausea, vomiting.
<u>EXAMINATION</u>	Patient looks unwell, red eye, hazy cornea, non-reactive mid-dilated pupil usually only one eye
<u>TREATMENT</u>	Acetazolamide 500mg PO STAT and pilocarpine 2% 1 drop both eyes REFER PATIENT TO HOSPITAL IMMEDIATELY

DIAGNOSIS

- **Measure Intra-ocular pressure** with eye pressure tool (Schiotz tonometer): Intra Ocular Pressures (IOP) will be raised (IOP normal range 10mm - 22mmHg).
- **Check visual fields** (confrontation test): there may be visual field loss: this is irreversible.
- Look with **ophthalmoscope**: you may see optic disc cupping.
- Check **light perception** and **pupil reaction**: in advanced glaucoma, the patient has abnormal pupil reactions to light due to loss of the optic nerve.

TREATMENT

Glaucoma is an ophthalmic emergency. Patients can become blind if diagnosis and management are delayed.

- If you suspect glaucoma start treatment immediately with:
 - Acetazolamide** (Diamox) 250mg PO QID
 - Pilocarpine 2%** 1 drop QID for both eyes
- REFER IMMEDIATELY for surgery to avoid complete blindness
- After surgery, patients should have regular IOP checks and control of glaucoma medication.

11.5.4. STRABISMUS

DEFINITION

Strabismus is when the eyes do not look in the same direction. Sometimes it is called “lazy eye”

CAUSES

In children:

Strabismus usually occurs because of poor vision, but can be caused by an eye defect. If not treated with eye glasses, the strabismus may become a permanent lazy eye.

In adults:

Strabismus occurs suddenly and are due to paralysis of one of the muscles. This may be caused by something very simple (abscess, Grave’s disease) or be a sign of serious illness (brain cancer, TB meningitis).

DIAGNOSIS

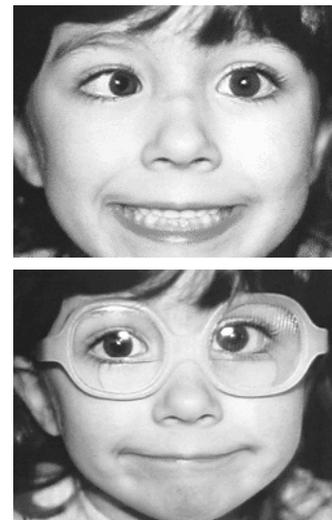
- Often develops in a child with normal eyes when aged 3-4 years.
- Listen to the parents, as they are the most likely to notice a strabismus in an infant.
- Shine a torch from about one metre and observe the central corneal light reflex, it should appear in the same place in both eyes. The light will be nearer the nose in a divergent squint and further away in a convergent squint.
- Shine the light into the eyes while asking the patient to look at your nose, cover the eye you think is normal with your hand and observe the one you think has a squint to see if there is any movement of the eye to focus. If it does not move, there is either no squint or there is no vision in that eye.
- Children old enough to cooperate with a visual perception test should be assessed.

In children with poor vision, both eyes should move in all directions when tested. If the cause is eye muscle paralysis, the eye will not move normally during examination.

TREATMENT

If you detect a strabismus, refer the patient to an eye specialist. For children if it is not treated by 6 years of age the child can lose sight permanently in that eye.

Figure 11.4 Strabismus and correction



11.6 XEROPHTHALMIA

DEFINITION

Vitamin A deficiency is a major problem (not only in diseases associated with the eyes, but also for childhood illnesses and child mortality). **Xerophthalmia** is an eye condition associated with Vitamin A deficiency. **If left untreated it can progress to irreversible blindness.** Vitamin A deficiency can occur in anyone, but usually affects children between 1 and 6 years old. Most babies who are breast-fed will not develop vitamin A deficiency.

SIGNS AND SYMPTOMS

The clinical stages of xerophthalmia:

1. **Night Blindness:** Poor vision in dusk when the sun goes down. This symptom is known as ‘night blindness’ or ‘chicken blindness’, and is often the first sign of xerophthalmia
2. **Conjunctival dryness (Conjunctival xerosis):** Dryness of the tear layer on the conjunctiva. The conjunctiva will start to look dry and rough. Even after the patient blinks, the eyes remain dry.
3. **Bitot’s spots:** Bitot’s spots are bubbles or foam on the conjunctiva that usually appear close to the cornea. The spots are mostly white/grey coloured (see *Appendix 1*).
4. **Corneal dryness (Corneal xerosis):** It is easy to see if the cornea becomes dry as it does not reflect light well and does not look smooth.
5. **Corneal ulcer/ keratomalacia:** If the cornea stays dry too long, it is in danger of contracting bacterial or viral infections known as corneal ulcers. These can cause holes on the cornea (keratomalacia). If a patient contracts a corneal ulcer, the eye can suffer permanent vision loss.
6. **Corneal scarring:** When the cornea heals, there may be scarring which can cause blindness. Corneal scarring is permanent.

Note: Not all patients with vitamin A deficiency will develop eye complications (or the eye shows only a little drying), **but** some infections can cause rapid deterioration and blindness can develop in just a few days. Long-term vitamin A deficiency can cause gradual damage to the eyes.

DIAGNOSIS

Diagnosis is made by an external eye examination and investigation of the patient's medical history.

Check for all stages of xerophthalmia in both eyes.

Final diagnosis should be made by a medic who has been trained in eye care.

TREATMENT

All cases of corneal dryness should be given 2 tubes of TEO to prevent the cornea from becoming ulcerated or infected.

Apply BID and protect eye with an eye pad after each application.

All patients seen with corneal ulcers/ keratomalacia must be seen by a doctor.

Vitamin A treatment/:

Children less than 6 months

Day of diagnosis (D 1) 50,000 IU

Next day (D 2) 50,000 IU

One week later (D 8) 50,000 IU

Children between 6 and 11 months (<8 kg)

Day of diagnosis (D 1) 100,000 IU

Next day (D 2) 100,000 IU

One week later (D 8) 100,000 IU

Children age 1 year and older and adults (>8 kg)

Day of diagnosis (D 1) 200,000 IU

Next day (D 2) 200,000 IU

One week later (D 8) 200,000 IU

Women of reproductive age

25,000 IU once a week **for 8 weeks**

Vitamin A capsules are available in two sizes: 200,000 IU (International Units) and 25,000 IU capsules. Read the bottle for the strength of the capsules. Write down carefully on the record the date and dose of treatment.

Treatment for pregnant woman:

<p>* In case of night blindness and Bitot's spot: Vitamin A 10,000 IU PO daily OR 25,000 IU PO per week for at least 4 weeks</p>	<p>* In case of corneal dryness and corneal ulcer/ keratomalacia risk of blindness outweighs risk to baby: Day of diagnosis (day 1) 200,000 IU Next day (day 2) 200,000 IU 1 Week later (day 8) 200,000 IU (This schedule should only be given by a DOCTOR) Also treat for cornea dryness with TEO as above</p>
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PREVENTION OF XEROPHTHALMIA

See Vitamin A deficiency chapter. Distribution of vitamin A capsules to each child every 6 months is effective in prevention of Vitamin A deficiency, especially in children with measles, severe diarrhoea, or severe respiratory tract infection.

PREVENTION OF XEROPHTHALMIA VITAMIN A DEFICIENCY

Newborn Vitamin A 50,000 IU at birth.

Less than 6 months (if not given at birth) Vitamin A 50,000 IU.

Children 6 months to 1 year Vitamin A 100,000 IU. Every 4-6 months.

Children 1 year and up Vitamin A 200,000 IU. Every 4-6 months.

Women of child bearing age Vitamin A 200,000 IU (give within 1 month of birth).

Document every time when giving a child vitamin A.
Overdose can cause raised intracranial pressure, impaired consciousness, convulsions
Give all children with measles vitamin A.

CHAPTER 12: FAMILY PLANNING AND GENDER BASED VIOLENCE

12.1 FAMILY PLANNING GUIDELINES

During the consultation for family planning advice, the following points should be discussed:

6. Ask the patient how many children he/she has?
7. Do they want more children? How long do they want to wait before the next pregnancy?
8. Does the patient know all the different forms of family planning?
9. What have they heard about the different forms of family planning?
10. Did the patient have a recent abortion?
11. Does the patient have a history of migraine or other serious medical problems?
12. Does she smoke?
13. Is the patient breast-feeding at the moment?
14. Check for a history of abnormal vaginal bleeding or discharge.
15. On examination, check for abnormalities of blood pressure, liver, breast, or cervix.
16. Is the patient pregnant? When in doubt, perform a pregnancy test. (See Family Planning Flow Chart)
17. Investigate any abnormal bleeding or discharge.

Contraception is for non-pregnant women.

In very early pregnancy it is hard to be sure if a woman is pregnant or not. When pregnant women accidentally take contraception, it does not cause the baby to be abnormal or cause abortion. See the **Family Planning Flow Chart** (see Appendix 4) to decide if a woman is pregnant or not, and when to give short-acting contraception, when to give long acting reversible contraception (LARC) and when to give emergency contraception.

12.2 EFFECTIVENESS OF CONTRACEPTION

Implant, sterilisation and intra-uterine device (IUD) are the most effective methods. For women who want family planning and would have a high-risk pregnancy if they become pregnant again it is important to encourage them to use one of these very effective methods of family planning. For more detail about each one see below.

Figure 12.1 Contraception and effectiveness

Method	Typical Use (usual mistakes)	Perfect use (no mistakes)
<i>Implant</i>	<1 in 100 women pregnant in 1 year	<1 in 100 women pregnant in 1 year
<i>Sterilisation (male or female)</i>	<1 in 100 women pregnant in 1 year	<1 in 100 women pregnant in 1 year
<i>IUD</i>	<1 in 100 women pregnant in 1 year	<1 in 100 women pregnant in 1 year
<i>Depoprovera</i>	6 in 100 women pregnant in 1 year	<1 in 100 women pregnant in 1 year
<i>Pill (COC or POP)</i>	8 in 100 women pregnant in 1 year	<1 in 100 women pregnant in 1 year
<i>Condom</i>	15 in 100 women pregnant in 1 year	2 in 100 women pregnant in 1 year

The IUD and implant are known as “Long Acting Reversible Contraceptives” (LARC) and are **the best method for most women** because they are very effective and not permanent.

.....

A method that is NOT EFFECTIVE
is also NOT SAFE for a woman at risk for mortality or morbidity in her next pregnancy
(e.g. severe HBP, grandmultipara, very old, TB, heart disease)

.....

12.3 CONTRACEPTIVES

12.3.1. CONDOMS

A latex condom is a tube made of rubber and closed at one end. It fits over the erect penis. It contains all the semen ejaculated during intercourse, therefore preventing sperm entering the vagina. A condom can only be used once.

EFFECTIVENESS

Latex condoms are very effective (between 85-98%) if used **every time** during sexual intercourse. However, most people forget to use them every time or do not use them correctly. Because of this, people who use only condoms often have unplanned pregnancy.

CONTRAINDICATIONS

Rubber allergy, but this is rare. Check the lubricant: nonoxynol-9 can cause allergy. Switch condom brand.

Note: Do not use a condom with Vaseline, oil or nystatin. These products weaken the condom and it can break.

Condoms are the only form of contraception that protect against sexually transmitted infections including HIV if used properly

12.3.2. ORAL CONTRACEPTIVE PILL (OCP)

PREPARATION

Most tablets contain a combination of oestrogen and progesterone.

EFFECTIVENESS

The pill is about 99.7% effective if used properly every day. However, it is difficult for many women to remember to take a pill every day and it is 92% effective with typical use (sometimes forgetting one).

CONTRAINDICATIONS

DO NOT GIVE IF:

- The patient is ≥ 35 years old and is a smoker because of risk for complications (see below)
- The patient has a history of stroke, heart attack, angina or blood clot in legs (Deep Vein Thrombosis (DVT)) or lungs (Pulmonary Embolism (PE))
- Close family history of stroke or heart attack at < 45 years.
- The patient has a history of migraine with aura (symptoms e.g. bright light, strange smell that occur before the headache) – discuss with doctor if unsure. Risk higher if ≥ 35 years old.
- High BP (systolic ≥ 140 or ≥ 90) or severe diabetes mellitus (e.g. needs insulin).
- Breast or liver cancer (or active liver disease), gallbladder disease
- Pregnant or breastfeeding (ask the doctor about progesterone-only pill for these women).
- The patient has Systemic Lupus Erythematosus (SLE)
- Taking these drugs: carbamazepine, phenobarbital, phenytoin and rifampicin.

MOST COMMON SIDE EFFECTS

Breast tenderness, nausea, weight gain, headaches, depression, some irregular menstrual bleeding.

GUIDELINE

- Before prescribing oral contraceptive pills you must:
 1. Take a full medical history and conduct a full examination, especially to exclude all of the above contraindications.
 2. Take a pregnancy test
 3. Examine the patient carefully to exclude abdominal mass or breast mass
 4. Discuss any questions or concerns with the doctor.
- Advise all smokers to stop smoking

You need to explain the possible side effects to the patient before they start oral pills. Most of the side effects will stop after 1 to 3 months. **Note:** nausea can be reduced by taking the pill at night.

For breakthrough bleeding (bleeding that occurs when not expected e.g. mid-cycle) that persists after 2 cycles:

- Exclude the following possible causes of breakthrough bleeding: cervix disease; retained products of conception; missing pills; drug use e.g. antibiotics; and diarrhoea.
- If all above causes are excluded consider the 50 μ g or 60 μ g oestrogen combined OCP

Figure 12.2 Counseling for oral contraceptive pill

What to tell women taking the oral contraceptive pill:

1. Take one tablet every day at the same time, like when wake up or when go to bed
2. Start taking active tablets on day 1 of menstruation (no need backup contraception) OR start taking active tablets today and use condoms/no sex for 7 days.
3. Take the pill at the same time every day. If a pill is >12 hours late, take it as soon as remembered, continue taking the pills in the packet and use condoms for 7 days.
4. Continue to take tablets even when sick, or husband is absent.
5. Start the new packet as soon as the last tablet is finished.
6. If sick with **vomiting, or taking antibiotics**, the pill may not work well so continue taking pills but use condoms while sick, or on antibiotics, and for 7 days after.
7. If have any side effects or concerns then come back to clinic
8. After stopping the pill, women can get pregnant very quickly, so it is important to take it regularly

12.3.3. DEPOPROVERA INJECTION*UPDATE

PREPARATION

Each injection of Depoprovera (Depo) contains 150mg of medroxyprogesterone acetate in 3ml. Depo contains no oestrogen and can be used for breastfeeding women. It can be given soon after delivery.

DOSE

1 injection of 3ml IM every 3 months.

EFFECTIVENESS

99% effective if used perfectly. It is less effective if women often forget or are unable to follow up regularly for injections. It is 94% effective with typical use. A common mistake may be to wait for menstruation before getting the next depo shot – these women often become pregnant.

CONTRAINDICATIONS

DO NOT GIVE IF:

- The patient has liver disease (can give if Hep BsAg positive if no symptoms or signs of liver damage/cirrhosis)
- The patient has breast cancer or liver cancer
- The patient has a history of stroke or heart attack.
- Close family history of stroke or heart attack at < 45 yrs.
- Severe high BP (systolic ≥ 160 or diastolic ≥ 100 mmHg), or severe diabetes mellitus (e.g. needs insulin).
- The patient has a history of migraine with aura (symptoms e.g. bright light, strange smell that occur before the headache) – discuss with doctor if not sure. Risk is higher if ≥ 35 years old.
- The patient wants to have regular menstruation (recommend IUD or OCP)
- The patient has Systemic Lupus Erythematosus (SLE)

MOST COMMON SIDE EFFECTS

Irregular vaginal bleeding or no bleeding at all (50% of women have no menstruation after 12 months on depo). The menstruation returns when depo is stopped. Other symptoms are nausea, weight gain, headaches, or dizziness.

WHEN TO START

Start at any time of the month. If starting within 7 days of monthly bleed, no need for condoms
If more than 7 days after start of monthly bleed need to use condoms for first 7 days after injection.

IMPORTANT

Make follow up very clear for the next injection due date (11-12 weeks).

If >2 weeks late for injection, do urine pregnancy test.

- a) If positive do not give Depo.
- b) If negative, give Depo and advise to use condoms for 7 days, and return to the clinic for repeat pregnancy test after 2 weeks.

Women who stop using the injection take longer to get pregnant after stopping as it takes longer for the hormones to leave the body, this is not affected by the length of time that the patient has been using Depo. This is not a good method for a woman who wants another baby and did not get pregnant quickly before.

Depo is not appropriate for long term contraception as one of the side effects is osteoporosis. The maximum recommendation is no longer than 2 years. Encourage Implant.

12.3.4. IMPLANTABLE DEVICES*UPDATE

PREPARATION

Implants contain a slow-release progestogen in rods (e.g. Jadelle & Implanex II = 2 rods, Implanon = 1 rod) placed just below the skin, usually in the medial, upper arm. Implants can be used for breastfeeding women and can be inserted postpartum. It is also safe after 1st trimester miscarriage, use immediately or up to 7 days after miscarriage.

Because implants are expensive and require a small surgery to put in and take out, **make sure the patient is not pregnant before putting it in!**

DOSE

Implanon is effective for 3 years. Implanex II is effective for 4 years. Jadelle is effective for 5 years. Always check the box for the number of years.

EFFECTIVENESS

>99% effective. Fertility comes back quickly after removal. Easy for patients to use correctly – after insertion they don't need to do anything for many years.

CONTRAINDICATIONS

DO NOT PUT IN IF:

- The patient has liver disease (can use if Hep BsAg positive and no symptoms or signs of liver damage/cirrhosis).
- The patient has breast cancer.
- The patient has a history of migraine with aura (symptoms e.g. bright light, strange smell that occur before the headache) – discuss with doctor if unsure. Risk higher if >35 years old.
- The patient wants to have regular menstruation (recommend IUD)
- The patient has Systemic Lupus Erythematosus (SLE)

MOST COMMON SIDE EFFECTS

Irregular vaginal bleeding or no bleeding at all, or infrequent spotting and bleeding; nausea; weight gain.

Note: this is less of a problem than with Depo.

WHEN TO START

Same as for depo.

12.3.5. INTRA-UTERINE DEVICE (IUD)

PREPARATION

This is usually a copper device that sits inside the uterus and prevents fertilisation. IUDs are long acting reversible contraception (LARC): they can stay in for many years, usually about 5 years. Check the package of the IUD for the exact time. IUDs can also act as emergency contraception if inserted ≤5 days after unprotected sex. If not menstruating and > 5 days since unprotected sex, use a short acting method first. **Always confirm the patient is not pregnant before inserting IUD.** See *the OB guideline* for details about insertion.

EFFECTIVENESS

99.2% effective. The contraceptive is quickly reversible. **This is a very good contraception for monogamous (one sexual partner) women who have finished their family but do not want sterilisation. It is the best method for many women with medical complications because there are no drug side effects.** Easy for patients to use correctly – after insertion they don't need to do anything for years except check to be sure it is still there.

CONTRAINDICATIONS

DO NOT PUT IN IF:

- Pregnant or when pelvic infection
- Cervical or uterine cancer

MOST COMMON SIDE EFFECTS

Insertion related e.g. perforation, unrecognised expulsion (falls out of the uterus, can't feel the threads). May have heavier bleeding or cramping with menstruation. This can be treated with prn mefenamic acid, ibuprofen etc.

WHEN TO START

Insertion is easiest during menstruation, post-abortion or < 2 months postpartum.

Contraception is immediate

- Put in immediately after delivery (placed by hand or with sponge forceps in the uterus),
- ≥1 month postpartum (safer to wait to 42 days postpartum)
- ≥ 6-12 weeks after C/S
- ≥ 6 weeks after septic abortion
- ≥ 12 months after molar pregnancy (confirm no recurrence)

12.3.6. STERILISATION

TYPES OF STERILISATION

- Male sterilisation - also called VASECTOMY.
 - Available through referral to hospital or Mae Tao clinic.
 - Two small incisions are made in the skin near the inguinal area to cut the vas deferens. Usually only Xylocaine is needed for anesthesia.
 - Need to use another form of family planning for 3 months after vasectomy.
 - This is a low risk procedure (not intra-abdominal procedure) and carries less risk for complications than female sterilisation.
- Female sterilisation- also called TUBAL LIGATION.
 - Can be done 24-48 hours post-partum, or between pregnancies (at least 4 weeks after delivery).
 - Mini-laparotomy (cut through abdominal wall) - a small incision is made underneath the umbilicus or above the pubic symphysis and tubes tied and cut.

EFFECTIVENESS

99.5% effective

CONTRAINDICATIONS

There are no contraindications to sterilization. But there may be some medical problems, such as high blood pressure, that are contraindications for performing a surgery. Discuss with the doctor for pre-surgery counselling.

DO NOT DO STERILISATION IF:

**The patient is not sure she doesn't want more pregnancies.
The procedure is not reversible (cannot re-connect the tubes)**

RISKS:

Risks of any surgery e.g. bleeding, infection, chronic pain. Rarely, the surgery does not work (e.g. the tube re-connects or the surgeon cannot reach the tube).

12.3.7. EMERGENCY CONTRACEPTION*^{NEW}

PREPARATION

Emergency contraception (EC) should be offered to women who come asking for contraception ≤ 5 days after unprotected sex. Emergency contraception is more effective if it is given early (e.g. 1-3 days after sex). There are 3 types of emergency contraception: IUD-EC, Packaged EC, and OCP-EC.

DOSE

1. **IUD-EC:** the copper IUD can be inserted any time ≤ 5 days after unprotected intercourse as emergency contraception. (*This method also gives the patient long acting contraception at the same time*)
2. **Packaged EC:** If you have Packaged Emergency Contraception (EC), follow the instructions on the box.
3. **OCP-EC:** Active pills in OCP packs can be used as EC. Because the dose of hormone in OCP is not always the same, you need to check the mg on the package. The dose for OCP-EC is *at least* Levonorgestrel 0.5 mg and Ethinyl Estradiol 0.1 mg or 100 mcg – usually 4 or 5 pills for each dose. The patient should take this dose every 12 hrs for 2 doses (see chart).

Figure 12.3 Emergency contraception dosing chart

OCP-EC dose chart			
Example	Levonorgestrel in 1 pill	Ethinyl Estradiol in 1 pill	How many pills to take
OCP A	0.15 mg	0.03 mg or 30mcg	4 pills every 12 hrs x 2 doses
OCP B	0.10 mg	0.02 mg or 20mcg	5 pills every 12 hrs x 2 doses

EFFECTIVENESS

IUD-EC: >99%

Packaged EC: 97-99%

OCP-EC: 97-98%

CONTRAINDICATIONS

> 5 days since unprotected sex (IUD may be helpful up to 7 days – consider using if rape case or very high risk)

Packaged EC and OCP-EC **can be used** in patients who should not use OCP as long-term contraception.

IUD-EC: follow IUD contraindications.

MOST COMMON SIDE EFFECTS

Nausea and vomiting (if vomiting <2hrs after dose, take that dose again)

Irregular bleeding, cramping

Women who use Packaged EC or OCP-EC should be counselled for an effective long-acting method. Give condoms/OCP/Depo and follow up in 2 weeks for pregnancy test and to start long-acting method (e.g. Implant, sterilisation)

12.3.8. LACTATIONAL AMENORRHOEA^{*NEW}

Breastfeeding can be a very effective form of contraception if:

- The mother:
 - is feeding only breast milk
 - has not had menstruation (even a little bit of bleeding) since her postpartum bleeding stopped
 - does not have a history of short interval between pregnancies
 -
- The baby:
 - feeds directly from the mother's breasts (e.g. mother is not squeezing out breast milk and feeding with a bottle)
 - feeds "on demand" (eg whenever the baby is hungry)
 - takes breastmilk <6 hrs between each feed
 - < 6 months old

If the woman has had NO BLEEDING since her postpartum bleeding and is nearly fully breastfeeding (e.g. okay if a little bit of water or rice occasionally) and the baby is <6 months old, lactational amenorrhea is still about as effective or more effective than condoms (>95%).

KEY POINT

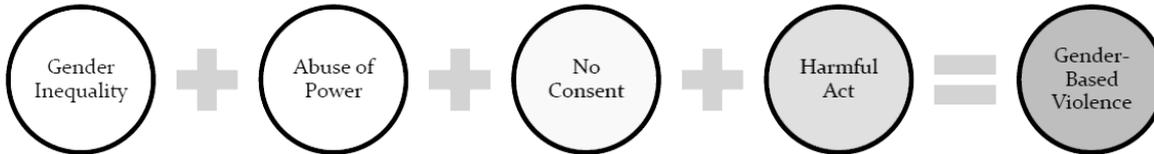
if a woman is almost fully breastfeeding, has had no menstruation yet, and is < 6 months postpartum:
if she wants LARC and has a negative pregnancy test, you can give it at that visit

12.4 GENDER BASED VIOLENCE*UPDATE

DEFINITION

Gender Based Violence (GBV) is violence against a person on the basis of gender or sex. This can happen to males or females, old or young. Think about GBV if a patient has STI symptoms, teen pregnancy, no husband, history does not match injury, caregiver that does not take care OR takes too much care (like controlling), very old with unexplained injury, mental illness or disability. (See *GBV pocket guide, Appendix 5*)

Figure 12.4 Definition of Gender based violence



At the health clinic, ANY type of gender based violence is to be treated seriously, even if it is not yet recognised by international or traditional law.

12.4.1. TYPES OF GBV

1. **Sexual Violence** = any completed or attempted sexual act against a person's consent e.g. sexual assault, rape, child sexual abuse, forced prostitution, sexual harassment (sexual comments e.g. from employer). Rape can happen to both males and females. It is defined as the invasion of *any part of a victim's body* with a sexual organ or use of an object by a perpetrator.
2. **Physical Abuse** = any form of violence within a relationship, which can be violent or neglectful to cause physical pain/injury
3. **Emotional and Psychological Violence** = non-physical violence by a partner or person that causes harm (by causing person to be frightened, humiliated, blamed etc.) e.g. verbal abuse, psychological abuse (threatening physical harm, destroying property), isolation (keep someone away) from friends/other family
4. **Social-Economic Violence** = non-physical, denying person income and social opportunities
5. **Traditional Practices** = culture specific e.g. female genital mutilation, arranged early marriage under the age of legal consent, forced marriage, honour killings, child infanticide/neglect (killing/ making a child suffer because the gender is not what the parents wanted)

TERMINOLOGY

Survivor	=	the person who suffered from the gender based violence
Perpetrator	=	the person who commits the act of gender based violence
Incident	=	the act or event that the survivor is seeking help about.
Consent	=	involves a voluntary agreement, for example: to consent to engage in a particular sexual act. Consenting people must have the mental capacity to understand the consequences of consent. Many countries have different ages for consent to sexual activity. This means that a sexual act with someone who is NOT an adult by the law is considered rape , because they are not old enough to consent.
Confidentiality	=	when you discuss cases, first be careful who you discuss with AND do not give identifying information (e.g. name, age, village, etc) unless it is for management purposes. Never post about the case online. Do not share everything the survivor tells you. You only share the necessary information with your supervisor or other people providing help. If you feel stressed or sad, try to debrief with other colleagues already involved with the case. The survivor must sign a consent form before you can share information about the case with other service providers. The health worker needs to explain who the information will be shared and the benefits and risks of sharing this information. The survivor can always refuse to share the information with others.
Child	=	Under Thai law person under the age of 15 years. Under Myanmar law under the age of 16 years. Laws may change so this definition should always be confirmed.

Recognising Domestic Violence

Many persons do not want to report domestic violence. Explain to the victim that they have the right to live without violence and that there are people who can try to help them.

12.4.2. GBV PRINCIPLES

Survivors have the right to dignity (self-respect). This right has been taken away by the perpetrator, and it must be explained to the survivor that:

**The perpetrator is wrong
AND
It is not the survivor's fault**

The **4 guiding principles** below should be followed by health staff whenever dealing with a case of violence.

1. Security/Safety

- Find a safe place so the survivors (person and their children) are away from the perpetrator (person causing them harm). Understand and respect that the survivor may not choose to leave the perpetrator yet but try to make a "safety plan" (e.g. contact the neighbour, run to the sister's house, contact police) if they choose to go home.

2. Confidentiality and Consent

- Get written permission (consent) from the survivor to share information.
- Explain that the information will only be used to tell the right people to help them.

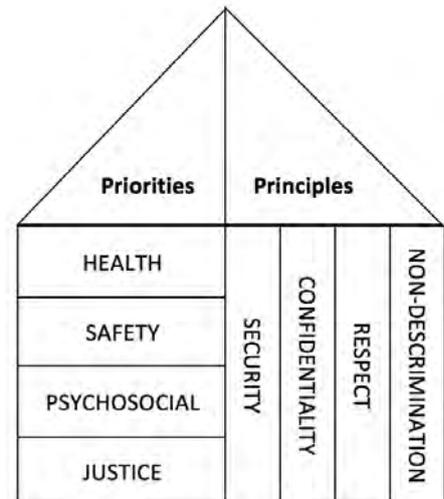
3. Respect

- Respect the choices, wishes, rights and dignity of the person. **Listen** carefully, do not judge or tell them what you think is best for them to do.
- Conduct interviews and examinations in a private and confidential room with same sex staff (and interpreters if necessary) whenever possible.
- Ask only relevant questions and avoid asking to repeat the history because this can be traumatic.

4. Non-discrimination

- Everyone has the right to equal access to services to help them.

Figure 12.5 Priorities and principles of GBV (see Appendix 6)*^{new}



12.4.3. MANAGING GBV CASES

The Thailand-Myanmar border has many organisations that have trained staff and facilities to help manage a patient who has suffered from GBV. At SMRU clinics, the GBV site Team will have up to date information about these organizations. See *GBV flowsheet* (see Appendix 6).

Aggression by perpetrators make survivors feel they don't have control of their lives.

We must help survivors feel strong again and help them feel in control.

Start talking to the survivor with these (or similar) words:

"This is not your fault. You are not alone. We are here to help you..."

"How can I support you?" "You are very brave to speak with me about this."

GBV FIRST AID

As soon as you think the patient is a GBV survivor, contact the SMRU site GBV team about the best plan. Remember your role and responsibilities. If you do not have the correct training for GBV you may cause harm to the survivor. You can use the steps below to help you manage a GBV survivor, if needed.

Here is an outline of the steps to be considered:

DO allow survivors to tell their story, **listen to them**. Be kind. Watch your body language.

DO NOT ask history that has already been told or if the patient doesn't want to tell.

DO NOT do an exam if it will need to be repeated (eg at referral hospital or by the doctor) or if the patient does not consent.

DO NOT judge the survivor or say anything that makes the survivor feel guilty.

At each step, consider if it is better to refer. If better to refer, offer referral.

1. **HEALTH:** Assess the patient for any **immediate life-threatening medical injuries** that need treatment e.g. suturing bleeding wound. **Note:** it is important to document very clearly any injuries, and what treatment has been given. If possible, take a photo of the injuries before treatment. *It may be better to just bandage the wound and refer.*

In an acute rape case (<72 hrs) AND if the patient gives written consent:

- advise the victim **not to wash/shower/change clothes**. Forensic evidence (to show in a court of law) may need to be collected by a trained person.
 - **consider immediate referral to Mae Sot Hospital/ Myawaddy hospital** or another organisation that has had training in the management of gender based violence. Referral should be strongly encouraged for GBV survivors who are children.
2. **SAFETY:** Assess risk of further attack or suicide before they leave the clinic. Offer referral to safe house or short-term stay at SMRU.
 3. **PSYCHOSOCIAL:** listen, be kind. Do not try to solve their problems. Offer information about organizations that can help. Always let the survivor decide.
 4. **LEGAL/JUSTICE:** ask if the survivor has reported to the police, village elder or other authority. Give information and let them decide:
 - **Forensic (DNA) evidence can only be taken <72 hrs after rape (at referral hospital).** Explain that it may be good to take samples now even if they don't plan to report – they may change their mind later.
 - Thai law only accepts cases reported within **3 months of the rape** (except in some special cases) so encourage them to report quickly if they plan to report.
 - **Reporting can be difficult.** Encourage them get help (e.g. from the site GBV team) if they want to report.

KEY POINTS:

**GBV survivors may be very upset and cry. This may make us uncomfortable.
The GBV survivor who is crying is having a normal reaction to an abnormal event.
DO NOT make the event seem normal: "It's not so bad, everything will be fine."
DO accept the survivor's feelings and make the feelings normal:
"You have a right to be upset and sad. It is okay to cry here. We can talk when you are ready."**

5. **Referral: Discuss with the correct people** e.g. referral organizations police, village head, **only after written consent from the patient.**

Reasons to refer a survivor:

- Experienced physical or sexual violence
- Rape <72 hrs (best chance to get forensic/DNA evidence)
- Any physical injuries (bruising, cuts, genital injuries)
- Acting unusually (e.g. very nervous/frightened/not making eye contact)
- Any suicidal thoughts
- GBV is by close neighbour or family member (not safe at home)
- The perpetrator is still nearby or can find the survivor easily (not safe)
- The survivor is <18 (especially <15), very old, or developmental delay

Always remember the 4 GBV principles when thinking about referral:
Health, Safety, Psychosocial Support and Justice.

GBV MANAGEMENT

If referral is not available, delayed, or if the survivor does not want to be referred, we must give treatment at SMRU.
Each case has different needs that we need to consider.

ASSESSMENT

1. If the patient is not being referred immediately to a hospital with GBV services, do the following assessment: Go to a private and confidential room in the clinic where you can talk to the GBV survivor. Ask them where they would be comfortable talking (they may be afraid if you take them to a very isolated place).
2. First, establish a relationship by introducing yourself; explain confidentiality. Tell the patient everything that is going to happen during the interview and the examination. Ask if they would like to ask any questions – do they want someone with them during the assessment? Tell them you would like to write down the history and examination so that you can help them.

3. Explain that everything they say will be confidential **EXCEPT IF:**
 - They give consent to share the information with another person who will help them.
 - Someone is in serious danger- such as suicidal ideas or death threats.
 - It involves allegations of abuse against an NGO, UN staff or Thai Military.
 - The patient is a minor under 15 (or 18).
4. The interview should be done with kindness. Include **counselling** techniques (see p.180). Ask a few open-ended questions. LISTEN. Avoid questions beginning with “why” – they can make the patient feel blamed. Assess the degree of distress of the survivor. Is the survivor at risk of suicide?

Suicidal thoughts

If a patient tells you that they are thinking of killing themselves, you must take this very seriously. Ask if they have specific plans to kill themselves. If they do, do not let them leave the clinic until they have been seen by a supervisor/doctor. **If the patient has suicidal thoughts you ARE allowed to break confidentiality** and inform another person, even if it is against the person’s wishes. See *suicide p.182* for more detail.

MEDICAL TREATMENT AND DOCUMENTATION

It is very important to **document all findings clearly and completely** in words and diagrams

A full examination including a genital examination **should only be done by a person trained in gender-based violence when possible**

1. Physical Examination (if possible, this should be done by a person trained in GBV)

A physical examination should include:

- Vital signs (temperature, pulse, respiration and blood pressure) and pain assessment.
- Looking for any injuries that could be life threatening (that would need referral) or immediate treatment that is needed e.g. suturing a wound.
- Collection of DNA evidence (e.g. blood, semen, loose hair, skin swabs, dirt under the fingernails, fingernail clippings, clothing, full description trauma, photographs)
- Do a normal complete physical exam (e.g. listen to heart and lungs, palpate abdomen, look at any skin bruises or injuries) – avoid focusing only on the genital exam (especially in children).

Remember that a survivor could have suffered real physical violence and not have visible trauma. If you see physical injuries (e.g. bruises, cuts, fractures) this is a sign of **severe** and dangerous violence.

2. Give emergency medical treatment

Wounds and fractures: clean, suture and dress appropriately or refer to nearest hospital. Wounds at high risk for tetanus will need a tetanus booster.

3. Specific treatment for rape victims

All rape victims should be treated for STI, PEP for HIV and Hepatitis B and pregnancy immediately:

- a) **HIV prevention: start as soon as possible after the incident**, preferably within 1-2 hours, but not more than 72 hours after. After 72 hours from the incident it is too late for HIV prophylaxis. See *post exposure prophylaxis, p.10*. Every clinic needs one or two PEP packs ready to give to rape victims (**Note:** check the expiration date). Check baseline HIV test before giving PEP. If **positive**, do not give PEP: give post-test counselling and refer to HIV treatment program.
- b) **Hepatitis B:** If the patient has not already been vaccinated, check for hepatitis B status and give immunisation with **hepatitis B vaccine** (HBV) as soon as possible if hepatitis B negative. Advise to finish the course. 1st dose: day 0 (as soon as possible), 2nd dose: 1 month, 3rd dose: 6 months.
- c) **Pregnancy prevention:**
Ask if she thinks she is pregnant already (before the rape). Is she using effective contraception (e.g. Implant, IUD, on time for depo)? Take a pregnancy test before giving emergency contraception (EC).

If pregnancy test positive: do not give her the pills. Explain this means she was pregnant **before** the rape occurred.

If pregnancy test **negative** and not using effective contraception: treatment depends on time since rape

- **<120 hours (5 days)** since incident
 - **IUD** can be used as emergency contraception and is very effective.
 - If you have access to a pack of **emergency contraception**, follow directions on the packet (either take all at once OR as 2 doses 12 hrs apart).
 - Use **combined oral contraceptive pill** containing levonorgestrel: See dose chart in section 1.2.7.
 - If needed, give **metoclopramide** 10 mg PO 1 hour before any emergency contraception pills to prevent nausea and vomiting.
- **≥120 hours (5 days) but ≤7 days** since incident: it is too late to use EC; explain that an IUD can help.
- **>7 days of the incident:** it is too late to prevent pregnancy. Check pregnancy test and follow-up.

d) **STI prevention:**

Ceftriaxone 250 mg IM STAT

AND

Metronidazole 2 g STAT

AND

Choose: Azithromycin 1g STAT

OR

Doxycycline 100 mg BID 7 days

Can give this now or later (e.g. wait until after she has finished PEP so less risk of side effects). If not given, counsel the patient to watch for signs and symptoms and come to clinic immediately. Consider doing a swab for trichomonas and gonorrhoea but offer treatment even if negative if she wants.

4. After prescribing all the necessary treatments review SAFETY.

Will the patient be safe when they leave the clinic?

Will someone try to hurt them when they leave the clinic?

Is there anyone else at home who is unsafe (e.g. brother or sister, child)?

If the patient does not feel safe, refer to an organisation that specialises in GBV. If necessary, allow short-term stay at the clinic. (Remember staff safety as well.)

FOLLOW UP

- If the patient/survivor is not being cared for by a GBV organisation, schedule a follow-up visit for 2 weeks, 1 month, and 3 months. Write the follow up visit in the lema so the patient does not forget.
- A patient can follow up sooner or more frequently.
- Follow the 4 GBV principles at all follow up visits: **Health, Safety, Psychosocial Support and Justice**
 - Give emotional and psychosocial support, review safety, offer patient about referral and support services
- **Pregnancy testing** for rape victims should be checked at 1 month and **HIV and VDRL testing** at 3 months. If no STI prevention drugs were taken an STI check may be necessary.

CHAPTER 13: GASTROINTESTINAL DISEASES

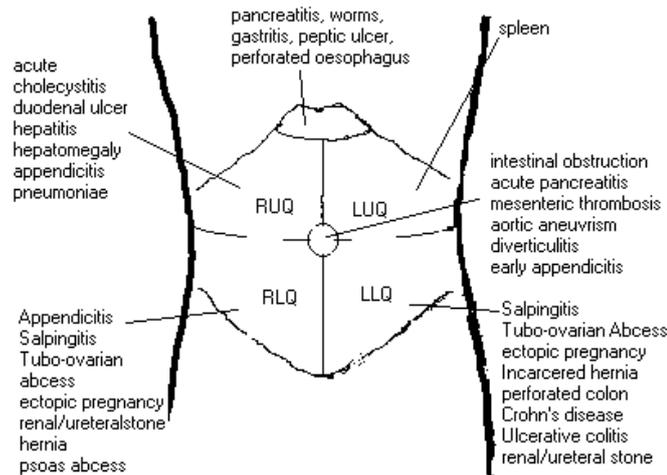
13.1 ACUTE ABDOMEN

DEFINITION

Any sudden, severe abdominal pain. There are 2 kinds of acute abdomen: non-surgical and surgical. Both kinds of acute abdomen are medical emergencies and need urgent management or immediate surgery (surgical abdomen).

CAUSES

Figure 13.1 Differential diagnosis of abdominal pain by quadrant



CAUSES OF SURGICAL ABDOMEN

Peritonitis, appendicitis, cholecystitis, pancreatitis, intestinal perforation or obstruction, acute intestinal ischemia (e.g. thromboembolism), ruptured ectopic pregnancy, ovarian torsion. Renal stones, incarcerated hernia and cholangitis might also need an operation.

CAUSES OF NON-SURGICAL ABDOMEN

Pyelonephritis, worms, diverticulitis, painful menstruation, pelvic inflammatory disease (PID), peptic ulcer (without perforation), gynaecological or obstetric problems (e.g. endometriosis, uterine fibroids, menstruation), hepatitis and dengue (abdominal pain is a warning sign).

SIGNS AND SYMPTOMS

Check the patient carefully before making a diagnosis and giving treatment. Some patients have non-specific symptoms. Examine the patient before giving pain medicine as analgesics (pain medicine) might cover symptoms and lead to the wrong diagnosis. If severe pain, analgesics may be needed to examine the patient. Examine young children when they are calm and quiet. Signs of shock may be present. Good history and examination are important to make the right diagnosis. If not sure, discuss with doctor.

1. Surgical abdomen. This is an **EMERGENCY**. Careful: some patients do not have all symptoms

- Moderate or severe (cannot walk upright) abdominal pain
- Hard, distended abdomen
- Absent bowel sounds in 4 quadrants or tinkling (like metal) sounds
- Guarding or rebound tenderness

2. Non-surgical abdomen is a soft abdomen with moderate pain

- Moderate pain
- Soft abdomen even if there is distension
- Decreased or normal bowel sounds
- No guarding or rebound

TREATMENT

- If abdomen is non-surgical, treat the cause
- If the abdomen is surgical:
 - **DRS AB-CABDE/S** (see p.27)
 - Give nothing to eat or drink (NPO – nil per oral)
 - IV **ampicillin** + IV **gentamicin** + IV **metronidazole**
 - IV fluids - **NSS**
 - **REFER THE PATIENT TO HOSPITAL IMMEDIATELY**

13.2 GASTRO-INTESTINAL BLEEDING

DEFINITION

Bleeding from the GI tract. Symptoms depend on where in the GI tract the blood is coming from. Sometimes the bleeding can be chronic e.g. from a cancer or can be acute e.g. variceal bleed.

CAUSES

Upper GI tract - stomach, oesophagus:

- Peptic ulcer disease
- Varices (portal hypertension from liver disease)
- Mucosal laceration (*Mallory-Weiss Syndrome*)
- Cancer

Lower GI tract – intestine, colon:

- Diverticulitis (pouches in wall of intestine)
- Cancer
- Inflammatory bowel disease
- Dysentery
- Haemorrhoids

SIGNS AND SYMPTOMS

- **Bleeding from the upper GI tract (UGI):**
 - Vomit brown liquid (like coffee grounds) or fresh blood
 - Melaena (black, sticky, smelly stools).
Remember that patients taking iron tablets may have black stools.
- **Bleeding from the lower GI tract (LGI):**
 - Dark blood (bleeding is high in the intestines) or bright red blood (bleeding is lower) from rectum.
- May have signs of shock – tachycardia, low BP, increased CRT, fast RR, cold peripheries.
- Bleeding from some causes e.g. peptic ulcer disease may occur slowly and be more chronic

TREATMENT

- No food or drink (NPO)
- **REFER TO HOSPITAL: Severe bleeding is an emergency; patients can become very unwell very quickly**

EMERGENCY TREATMENT FOR ACUTE BLEEDING

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment (see p.13) should be done. You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step**

Figure 13.2 DRS ABCDE for GI bleeding

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR GI BLEEDING
DRS	Danger Response Send for help	Gloves Safe place Call for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Suction (if available)
B	RR, SpO ₂ , cyanosis Chest indrawing/ tracheal tug Listen to chest	Oxygen
C	HR, BP, Cap refill Urine output, Temp Listen to HS	2 IV cannulas (biggest size possible 16G or 18G) Take bloods e.g. Hct, blood group, BUN (high), CBC, MS, dextrose etc. Fluid bolus 1L STAT Blood transfusion if signs of shock
D	Check dextrose Seizures Pain	If UGI bleeding and suspect PEPTIC ULCER DISEASE (e.g. h/o abdominal pain, no risk factors for liver disease): Omeprazole 40mg IV (or PO) <u>OR</u> Ranitidine 50mg IV (if available) AVOID NSAIDs (e.g. aspirin, ibuprofen, diclofenac) in UGI bleeding
E	AVPU/GCS Expose and examine	If suspect PORTAL HYPERTENSION (e.g. alcoholism, Hep B or C, cirrhosis) discuss with the doctor and consider: Ceftriaxone IV 1g OD for 5-7 days (varices may be associated with bacterial infection) Vitamin K IM 2.5-10mg STAT dose (to stop bleeding)
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

This patient needs referral to hospital: it is very important to make the patient as stable as possible (using DRS AB-CABDE/S) before you transport them to hospital

13.3 EPIGASTRIC PAIN

Epigastric pain is a very common complaint. Possible causes are:

13.3.1. GASTRO-OESOPHAGEAL REFLUX DISEASE

DEFINITION

Gastro-oesophageal reflux disease (GORD) is caused by a weak sphincter (muscle) between the oesophagus and the stomach which means that the acid from the stomach flows back (= reflux) into the oesophagus causing a burning pain.

RISK FACTORS

- High alcohol intake
- Obesity
- Eating spicy food, chocolate
- High caffeine intake
- Heavy smoking
- Pregnancy
- Drugs e.g. NSAIDs, steroids and doxycycline

SIGNS AND SYMPTOMS

Burning pain in the epigastric or chest area moving to the mouth with acid taste, especially when lying down. Chronic cough (less common). Long-term GORD can cause oesophageal cancer (*Barrett's oesophagus*).

DIAGNOSIS

Clinical diagnosis.

TREATMENT

Lifestyle advice:

- Stop (or at least reduce): alcohol, smoking, spicy food, chocolate, hot drinks, tea and coffee.
- Avoid eating 3 hours before bedtime; eat small meals but more frequently, do not lie down after meals.
- Advise overweight patients to lose weight, reduce fatty foods.
- If possible, avoid medications that can cause GORD.

Medications:

- See *Treatment algorithm for gastritis and epigastric pain, Figure 13.14, p.103.*

PREVENTION

Lifestyle advice (same as for treatment)

13.3.2. GASTRITIS*UPDATE

DEFINITION

Gastritis is an inflammation of the stomach mucosa (the inner surface of the stomach).

CAUSES

- *Helicobacter pylori* (*H. pylori*) bacteria in the stomach
- High alcohol intake
- Drugs: NSAIDs, steroids high dose, ferrous sulphate. Especially prolonged use is a risk factor
- Heavy smoking
- Eating spicy food
- Autoimmune (can cause *Pernicious anaemia*)

SIGNS AND SYMPTOMS

- Pain in the epigastric area (burning pain, dull pain).
- Nausea, vomiting, bloating, belching, feeling of fullness, weight loss.
- Anemia in autoimmune gastritis (decreased HCT, increased MCV and MCH)

DIAGNOSIS

Clinical diagnosis, CBC in autoimmune gastritis.

If vomiting with blood: see *Figure 13.1, p.100* for gastrointestinal emergencies.

TREATMENT

Lifestyle advice:

- Stop (or at least reduce): alcohol, smoking, spicy food, hot drinks, tea and coffee.
- Advise overweight patients to lose weight, reduce fatty foods.
- If possible, avoid medications that can cause gastritis.

Medications:

- See *Figure 13.14 Treatment algorithm for gastritis and epigastric pain, p.98.*

PREVENTION

Avoid coffee, alcohol, eating spicy foods, smoking. Avoid prolonged use of medications that cause gastritis e.g. steroids or NSAIDs (non-steroidal anti-inflammatory drug) like ibuprofen. If long term medication is absolutely necessary (e.g. steroids for nephrotic syndrome) consider **omeprazole** 20mg OD prophylaxis to prevent gastritis.

13.3.3. PEPTIC ULCER DISEASE

DEFINITION

In peptic ulcer disease, epigastric pain can be very severe. Ulcers can be in the stomach (gastric ulcer) or in the duodenum (duodenal ulcer). Often peptic ulcers are caused by infection with bacteria called *H. pylori*. Medicines that decrease stomach acid like aluminium hydroxide may make you feel better, but the ulcer may come back.

SIGNS AND SYMPTOMS

- Burning pain in the epigastric area:
 - **Gastric ulcer:** pain worse with food
 - **Duodenal ulcer:** worse before meals and in the morning (empty stomach). Pain may improve with eating but comes back 1-2 hours after a meal.
- Nausea vomiting, bloating, loss of appetite
- Weakness and fatigue due to chronic blood loss.

COMPLICATIONS

- **Acute bleeding:** In some cases, acute **bleeding** can happen. The patient will vomit brown liquid (like coffee ground) or fresh (bright red) blood and may have melaena (black sticky smelly stools). *See above for emergency treatment.*
- **Chronic bleeding:** if small amount of bleeding occurs over a long time, then the patient will become anaemic.
- **Perforation:** hole in the stomach wall or the duodenum which can lead to peritonitis (hard, very tender abdomen), sepsis and death.
 - **DRS AB-CABDE/S**
 - Give nothing to eat or drink (NPO)
 - IV **ampicillin**+ IV **gentamicin** + IV **metronidazole**
 - IV fluids – NSS

REFER THE PATIENT TO HOSPITAL IMMEDIATELY if suspect perforation

DIAGNOSIS

It is a clinical diagnosis. Examine abdomen to check for any pain/masses. Look for signs of anaemia. If possible, test for *H. pylori*. However, testing is expensive and may not be available.

TREATMENT

When giving treatment it is important to do ALL the steps, not just give medication:

1. Lifestyle advice
2. Stop any medications that make symptoms worse
3. Consider de-worming, check stool test.
4. Try step by step treatment. *See Figure 13.4, next page, Treatment algorithm for gastritis and epigastric pain.*

PREVENTION

Avoid coffee, alcohol, eating spicy foods, smoking. Avoid prolonged use of medications that may cause peptic ulcer disease (e.g. NSAIDs). If long term medication absolutely necessary e.g. steroids for nephrotic syndrome, consider **omeprazole** 20mg OD prophylaxis.

Figure 13.3 *Helicobacter pylori* description and treatment

***Helicobacter pylori* (*H. pylori*):**

H. pylori is a bacterium that is found in many people's stomachs. This bacterium is able to survive the highly acidic environment in the stomach. Most people do not know they have the infection, and it often it does not cause any problems. Sometimes it causes gastritis or ulcers. It is not known why and when people become infected. It has also been linked to stomach cancer. Testing for *H. pylori* can be done by serology, a breathing or a stool test. These tests are expensive and not routinely available at most clinics on the border.

Since the source of *H. pylori* is not yet known, recommendations for avoiding infection have not been made. In general, it is always wise for persons to wash hands thoroughly, to eat food that has been properly prepared, and to drink water from a safe, clean source.

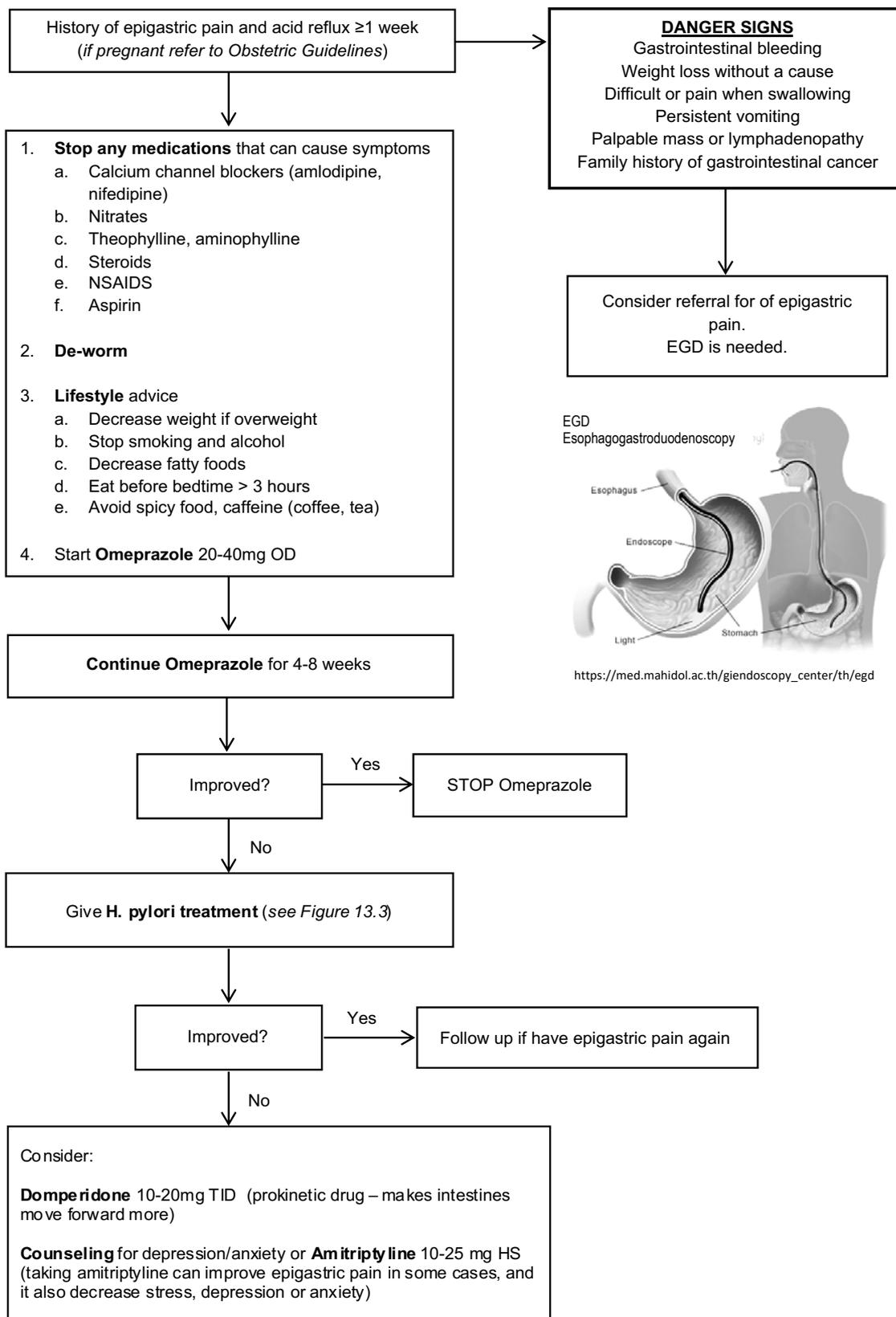
If symptoms do not improve with medical management, try to treat for *H. pylori*.

Omeprazole 20mg BID for 10 days AND
Metronidazole 500mg TID for 10 days AND
Amoxicillin 500mg TID for 10 days

Then continue **Omeprazole** 20mg OD for 2 weeks

Note: *H. pylori* may be resistant to antibiotics, so even if these medications are given the bacteria may not be cleared and the patient may not improve. Longer treatment duration (e.g. 14 days) might improve outcome.

Figure 13.4 Treatment algorithm for gastritis and epigastric pain ^{*update}



If the pain does not improve when this algorithm, comes back again and again, or getting worse, discuss with doctor. There could be another problem like cancer (see section 13.3.6, p.104) or *H. pylori* resistance to antibiotics (see Figure 13.3, p.102).

13.3.4. WORMS

Worms often give epigastric and/or abdominal pain in children and adults.

Check stool sample and treat all epigastric pain with a course of **mebendazole** or **albendazole**.
(Not in children < 1 year or pregnant women in first trimester).

13.3.5. ANXIETY

An anxious (feeling nervous) person can complain of epigastric pain. Try to take a good history and look especially at the social history. **You need to rule out other causes of abdominal pain before considering anxiety as the diagnosis.**

13.3.6. STOMACH CANCER

In a patient with chronic or recurrent **epigastric pain** (sometimes not responding to treatment) and **weight loss**, consider the possibility of cancer, especially if more than 60 years old. Symptoms of weight loss, loss of appetite, weakness and fatigue make the diagnosis more likely. A large lymph node above the left clavicle is a sign of cancer of the stomach. The treatment is chemotherapy with cancer drugs, but this is only available at high level hospitals. If cancer treatment is not available, you can provide palliative care.

13.4 DIARRHOEA

DEFINITION

Diarrhoea is a symptom and not a disease.

Use the ISOLATION protocol for diarrhoea patients. (see p.8)

**Start SURVEILLANCE
DEPENDING ON NUMBERS**
See Appendix 7

Acute diarrhoea = an increase in the number (>3/day) AND loose or watery stools passed over a period of less than 14 days. Acute diarrhoea can have many different causes (gastrointestinal infection, food poisoning, surgical problems, allergy, food intolerance or other diseases).

Chronic diarrhoea = A diarrhoeal episode that lasts more than 2 weeks. Possible causes are inflammatory bowel disease, hyperthyroidism, cancer, abuse of laxatives, gastrointestinal tuberculosis. (**Note:** causes and treatments for chronic diarrhoea are different than for acute diarrhoea).

Two types of acute diarrhoea are described: (mixed syndromes can occur)

1. DIARRHOEA WITHOUT BLOOD, see p.109

Stools are very liquid (watery diarrhoea), many stools, and clear colour (brown, yellowish). There may be fever and abdominal pain but there is no blood or mucus in stools. The cause can be viral, bacterial (e.g. Cholera, *Salmonella* non-typhoid), some *E. coli* strains) or parasitic (e.g. *Giardia*, *Cryptosporidium*). **Note:** acute diarrhoea without blood can also be seen in malaria or systemic allergic reactions.

2. DYSENTERIC DIARRHOEA - DIARRHOEA WITH BLOOD, see p.109

Stools are soft rather than liquid and are with blood. There is abdominal pain and fever can be high. Most common causes are *Shigella*, *Campylobacter*, some *E. coli* strains. Parasites (e.g. *Entamoeba histolytica*) can also cause dysentery (usually without high fever).

SIGNS AND SYMPTOMS

- How many days has the patient had diarrhoea? How many times per day?
- Is it watery or with blood?
- Is there abdominal pain, rectal pain, tenesmus (feeling always need to pass stools), fever or vomiting?

Figure 13.5 Causes of acute diarrhoea

	DIARRHOEA WITHOUT BLOOD	DYSENTERIC DIARRHOEA
Signs	Sometimes fever, slight abdominal pain, vomiting	High fever Moderate to severe abdominal pain, vomiting
Stools	Watery	With blood
Life-threatening	Dehydration	Sepsis

DIAGNOSIS

It is most important to evaluate and treat dehydration. Diagnosis is made clinically: diarrhoea without blood or dysentery. To specify between viral, bacterial or amoebic disease you need to do a **stool-test**. Consider the next points:

- For all types: First evaluate the **signs of dehydration** (see below).
- If there is **fever** you must also think of concurrent (“other”) diseases such as malaria, otitis media, pneumonia, meningitis or UTI.
- If signs of purging (very large volume) watery diarrhoea or repeated vomiting, think of **Cholera**.
- If the patient has **abdominal signs**: a tender abdomen or abdominal distension, think of surgical causes (e.g. obstruction or perforation).
- With **chronic diarrhoea** (>2 weeks) check for malnutrition and chronic diseases e.g. HIV.

TREATMENT

Follow these steps to safely diagnose and treat diarrhoea:

1. Assess acute or chronic
2. Evaluate hydration status using the WHO criteria.
3. Choose a treatment according to the WHO criteria.
4. Recognise the syndrome: diarrhoea without blood or with blood (dysentery).
5. Consider causes of diarrhoea and if any antibiotics are needed.

Below is more detail about each stage of management:

1. Assess acute or chronic:

As per definition above.

2. Evaluate hydration using the WHO criteria

Diarrhoea (mainly diarrhoea without blood) can lead to severe dehydration (especially in children). First assess your patient for signs of dehydration.

Figure 13.6 Clinical signs for evaluating dehydration (WHO plan)

	Plan A: No Dehydration	Plan B: Mild Dehydration	Plan C: Severe Dehydration
		2 or more of:	2 or more of:
General conditions	Normal	Agitated	Very tired or unconscious
Eyes	Normal	Slightly sunken	Deeply sunken
Tears	Present	Absent	Absent
Mouth and Tongue	Moist	Dry	Very dry
Thirsty	None	Yes	Not able to drink (too weak to express the need)
Skin pinch	Goes back normally (quickly)	Goes back slowly	Goes back very slowly

3. Choose a treatment according to the WHO criteria:

The decision on whether to admit and how to treat the patient is dependent on the WHO classification A, B or C. Once evaluating the level of dehydration then follow the treatment:

Figure 13.7 WHO Plan A for dehydration

WHO PLAN A

To treat diarrhoea at home and prevent dehydration

(SEE APPENDIX 8, FOR ORS/RICE WATER)

The patient has no signs of dehydration. No need to admit to IPD.

Rules of home treatment:

GIVE EXTRA FLUID

- **How much?**
 - After each loose stool give:
 - Child < 2 yrs: 50-100ml (quarter of a large cup).
 - Child 2-10 yrs: 100-200ml (half of a large cup).
 - Older child and adults: give patient enough ORS for at least 2 litre.
- **What fluid to give?**
 - **Oral Rehydration Solution (ORS).**
You can also give salted rice water, salted yoghurt drink or vegetable/ chicken soup with salt. Be careful, too much salt can make dehydration worse (“osmotic dehydration”)
 - Do not give fluids e.g. carbonated (fizzy) drinks, commercial fruit juices, sweetened tea, tea or coffee.

How to give?

- Give frequent, small sips from a cup.
- If there is vomiting, wait 10 minutes then continue more slowly.
- Continue to give extra fluids until the diarrhoea stops.

-

ZINC

Zinc sulphate Child <6m: 10mg OD; Child 6m-5yrs: 20mg OD for 10-14 days*. (1 tablet = 15mg)

Note: no benefit to give if child >5yrs so DO NOT GIVE.

- Infants: dissolve tablet in a small amount of expressed breast milk, ORS or clean water; in a spoon.
- Older children: chew tablets or dissolve in a small amount of clean water in a cup or spoon.

Remind the mother to give the zinc supplements for **10-14 days***.

CONTINUE FEEDING

- **Continue to feed normal diet, and increase breast feeding:**
 - **Infants who are not breastfeeding:** continue usual milk formula at least every 3 hours (if possible, by cup).
 - **Infants who are less than 6 months who are being breastfed and given extra food** should try to increase breastfeeding (more times and for longer each feed) and decrease the food (ideally to **exclusive breastfeeding**).
 - **Children older than 6 months** that are not taking soft food should be given cereals (or bread, rice) and vegetables in addition to milk. Educate the parents about giving solid foods.
- Recommend food rich in potassium as this can be lost in the diarrhoea/vomiting e.g. banana, green coconut water, fresh fruit juice, tomatoes.

ADVISE WHEN TO COME BACK

- **You should tell the family/patient that they should return if:**
 - Pass many watery stools
 - Is very thirsty
 - Blood in stool
 - Vomits a lot
 - Not better after 3 days
 - Has a fever
 - Does not eat or drink normally.

-

Figure 13.8 WHO Plan B for dehydration

WHO PLAN B

To treat dehydration

(SEE APPENDIX 8 FOR ORS/RICE WATER)

The patient has **signs of dehydration** (see Figure 13.6, p.105). Needs to be admitted to IPD.

REHYDRATE

Give ORS in the first 4 hours according to the table below.
 Vomiting is very common especially in the first 1-2 hours: **if the child vomits wait 5-10 minutes and try again more slowly (small but frequent amounts of fluid) – do not go straight to IV fluids because of vomiting:**

Table 3: WHO Guidelines approximate amount of ORS to give in first 4 hours

**** Use age if you cannot get weight****

Weight	< 5kg	5-7.9kg	8-10.9kg	11-15.9kg	16-29.9kg	30kg or more
Age**	<4 months	4-11 months	12-23 months	2-4 years	5-14 years	15 years +
ORS	200-400ml	400-600ml	600-800ml	800-1200ml	1200-2200ml	2200-4000ml

Note: If patient wants more ORS then give them more

REASSESS

Assess for signs of dehydration **every 1 hour**. If signs of dehydration get worse and the child develops signs of severe dehydration e.g. very tired or unconscious, deeply sunken eyes, not able to drink treat for severe dehydration (Plan C).
 After **4 hours** reassess fully according to Table 2 then decide what treatment plan to continue:

- No signs of dehydration → plan A
- Some dehydration → plan B **AND offer food, milk and other fluids (as above)**
- Worsening dehydration → plan C

ZINC

Zinc sulphate Child <6m: 10mg OD; Child 6m-5yrs: 20mg OD for 10-14 days*.
Note: no benefit to give if child >5yrs so **DO NOT GIVE**.

- Infants: dissolve tablet in a small amount of expressed breast milk, ORS or clean water; in a spoon.
- Older children: chew tablets or dissolve in a small amount of clean water in a cup or spoon.

Remind the mother to give the zinc supplements for the **full 10-14 days***.

FEEDING

- Solid food should not be given in the first four hours (except breastfeeding).
- After 4 hours if plan B or plan A is continued, give food every 3-4 hours (as per plan A feeding).
- If change to treatment plan A children >6m should have some food before they are discharged.

Figure 13.9 WHO Plan C for dehydration

WHO PLAN C
****EMERGENCY** to treat severe dehydration:**

DRS AB-CABDE/S emergency approach, see p.16. Needs admission to IPD

REHYDRATE
 Give IV hydration with Ringers Lactate^a:

	Whilst waiting for IV access	First give 30ml/kg in:	Then give 70ml/kg in: (or use SMRU IVF chart ^b)	When to re-assess
Infants under 12 months	Give ORS	1 hour	5 hours	6 hours
Older than 12 months	Give ORS	30 minutes	2 ½ hours	3 hours

How to calculate drop rate

$$\text{Drops/Minute} = \frac{\text{ml}}{\text{hour}} \times \frac{\text{drops per 1 ml}^*}{60}$$

Giving sets:
 No set*: 1 ml = 20 drops
 Metroset* (burette): 1 ml = 60 drops
 Blood set*: 1 ml = 15 drops

Example I	Example II
You want to give 500 ml in 5 hours with Metroset:	You want to give 500 ml in 5 hours without set:
$\text{Drops/Min} = \frac{500}{5} \times \frac{60^*}{60} = 100 \text{ drops/min}$	$\text{Drops/Min} = \frac{500}{5} \times \frac{20^*}{60} = 33 \text{ drops/min}$

If cannot get IV access, give ORS by nasogastric tube (NG tube): 20ml/kg/hr for 6 hours. Check clinical condition as for IV infusion. Continue to try for IV access, it will become easier as the patient becomes more hydrated.

Also give ORS (approx. 5ml/kg/hour) as soon as the patient can drink (usually after 3-4hrs (infants) or 1-2 hrs (children)).

REASSESS
 Do vital signs every 15 minutes initially.
After 1-2 hours: if IV hydration is not improving then increase the rate of the fluid.
After 3 hours (children/adults) and 6 hours (infants) re-assess according to Table 2:

- No signs of dehydration → plan A (observe the child for at least 6 hours)
- Some dehydration → plan B (stop IV fluid and give ORS)
- Worsening dehydration → plan C again

ZINC
Zinc sulphate Child <6m: 10mg OD; Child 6m-5yrs: 20mg OD for 10-14 days*.
Note: no benefit to give if child >5yrs so DO NOT GIVE.

- Infants: dissolve tablet in a small amount of expressed breast milk, ORS or clean water; in a spoon.
- Older children: chew tablets or dissolve in a small amount of clean water in a cup or spoon.
- Remind the mother to give the zinc supplements for the **full 10-14 days***.

FEEDING

- Should not be given until at least the first re-assessment (except for breastfeeding).
- If continuing on plan B or plan A give food every 3-4 hours as described above.
- If change to treatment plan A, children >6m should have some food before they are discharged.

^a Use a Metroset (burette) if the patient is <15kg and the IVF bag is 500ml. If a small child receives a large amount of IV fluid suddenly, it may cause sudden pulmonary oedema.

^b At SMRU an IVF chart is used for giving maintenance IVF. See Appendix 9.

DIARRHOEA WITHOUT BLOOD

**Most patients with watery diarrhoea do NOT need antibiotics.
REHYDRATION is the most important treatment.
Check the stool sample as some intestinal parasites can cause diarrhoea (e.g. *G. intestinalis*).**

Most cases of acute diarrhoea without blood do not need antibiotic treatment. However, there are (at least) two special cases of watery diarrhoea that do need antibiotics.

Cholera: In cases of acute fulminant watery diarrhoea ('rice-water stools') consider cholera. Cholera should be suspected when a child older than 5 years, or an adult, develops severe dehydration from acute watery diarrhoea (usually with vomiting), or if any patient older than 2 years has acute watery diarrhoea when cholera is known to be present in the area. Antibiotics can be given patients with severe cholera, as they have been shown to reduce the volume and duration of the diarrhoea (e.g. **Ciprofloxacin** 500 mg BID for 3 days or **Azithromycin** 1000 mg STAT).

Giardia : This diarrhoea is caused by the protozoa *Giardia intestinalis*. In most cases, there are only few clinical signs: nausea, abdominal pain, weight loss, (watery) diarrhoea. There is no fever. If the diarrhoea becomes chronic (>14 days): treat with **metronidazole** or **tinidazole** (at SMRU use tinidazole, see *Figure 13.14 Worm treatment table, p.122*).

DYSENTERY – DIARRHOEA WITH BLOOD

If possible, a stool sample should be done.

There are two types of dysentery:

Bacterial: Several types of bacteria cause dysentery, the most severe form is *Shigella*. Associated symptoms: fever, abdominal pain, tenesmus (feeling of constantly needing to pass stools), unwell patient.

Amoebic: Often not acute illness, less than 30% of sufferers have fever. Sometimes the amoebae migrate via the blood and cause abscesses (e.g. liver).

It can be difficult to know difference between amoebic and bacterial diarrhoea without a microscopic stool investigation (if a stool culture is needed discuss with the micro lab if a stool sample can be sent). Choose the treatment according to patient's symptoms (especially presence of fever and if patient is at risk):

ADULT PATIENTS AT RISK

1. Patient over 65 years old with no support at home to help them.
2. Malnourished.
3. High fever >39°C.
4. Signs of severe dehydration.
5. Signs of confusion, seizures or coma.

1. NO FEVER – (more likely amoebic)

Admit to IPD if the patient is **at risk**. If possible, isolate the patient (see p.8, *Isolation guidelines*)

Prescribe **metronidazole PO x 5-10 days** (10 days if amoebic liver abscess):

- Adult: 750mg TID
- Child: 15mg/kg TID

Note: Metronidazole doses for amoeba are higher than usual. Follow the dose given here

2. FEVER

Admit to IPD if patient is **at risk**. If possible, isolate the patient (see p.8, *Isolation guidelines*)

Treat the fever with paracetamol, treat/prevent dehydration

Use antibiotics with caution as in some infections (e.g. enterohemorrhagic *E. coli*), antibiotic use can lead to endotoxin release from dying bacteria.

If condition requires antibiotics, give **ciprofloxacin PO x 3-5 days**. Can stop after 3 days if better.

- Adults: 500mg BID
- Child >1m 15mg/kg BID

Note: if pregnant (ciprofloxacin contraindicated) give **ceftriaxone IV 1g OD for 3-5 days**.

If not better give **metronidazole** (dose as above).

Ensure sufficient food intake of normal diet.

MANAGEMENT

1. Watch for complications of abdominal distension, perforation, and sepsis
2. For all diarrhoea do a stool-test to try to differentiate between amoebic and bacterial diarrhoea. If stool test is negative it does not mean there is no amoeba, sometimes it is difficult to find with a microscope. When there is an increased number of cases of diarrhoea, take stool samples for laboratory analysis (culture and sensitivity) if possible, inform the doctor and prepare for an outbreak of dysentery.

PREVENTION

Give the following education to all patients to prevent diarrhoea:

- Wash hands with soap and water before eating, preparing food and after visiting the toilet.
- Breastfeed babies (exclusive breast feeding if <6m).
- Boil drinking water if not chlorinated (some parasites (e.g. *Cyclospora*) are resistant to chlorination)
- Cook food well and keep it covered.
- Use toilets. Clean carefully after passing stools.
- Do not use chronic antacid (like aluminium, omeprazole); gastric acidity helps to kill bacteria.

COMPLICATIONS

Septicaemia, acute abdomen, amoebic liver abscess and haemolytic uremic syndrome (HUS - anaemia, low platelets and acute renal failure which can be caused by some *E. coli* strains).

13.5 CHOLERA

Cholera is very infectious – if suspect a case then use safety precautions and discuss with the doctor about referral to hospital. (see p.8, *Isolation guidelines*)

DEFINITION

Cholera is an intestinal infection caused by the bacterium *Vibrio cholerae*. This bacterium produces Cholera Toxin (CT), an enterotoxin which causes a massive outpouring of fluid and salts (electrolytes) into the bowel. Cholera infection is transmitted through contaminated water or food.

Cholera should be suspected when a child older than 5 years, or an adult, develops severe dehydration from acute watery diarrhoea (usually with vomiting), or if any patient older than 2 years has acute watery diarrhoea when cholera is known to be present in the area.

SIGNS AND SYMPTOMS

- Infections range from asymptomatic to acute fulminant watery diarrhoea, described as 'rice-water stools'.
- In severe cases, purging watery diarrhoea can rapidly cause the loss of 10% or more of the body's weight, with hypovolemic shock, metabolic acidosis and potassium loss causing death.
- Vomiting starts after the onset of (always painless) diarrhoea.
- 75% or more of initial infections with *V. cholerae* are asymptomatic, depending on the infecting dose.
- People with blood type O are more likely to develop severe cholera than those with other blood types.

DIAGNOSIS

Diagnosis is made clinically

In outbreaks, in non-epidemic situations a stool-sample test for *V. cholera* can be done. Because cholera is very contagious, refer the suspect case to a hospital that can manage cholera.

TREATMENT

If suspect cholera – put in IV line, give Ringers Lactate 1L STAT and refer to hospital immediately

If patient cannot be referred to a hospital, then follow these steps:

- Rapid replacement of lost fluid and electrolytes using immediate oral or IV rehydration. A patient needs 10-15 litres of fluid the first day. In severely dehydrated patients give IV 50-100ml/kg/hr.
- Rehydrate with Ringers Lactate with careful replacement of potassium after 24h of fluid replacement. Check potassium and blood glucose. If hypokalaemia, add potassium chloride (20-40mmol KCl) in one litre Ringers Lactate. See electrolyte abnormality p.64.
- Antimicrobial therapy is indicated for severely dehydrated patients 2 years or older.
- Several antibiotics are recommended by WHO (doxycycline, tetracycline, trimethoprim-sulfamethoxazole, erythromycin, chloramphenicol or ciprofloxacin but different resistance levels are found in different parts of the world. Previous recommendation for the Thai-Myanmar border is **ciprofloxacin 1 gram STAT dose**. It is recommended to check for resistance in your clinic before starting treatment, but this may not be possible.

If cannot refer it is VERY important to take precautions to avoid the spread of cholera:
 Isolate patients in a separate area/room
 Make a hole in the bed so the stool falls into a chlorinated bucket
 Make sure you wear protective equipment (see p.8 for Isolation precautions)

PREVENTION

Use clean water for hand-washing and for cooking.
 Avoid uncooked seafood.
 Be careful when eating leftovers of rice because cholera can grow easily in old rice.

VACCINE

There are vaccines for short-term protection (6 months). They should be given in case of an outbreak situation.

13.6 LIVER DISEASES

13.6.1. LIVER FUNCTION TESTS (LFTS)*NEW

Liver function tests (LFTs) can be used to help diagnose liver disease. They can also help you distinguish between different types of liver diseases. There are many causes for abnormal LFTs but here is an overall explanation:

Figure 13.10 Liver enzymes and causes of abnormal values*new

LIVER ENZYMES	FUNCTION	CAUSES
AST/ALT	Enzymes produced by the liver that get released in the blood when the liver is damaged.	High if: Problem with liver cells e.g. hepatitis, toxins, cirrhosis, cancer, some drugs, cardiac failure.
ALP	Found in high amounts in the liver, bone and placenta. The normal range depends on the patients age.	High if: Cholestasis (decreased bile flow, e.g. obstruction with gallstones) Bone e.g. fracture, tumour, growing bones in children Kidney failure Pregnancy
GGT	Produced with diseases of liver, pancreas and biliary tract i.e. gallbladder.	High if: Cholestasis, cholecystitis, hepatitis, cancer and alcohol excess. If GGT high and ALP also high helps to say it is liver problem rather than bone problem
Albumin	Major blood protein in the body that is produced in the liver.	Low if: Malnutrition, chronic liver disease, nephrotic syndrome, gastro-intestinal loss, burns
Bilirubin	Waste product of the RBC degradation. To remove bilirubin from the body the liver 'conjugates' the bilirubin to <i>direct</i> bilirubin. Direct bilirubin is water soluble that can be excreted with stool/urine. An increase in bilirubin is called <i>icterus</i> and presents as jaundice.	
Unconjugated (indirect) bilirubin	Bilirubin that has not been <i>conjugated</i> . If indirect bilirubin is >80% of total bilirubin, suggestive of pre-hepatic icterus.	High if: Haemolysis e.g. G6PD, drug reaction
Conjugated (direct) bilirubin	Bilirubin that has been conjugated by the liver. If direct bilirubin is elevated, the liver changes bilirubin but there is a problem with excretion.	Liver problems (e.g. hepatitis) or blocked bile ducts (e.g. gallstones, congenital bile duct problem, pancreatic cancer)

13.6.2. HEPATITIS

DEFINITION

Hepatitis is an inflammation of the liver. It has many causes, but the commonest on the Thai-Myanmar border is viral hepatitis.

Hepatitis can be:

Acute e.g. hepatitis A or drug reactions (most will improve if the drug is stopped).

Acute or chronic e.g. hepatitis B: may be acute if the body's immune system manages to fight the virus (then become immune and cannot get infected again), or may become chronic and lead to liver cirrhosis (*see below*).

Chronic e.g. autoimmune hepatitis: will get worse over time.

CAUSES

1. Viral Infection:

Figure 13.11 Viral hepatitis (A, B, C), Cytomegalovirus, Epstein-Barr Virus

	Transmission	Length of infection	Treatment	Complication
Hepatitis A	Faeco-oral e.g. poor hygiene	Acute, usually self-limiting	Supportive	Severe illness if pregnant
Hepatitis B	Contact with infected blood or body fluids, mother to child, sexual intercourse	Acute or chronic: 5% of adults infected will become chronic 95% neonates infected will become chronic	Antiviral drugs (may not be available). <i>See OB guidelines</i> for peri-natal prevention	Liver cirrhosis Liver cancer Associated with Hepatitis D infection
Hepatitis C	Contact with infected blood, congenital	Often chronic	Antiviral drugs (may not be available)	Liver cirrhosis Liver cancer
Hepatitis E	Faeco-oral	Acute, usually self-limiting	Supportive	Severe illness in pregnancy possible

- Parasitic** (e.g. Liver flukes, *E. histolytica*, malaria)
- Metabolic syndrome** (non-alcoholic liver disease)
- Drugs:** e.g. anti-TB drugs, HIV drugs, leprosy drugs, paracetamol (dose-dependent)
- Alcoholic hepatitis**
- Autoimmune hepatitis**

SIGNS AND SYMPTOMS

- Jaundice
- Malaise (fatigue, tiredness)
- Mild fever
- Loss of appetite
- Nausea and vomiting
- Right upper quadrant pain
- Smooth, tender and slightly enlarged liver
- Dark urine, stools not pale

Viral hepatitis infection can cause different symptoms in each patient. Some patients will have moderate symptoms (e.g. fatigue) and other patients may have severe liver disease.

DIAGNOSIS

Liver function test (AST/ALT raised >1000U/L)

Hepatitis B testing (*see below*)

Liver ultrasound

Interpretation of Hepatitis B results:

For definitions e.g. antibody/antigen *see Figure 13.12, next page*.

Note: In some settings it is not usually needed to check all of these tests (often only HBsAg +/- HBeAg are tested). Sometimes only the rapid test for HBsAg is available.

HBsAg (Hepatitis B surface antigen)

- Protein on the surface of the hepatitis B virus which is present during acute or chronic infection.
- Means that the person is infectious e.g. can pass the infection on to someone else.

Anti-HBs (antibody against hepatitis B surface antigen)

- Antibody that is formed when the immune system fights the hepatitis B virus.
- It means that the person has developed immunity either from an infection of hepatitis B or from the vaccine.

HBcAg (Hepatitis B core antigen)

- Protein inside the hepatitis B virus.
- Means that the virus is replicating e.g. making copies of the virus and that the patient is infectious.

IgM anti-HBc (IgM antibody against hepatitis B core antigen)

- Antibodies against hepatitis B core antigen when the symptoms begin in acute hepatitis B.
- Means recent or new infection, or exacerbation of chronic infection

Anti-HBc (IgG antibody against hepatitis B core antigen)

- Antibodies that stay positive for life.
- Means that the patient has an acute ongoing infection or had a previous infection.

HBeAg (Hepatitis B e antigen)

- Similar to hepatitis core antigen.
- Means that the patient is **very infectious**.

Figure 13.12 Hep B viral markers

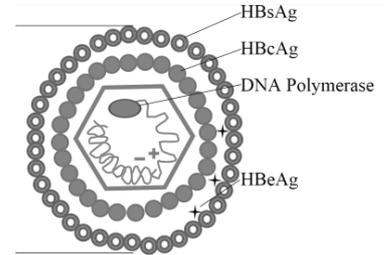
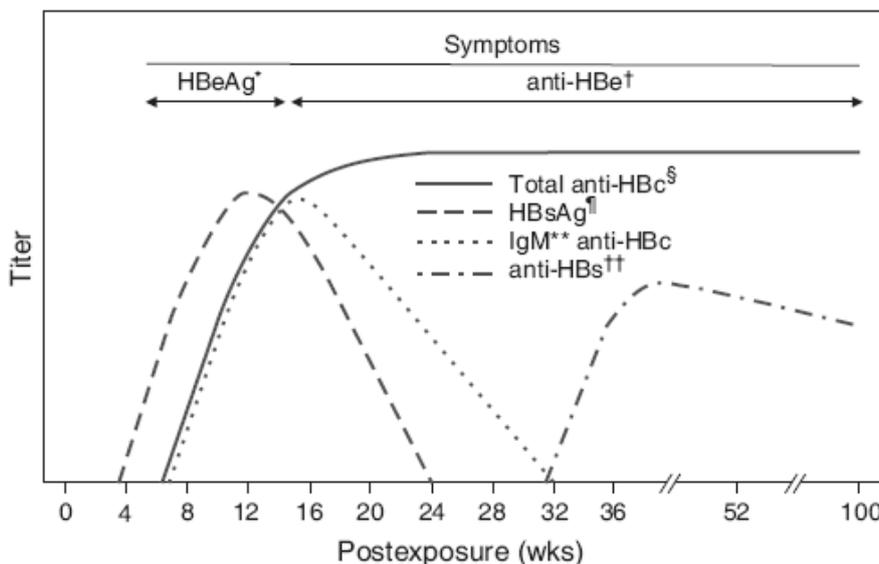


Figure 13.13 Hepatitis B serology interpretation

HBsAg	Anti-HBc-Ab	Anti-HBs-Ab	IgM anti-HBc-Ab	Interpretation
-	-	-		No acute or chronic infection. Hep B infection in incubation period; repeat Hep B diagnostic after 2-6 month if suspected. Not immunised and could become infected if exposed.
-	+	+		No acute or chronic infection. Patient has previous infection. Depending on the antibody level, the patient is now immune.
-	-	+		No acute or chronic infection. Patient had hepatitis B vaccination. Immunity depends on antibody level
+	+	-	+	Acute infection
+	+	-	-	Chronic infection (can check HBeAg to see if patient is very infectious)
-	+	-		Unclear – could be: 1. Resolved infection (most common) 2. False positive anti-HBc 3. Low level chronic infection 4. Resolving acute infection

Figure 13.14 Serology of acute Hepatitis B infection and recovery^{*new}



- * Hepatitis B e antigen.
- † Antibody to HBeAg.
- § Antibody to hepatitis B core antigen.
- ¶ Hepatitis B surface antigen.
- ** Immunoglobulin M.
- †† Antibody to HBsAg.

TREATMENT

Supportive treatment only: if the patient is dehydrated, or cannot eat or drink, admit to IPD.

Encourage the patient to drink or give maintenance IV fluids.

No alcohol!

If the patient is taking drugs that could affect the liver (e.g. paracetamol), stop the drugs and discuss with the doctor.

When giving medications be careful to check if safe in liver disease or if a different dose needs to be given.

Specific treatment for hepatitis B or C is not available at many clinics on the border.

PREVENTION

Hepatitis A: improvement of sanitation.

Hepatitis B: general precautions for health workers, vaccination (and immunoglobulin) including for PEP (see p.11), testing of donor blood, condom use, don't re-use needles.

Hepatitis C: general precautions for health workers, testing of donor blood (although not currently available at most clinics on the border), don't re-use needles.

VACCINATION

Hepatitis B vaccine (see *Vaccine schedule for Thailand and Myanmar, Appendix 2*).

13.6.3. LIVER CIRRHOSIS

DEFINITION

Cirrhosis is a chronic liver disease that destroys the cells of the liver and replaces them with scar tissue. This is an irreversible (cannot be cured) liver tissue damage.

CAUSES

Common causes:

Chronic alcohol abuse

Chronic hepatitis B (or C) virus is a common cause

Less common causes

1. Auto-immune e.g. primary biliary cirrhosis
2. Genetic e.g. Recurrent haemolysis due to blood disorders, biliary atresia (congenital structural abnormality of liver/bile ducts), enzyme deficiency (Alpha-1-Antitrypsin)
3. Drugs e.g. isoniazid, steroids, paracetamol overdose
4. Chronic heart failure ("Cardiac cirrhosis")

SIGNS AND SYMPTOMS

- Jaundice
- Malaise, weakness, bodily itching
- Red palm of hands (palmar erythema)
- Slow hand tremor
- Ascites, oedema of the legs and back
- Muscle wasting
- Spider naevi (red spider-like blood vessels on the skin)
- Hair loss
- Loss of libido (decreased sex drive)
- Peripheral neuropathy
- Hepatic neuropathy
- Men: Gynaecomastia, testicular atrophy, impotence
- Women: Breast atrophy, irregular menstruation, amenorrhoea
- Haemorrhage: bruises, purpura, epistaxis
- Portal hypertension: splenomegaly, caput medusa (distended abdominal veins), variceal bleeding (varices are distended veins in the GI tract, especially the oesophagus)
- Hand signs: clubbing, pigmentation, Dupuytren's contracture (thickening of the tendon of little/ring finger), white nails

COMPLICATIONS

- Hypoglycaemia
- Liver failure +/- encephalopathy (confusion, disorientation)
- Portal hypertension +/- oesophageal varices +/- GI bleeding
- Ascites
- Infections (spontaneous bacterial peritonitis)
- Poor nutrition +/- vitamin deficiencies
- Gastro-intestinal bleeding (bleeding of varices in oesophagus)
- Hepatocellular carcinoma (liver cancer)
- Heart and kidney failure

DIAGNOSIS

Liver function test (AST/ALT high, albumin low); sometimes the LFT are not elevated because the liver does not produce enough enzymes anymore. Alpha feto-protein (AFP) is a blood test for liver cancer, discuss with doctor if appropriate. Ultrasound of liver, if available.

TREATMENT

It is not possible to cure cirrhosis, only to control the symptoms and to delay liver failure:

General Treatment:

- Strongly advise patients to STOP alcohol – give support in stopping if addicted to alcohol.
- Nutrition: high protein, low salt diet.
- Monitor BP, because HBP can increase portal hypertension (high BP in the portal vein, see below). Portal hypertension is a risk for bleeding from varices.
- If possible, vaccinate against Hepatitis B, if not already infected. If Hepatitis B positive give counselling for their partner to get screening/immunisation.
- Avoid drugs that can cause liver toxicity e.g. paracetamol, Anti-TB drugs, statins, NSAIDs.
- If alcohol is the cause give prophylactic thiamine (vitamin B1) to prevent Wernicke's encephalopathy
- Lactulose helps preventing constipation and maybe beneficial in hepatic encephalopathy.

Specific treatment:

1. Portal Hypertension

DEFINITION

A patient with liver cirrhosis will have scarring in the liver which causes increased pressure in the portal vein (the blood vessel that carries blood from the spleen and GI tract to the liver). Increased pressure causes the veins in the oesophagus, stomach, rectum and abdominal wall to dilate (called varices) and possibly rupture and bleed. This will cause fresh blood in vomit (haematemesis) or bleeding in the stool (melaena or fresh bright red blood).

SIGNS AND SYMPTOMS

- Splenomegaly
- Caput medusa (distended abdominal veins)
- Variceal bleeding

TREATMENT

In case of an acute upper gastrointestinal haemorrhage: use DRS AB-CABDE/S management (*Figure 13.2, p.100*)

- When stable start propranolol 40mg BID to decrease the risk of bleeding from the varices. Increase to 80mg BID according to HR/BP (max 160mg BID).

2. Ascites

DEFINITION

Fluid collection in the abdominal cavity. May lead to abdominal distension and is caused by portal hypertension and/or low albumin.

DIAGNOSIS

- Clinical – look for other signs of liver failure.
- Abdominal ultrasound – to look at liver, kidneys and amount of ascites.
- Think about other causes of oedema e.g. heart failure, kidney failure, low albumin (consider blood tests e.g. albumin, BUN & creatinine).

TREATMENT

- Decrease salt intake.
- Diuretics
 - **Spirolactone** 50mg OD (increased to 200-400mg OD if needed)
 - **Furosemide** 20mg OD (increase to 120mg if necessary)
 - **Increase diuretics by ratio of 2:5 furosemide:spironolactone**
 - **Note:** Long term high doses of diuretics should have sodium, potassium, BUN and creatinine monitoring
- Record weight daily.
- If tense ascites does not improve with medication, consider paracentesis to remove ascitic fluid. Discuss with doctor. how much fluid to remove as removing too much liquid can lead to circulatory collapse. After paracentesis, the patient will feel better, but the fluid will return and ascites will become tense again.

Complications of paracentesis are infection, bleeding (hematoma, hemoperitoneum) or bowel perforation

3. Spontaneous Bacterial Peritonitis (SBP)

DEFINITION

Patients with ascites are at risk of getting infections of the ascitic fluid without any obvious source of infection. Common organisms are *Klebsiella*, *E. coli* and *pneumococcus*. Anaerobic organisms are rare (<1%)

SYMPTOMS

- Abdominal pain
- Fever (although may not have fever)
- Decreased bowel sounds
- Sometimes confusion, drowsiness

DIAGNOSIS

- If possible, check CBC, blood culture, Liver function tests (LFTs), creatinine & BUN
- If unsure of diagnosis can send sample of peritoneal fluid for culture and cell count (Likely SBP if neutrophils >250cell/mm³).
- **Note:** DO NOT WAIT FOR RESULTS BEFORE GIVING ANTIBIOTICS

TREATMENT

1. Start **ceftriaxone** IV 1g OD
2. Use metronidazole only if you suspect anaerobic infection (<1% of causes of SBP)

4. Hepatic Encephalopathy

DEFINITION

Normally the liver removes the toxins (e.g. ammonia) in the blood. A damaged liver (e.g. cirrhosis) does not remove toxins well, so toxin level increases in the body. The toxins cause changes to brain function (decreased consciousness, irritability, confusion). Infection, constipation or gastrointestinal bleeding can also increase the risk for changes in consciousness.

SYMPTOMS

- Sleep problems (sleeping too much/drowsy, too little, or sleeping during the day)
- Mood or personality changes
- Trouble concentrating or thinking clearly
- Shaking
- Slurred speech
- Coma

DIAGNOSIS

Clinical, look for an infection, rule out any other causes of confusion (e.g. stroke etc.)

TREATMENT

- If available give **lactulose** 30ml OD or BID (this decreases ammonia production and helps pass stool)
- Stop diuretics and correct electrolyte abnormalities
- Treat any infection, dehydration, or GI bleeding
- Remove any sedatives (medications, drugs or alcohol)

5. Hepatocellular carcinoma

DEFINITION

Primary cancer of the liver

RISK FACTORS

1. Alcohol excess
2. Hepatitis B and C
3. Aflatoxin (a toxin produced by fungus)
4. Liver cirrhosis
5. Haemochromatosis (disease with high iron levels)
6. Wilson's disease (disease with high copper levels)
7. (Liver flukes (e.g. *Opisthorchis* or *Clonorchis*) can cause cholangiocarcinoma (cancer of the bile duct)

DIAGNOSIS

Ultrasound of liver, can check alpha feto-protein (AFP) but AFP is not very reliable. Definite diagnosis is made by liver biopsy and histologic examination.

TREATMENT

If treatment is not available, consider referral to hospital. If referral is also not possible, provide palliative care.

13.6.4. BILIARY COLIC

DEFINITION

Biliary colic is severe abdominal pain caused by the passage of a stone through the bile duct. When there is an obstruction of the bile duct, jaundice can occur. The blockage may be caused by gallstones or worms (especially ascaris). During pregnancy, gallstones are more common.

RISK FACTORS

Four Fs – Female, Fertile, Fat, Forty (years old)

SIGNS AND SYMPTOMS

- Pain comes in waves (colicky) and can radiate to back and right shoulder
- Guarding in right upper quadrant (RUQ)
- Central abdominal pain moving to RUQ
- Vomiting
- No fever, no jaundice

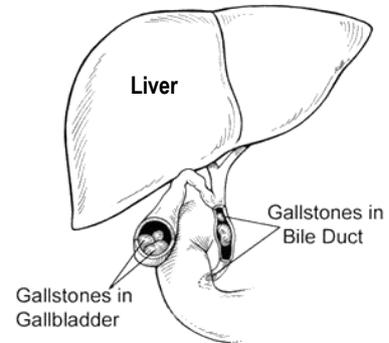
DIAGNOSIS

Diagnosis is made clinically. Ultrasound of gallbladder to reveal stones (if available). Check stool for worms.

TREATMENT

- **Buscopan** IM or IV 20mg, not more than 4 times per day
- **Analgesics** (e.g. ibuprofen, diclofenac). Opioids (e.g. tramadol) may increase the pressure in the bile ducts system and should only be given in severe pain.
- If the pain persists after two injections of buscopan and NSAIDs consult a doctor.
- Worm treatment

Figure 13.15 Anatomy of the liver



If there is also evidence of infection e.g. fever, high WBC then treat as acute cholecystitis

PREVENTION

Regular deworming (e.g. of pregnant women)
Intake of a healthy, low fat diet.
Weight loss

13.6.5. ACUTE CHOLECYSTITIS

DEFINITION

Acute cholecystitis is a bacterial infection of the gall bladder mostly due to obstruction of the bile ducts. It may follow an attack of biliary colic. Cholecystitis can also be due to malnutrition or typhoid fever.

SIGNS and SYMPTOMS

- Pain, tenderness and guarding in the RUQ. Pain radiating to the right shoulder.
- Vomiting
- Fevers, rigors
- Jaundice (if bile duct obstruction)

DIAGNOSIS

Diagnosis is made clinically and by ultrasound. A specific sign for acute cholecystitis is the Murphy's sign. This is when the RUQ is palpated at the same time as the patient is asked to take a deep breath. If he suddenly stops inspiration (due to pain), this is a positive sign.

If available, do an ultrasound of the gallbladder. Findings suggestive of cholecystitis are gallstones, fluid around the gallbladder, gallbladder wall thickening (> 3 mm) and dilated bile ducts.

COMPLICATIONS

Empyema (gallbladder fills with pus), gallbladder rupture, formation of a fistula, peritonitis.

Watch for signs of acute abdomen. This is an emergency.

TREATMENT

- Bed rest
- IV fluids, no food or drink
- **Buscopan** IM or IV 20mg QDS (max 100mg/d)
- Strong Analgesia e.g. **tramadol** PO 50-100mg, not more often than every 4 hours (max dose 400mg/d)
- **Ceftriaxone** IV 1g OD and **metronidazole** IV 500mg TID
 - When fever decreases change to oral **ciprofloxacin** 500mg BID and **metronidazole** 500mg TID (total 10 days of antibiotics)
- Once the acute infection is over consider referral for surgical removal of gallbladder. Without surgery, recurrence is 25%.

PREVENTION

Surgical removal of the gallbladder will prevent further attacks of cholecystitis.

Intake of a healthy, low fat diet.

Lose weight

13.6.6. ACUTE PANCREATITIS

DEFINITION

Acute pancreatitis is inflammation of the pancreas. Acute pancreatitis can become chronic. Patients can become very unwell, very quickly (mortality rate 10-15%).

CAUSES – “I GET SMASHED”

1. Idiopathic (no obvious reason)
2. Gallstones
3. Ethanol (= Alcohol)
4. Trauma
5. Less common:
 - Steroids Medications e.g. steroids, HIV drugs, metformin
 - Mumps infection
 - Autoimmune
 - Scorpion poison
 - Hypercalcemia, hypertriglyceridemia
 - ERCP (a surgical procedure)
 - Drugs (Tetracycline, furosemide, co-trimoxazole)

SIGNS AND SYMPTOMS

- Severe epigastric pain radiating to back (like a belt); mostly dull pain
- Nausea, vomiting
- Jaundice
- If chronic pancreatitis: weight loss, fatty stool (floats on the water and bad smell), diarrhoea

Jaundice without abdominal pain is suspicious for pancreatic or gallbladder cancer, examine for a mass

DIAGNOSIS

Clinical: typical history and epigastric tenderness on examination. No signs of peritonitis/bowel obstruction.

If possible, consider checking amylase (if pancreatitis will be 3 or more times the normal range).

Ultrasound may show inflamed pancreas (very difficult to see), but may also show cause e.g. gallstones, alcoholic fatty liver disease.

COMPLICATIONS

Acute respiratory distress syndrome, acute renal failure, haemorrhage in the GI-tract or retroperitoneal (due to erosion of blood vessels), hypotensive shock, chronic pancreatitis, abscess or necrosis of pancreas, pseudocysts, pleural effusion.

TREATMENT

- Bed rest
- Strict NPO - No food or drink until the inflammation has resolved.
- Intravenous fluids – NSS, D5W, careful **monitoring of fluid input/output** is very important.
- **Buscopan** IM or IV 20mg QDS (max 100mg/d)
- Strong Analgesia e.g. **tramadol** PO 50-100mg, not more often than every 4 hours (max 400mg/d).
- No surgery is needed.

PREVENTION

Gallbladder removal after cholecystitis, decrease alcohol intake, weight loss.

13.6.7. LIVER ABSCESS

DEFINITION

One or more collections of pus within the liver. There are two types of liver abscess:

1. Amoebic

Due to the protozoa *E. histolytica*
More common than bacterial in tropical settings.
The patient may report a recent episode of dysentery.
Treat with metronidazole, drainage only for selected cases.

2. Bacterial (= pyogenic)

Mostly due to *E. coli*, *Klebsiella*, *Proteus*,
Staphylococcus and *Streptococcus*
Mostly from bacteria ascending the bile ducts.
The patient is often unwell/septic.
Drainage and antibiotics are the main treatment.

SIGNS AND SYMPTOMS

- Fever, chills, no appetite, nausea. Sometimes just feel unwell.
- Painful and enlarged liver (hepatomegaly) on palpation or percussion (in 50% of cases).
- Sometimes chest pain with a right-sided pleural effusion.
- Usually no jaundice, no splenomegaly, no ascites (if present think of other diagnoses).

DIAGNOSIS

Clinical symptoms

Ultrasound

Check stool sample as it can help to find specific cause (e.g. *E. histolytica*, or in rare cases liver flukes, such as *Fasciola hepatica*, *Clonorchis* and *Opisthorchis* can cause liver abscess by blocking the bile flow)

TREATMENT

Treatment depends on the cause of the abscess (amoebic or pyogenic). But it is difficult to know the difference between these two forms.

1. Amoebic abscess: the patient is mostly stable (moderately unwell/ not septic)

Start **metronidazole** PO x 7-10 days:

Adults: 750mg TID
Child 15mg/kg TID

****Note:** Metronidazole doses for amoeba are higher than usual. Follow the recommended dose.

Drainage of amoebic abscesses is not routinely recommended. Consider drainage in the following situations (i) high risk of liver rupture (e.g. abscess > 5 cm), (ii) abscess in the left lobe of the liver, (iii) not improving with metronidazole treatment (3-5 days), (iv) if you are unsure if amoebic or pyogenic abscess.

2. Bacterial (= pyogenic) abscess: the patient is mostly unwell/septic:

Drainage of the abscess is the most important treatment. Discuss this with the patient and consider referring the patient to the hospital for surgical drainage.

Start **IV ampicillin, gentamicin and PO metronidazole** (dose as for stable patient).
Continue for 10-14 days.

If the patient does not improve on treatment, consider other causes (e.g. parasites, hepatic tuberculosis)

PREVENTION

Adequate and early treatment of (amoebic) dysentery could prevent liver abscess.

13.7 INTESTINAL WORMS

Intestinal worms are very common (*ascaris* / *hookworm*/ *trichuris* / *small liver flukes*). There are different ways how patients get infected.

Worms should be treated to:

1. Prevent anaemia, malnutrition, impaired growth, delayed development.
2. Prevent the following complications:
 - Intestinal obstruction/obstructive jaundice
 - Cysticercosis (*Taenia solium*) – lesions in brain and skin
 - Cancer (in an infection with small liver flukes)

Immunosuppressive medication decreases the immune system response. Worm infections can get worse. Therefore, **ALWAYS** check the stool and consider deworming even if stool sample is negative in patients that need steroids (e.g. prednisolone) for another disease.

13.7.1. SOIL-TRANSMITTED HELMINTHS

DEFINITION

Soil-transmitted helminths are *ascaris*, *hookworm* and *trichuris*. These worms do not require an intermediate host and humans get primarily infected through contaminated soil. Eggs are passed in the faeces (= stool) by an infected person. To get infected with *Ascaris* and *Trichuris* these eggs need to be ingested (e.g. contaminated hands or fingers, food or water). Hookworm larvae hatch from eggs that were passed with the stool and penetrate through the skin (e.g. waling barefoot). The adult worms live in the intestines of the infected person. *Ascaris* and hookworm larvae migrate through the body to get to the intestine, while *Trichuris* larvae develop inside the intestine. Children infected with worms are more affected by worm infections (e.g. impaired growth and developmental delay).

SIGNS AND SYMPTOMS

- Mostly asymptomatic
- Worms can be seen in the stool or vomit
- Abdominal pain or diarrhoea
- Epigastric pain, especially in hookworm infection
- Fever, dry cough during larva migration
- Enlarged, swollen abdomen
- Chronic anaemia
- Chronic micronutrient loss
- Complications: intestinal obstruction, jaundice, rectal prolapse
- Rash from migrating worm (cutaneous larva migrans) occurs in an infection with a zoonotic hookworm (e.g. dog hookworm).
- Larva currens in *strongyloides* infection

DIAGNOSIS

Stool microscopy test for eggs and/or larvae.
CBC can show eosinophilia.

TREATMENT

- See Figure 13.16 Treatment of worms table, p.122.
- **Treat any associated anaemia** and malnutrition

Note: A negative stool samples does not exclude a worm infection. If worms are suspected but do not have a stool sample, treat the patient empirically,

Mass deworming projects are recommended for all schoolchildren and pregnant women in the second and third trimester of pregnancy in areas where worms are endemic

PREVENTION

Advise people to use latrines, wash hands after passing stools and before eating/cooking, wear shoes.

13.7.2. TAENIA (TAPE WORM)

DEFINITION

This worm is long, flat, made up of many short segments (= proglottids) and can be up to 10 meters long. Patients get infected by eating raw or undercooked pork (*Taenia solium*) or cattle (*Taenia saginata*). The eggs and the segments (proglottids) of these parasites leave the human body in the stools and infect pigs or cattle.

SIGNS AND SYMPTOMS

- Patient sees worm pieces in stools or vomit
- Abdominal discomfort, epigastric pain, nausea
- Patient eats a lot but still loses weight
- If humans accidentally ingest *T. solium* eggs directly (instead of the contaminated pork meat), nodules (= cysticerci) can be found in the skin or muscles. If cysticerci migrate to the brain, cysts can form in the brain and cause seizures. Neurocysticercosis is the most common cause of epilepsys in tropical regions.

DIAGNOSIS

Stool microscopy.
CBC can show eosinophilia.

TREATMENT

- See Figure 13.16 Treatment of worms table, p.122.

PREVENTION

Advise people to:

- Avoid eating raw or undercooked pork and any meat in general
- Wash hands with soap and water after using the toilet and before handling food, use latrines
- Meat should be inspected for cysts: do not eat pork/cattle if it is likely to be infected with tapeworm

13.7.3. LIVER FLUKES*NEW

Opisthorchis viverrini and *Clonorchis sinensis*, which are known as small liver flukes (SLF), and *Fasciola hepatica* (known as common liver fluke). These parasites are flatworms that reside in the bile ducts. Infection occurs by ingestion of undercooked freshwater fish (*Opisthorchis* and *Clonorchis*) and vegetable (e.g. water cress) in *Fasciola*.

SIGNS AND SYMPTOMS

- Mostly asymptomatic
- Abdominal discomfort/pain
- Nausea/vomiting, loss of appetite

COMPLICATIONS: *Opisthorchis* and *Clonorchis* significantly increase the risk of cancer (cholangiocarcinoma). The longer the patient is infected, the higher the risk is. Repeated treatment, as a sign of repeated infection is also increasing the risk. Other complications are hepatic fibrosis, cholangitis, cholecystitis, obstructive jaundice and liver abscess.

DIAGNOSIS

Stool microscopy.

CBC can show eosinophilia.

Ultrasound to check for complications

TREATMENT

- See Figure 13.16 Treatment of worms table, p.122.

PREVENTION

Advise people to:

- Avoid eating raw or undercooked fish (small liver flukes)
- Advise to clean or cook vegetable before consumption (*Fasciola*)

Figure 13.16 Treatment options for worms

Organism	Treatment	
	Oral treatment for adults and children >1 year (avoid in 1st trimester of pregnancy)	Children (avoid in children < 6 mo old)
Roundworms (Nematodes): infection by contact with soil/water/food infected with human faeces		
Hookworm	1. Albendazole ¹ 400mg STAT 2. Mebendazole 100mg BD x 3 days	Mebendazole ² (6mo - 1 year OR < 10kg) Give 50mg STAT or BD x 3d
Ascaris Lumbricoides		
Trichostrongyliasis	1. Mebendazole 100mg BD x 3 days 2. Albendazole ¹ 400mg OD x 3 days	Albendazole ^{1,2} (1 - 2 years old) Give 200mg STAT or OD x 3d
Trichuris Trichiura		
Enterobius Vermicularis	1. Albendazole ¹ 400mg STAT, repeat day 14 2. Mebendazole 100mg STAT, repeat day 14	
Strongyloides larva	1. Albendazole ¹ 400mg OD x 3 days	
Capillaria	1. Albendazole ¹ 400mg OD, for 10 days 2. Mebendazole 200mg BD, for 20 days	Consider treatment up to 30 days. Relapse is common if treatment is not completed.
Tapeworm (Cestode): infection from ingesting raw or undercooked infected meat		
Taenia species	Praziquantal ³ 10mg/kg STAT	Only use if >2 years old. Give adult dose
Hymenolepis nana or diminuta	Praziquantal ³ 25mg/kg STAT, repeat day 14	
Flatworms (Trematodes): ingestion of raw, undercooked, alted, pickled, or smoked freshwater fish, crab, or crayfish		
Opisthorchis viverrini, Clonorchis sinensis	Praziquantal ³ 25mg/kg/dose TID x 3 days	Only use if >2 years old. Give adult dose
Paragonimus		
Fasciola hepatica	Refer: discuss with doctor	
Protozoa: infection from contaminated water or food		
Giarda Lamblia	Tinidazole 2g STAT	Only use if > 3 years old. Give 50mg/kg STAT or OD x 3d ²
Entamoeba histolytica	Tinidazole 2g OD x 3 days	
Balantidium Coli		
Blastocystics Hominis, Entamoeba Coli	No treatment, not pathogenic; if symptoms repeat stool test	
Cryptosporidium	Refer: discuss with doctor	Consider treatment if symptomatic or immunocompromised

NOTE: This table may be updated again in the future. The worm treatment table is different from the 2018 Obstetric guidelines.

¹ Albendazole should be given when empty stomach. Avoid in the first trimester of pregnancy.

² Mebendazole maximum child dose should not be more than the adult dose. Avoid in the first trimester of pregnancy.

³ Praziquantal should be chewed before swallowing

CHAPTER 14: GENITO-UTERINE DISEASES

14.1 URINARY TRACT INFECTIONS*UPDATE

DEFINITION

Urinary Tract Infection (UTI): symptoms and bacteria in the urine from an infection somewhere between the kidneys and the bladder.

- **Lower UTI (cystitis):** infection in the **bladder**
- **Upper UTI (pyelonephritis)** infection in the **kidney**
- **Prostatitis:** infection of the **prostate**

Diabetes Mellitus is a risk factor for UTI. **UTIs in men are not common**, so think about other diagnosis e.g. prostatitis, STIs, renal stones or enlarged prostate (if older age). Urinary tract infections in children require treatment as soon as possible in order to prevent kidney damage. Recurrent UTIs can lead to urinary tract stones, urinary tract obstruction from scarring or chronic renal failure.

In SMRU clinics there is an increasing resistance of bacteria to some antibiotics like amoxicillin and cotrimoxazole. Treatment of UTI should be according to local resistance/sensitivity patterns at each hospital (or organization). Refer to SMRU antibiogram or discuss with microbiology lab.

CAUSES

1. Ordinary bacteria, usually E. coli, can cause acute or chronic UTI
2. Tuberculosis bacteria causes chronic UTI
3. Sexually transmitted infections (STI)
4. Urethral catheter
5. Obstruction of urinary tract with stones or mass or congenital abnormality
6. Intercourse
7. Pregnancy
8. No special cause in some females

All children < 5 years old with more than one UTI should be referred for further investigation at a hospital if possible. Unexplained recurrent UTIs in adults may be caused by urinary tract stones, tumours or STIs. Consider referral.

If you suspect a UTI you must think of lower UTI/cystitis (infection of the bladder) or upper UTI/pyelonephritis (infection of the kidney.) **Note:** Cystitis NEVER has fever in adults.

SIGNS AND SYMPTOMS

Lower UTI Cystitis	<ul style="list-style-type: none"> • Dysuria (pain or burning when pass urine NOT HOT URINE WITH FEVER) • Cloudy urine • Blood in urine (haematuria) • Frequent urination • Pain and tenderness lower abdomen 	**NO FEVER**
Upper UTI Pyelonephritis	Symptoms of lower UTI AND/OR <ul style="list-style-type: none"> • Flank pain (kidney area) • Chills and rigors • Sepsis or shock 	**AND FEVER**

Remember to also ask about:

- Vaginal itchiness: **consider candida**
- Vaginal or penile discharge: **consider STI**
- If suprapubic pain: is it similar to menstrual pain? **Consider menstrual cramps**
- Recent antibiotic use: may affect the culture being positive

DIAGNOSIS

Urine dipstick, urine sediment, and urine culture (Ucx)

Urine dipstick and sediment are not very accurate for diagnosis, but you can get results immediately. Urine culture is the best test but takes a few days for results.

Figure 14.1 Interpretation of urine dipstick and urine sediment results in patients with lower UTI symptoms

Urine Dipstick	Urine Sediment	Action
Any Positive or Strong Positive	NA	Treat as UTI
Weak Positive	Negative	Maybe UTI
Negative	Positive	Maybe UTI
Negative	Negative	UTI unlikely
Urine dipstick: Any positive = WBC* ≥ 1 OR nitrite positive Weak positive = WBC 1 OR WBC 2 only (nitrite negative) Strong positive = WBC 3 AND/OR nitrite positive Negative = WBC 0 AND nitrite negative		Urine sediment: Positive = WBC ≥ 10 AND Epithelial cells < 5 Negative = WBC <10 Contaminated = Epithelial cells ≥5 (need to repeat)

* WBC = leucocyte

Extra-information you can get from the tests:

Urine Dipstick:

- **Specific gravity:** a sign of dehydration, normal hydration = <1.010, mild = 1.010-1.020, moderate = 1.021-1.030, severe >1.030
- **Ketones:** sign of anorexia, if ketones high check dextrose – if dextrose high may be a sign of diabetic ketoacidosis (*see Diabetic emergency see p.25*)
- **Glucose:** If positive, this is a sign of diabetes
- **Protein:** if very high may be a sign of renal failure – consider checking BUN/Creatinine
- **Blood (erythrocytes):** especially if WBC/nitrite negative may be a sign of renal stones or trauma
- **Haemoglobin:** may be a sign of haemolysis
- **Urobilinogen:** a sign of haemolysis or liver disease.

Urine Sediment:

- **RBC casts, granular casts or waxy casts:** consider renal failure, discuss with doctor –check BUN/ Creatinine
- **WBC casts:** suggest infection or inflammation
- **Crystals e.g. phosphate, calcium:** consider renal stones

Figure 14.2 How to interpret urine culture results

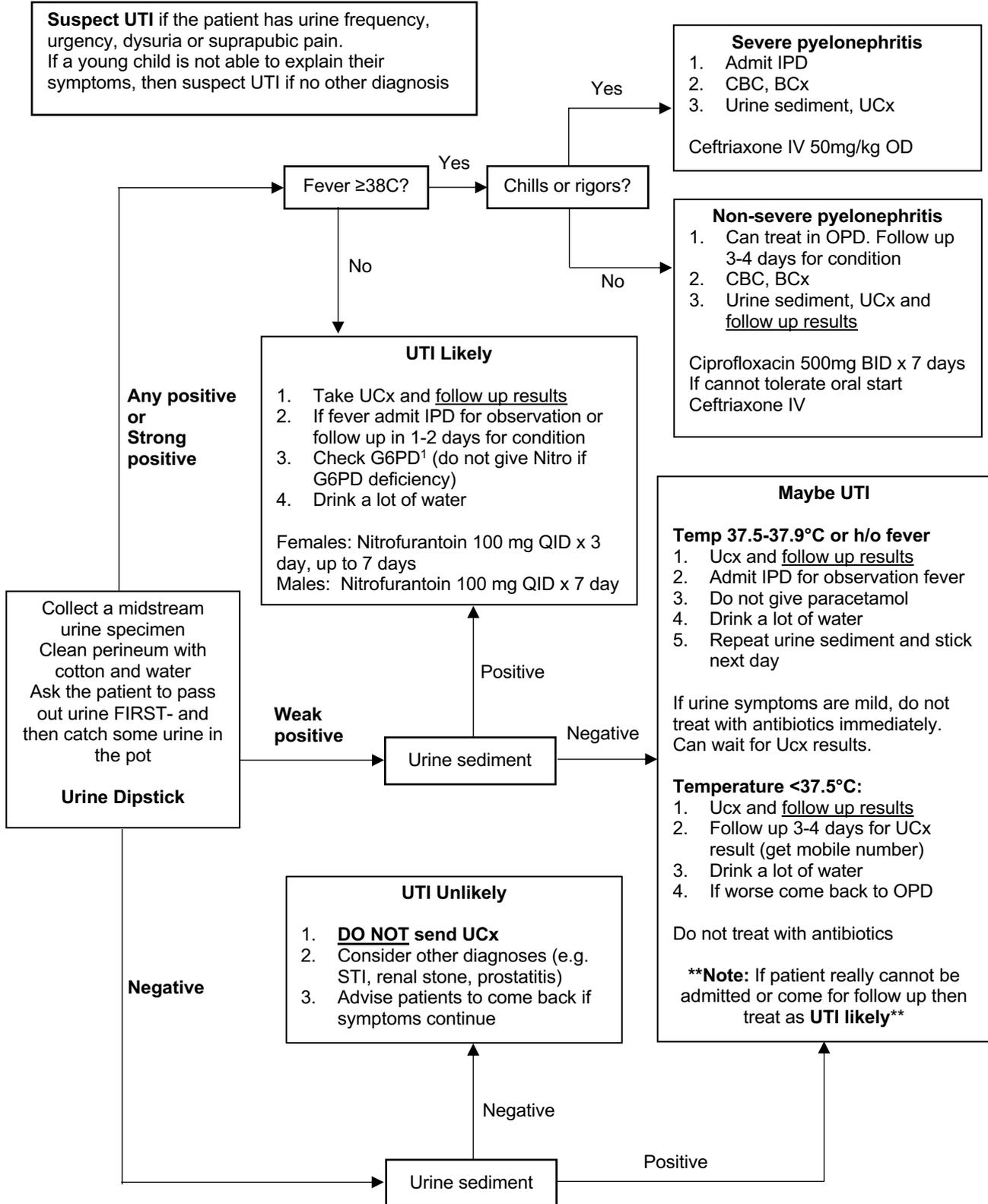
Urine culture (UCx): do a mid-stream urine collection (MSU) in sterile container. Store in fridge. Transport in cool box.	
Mixed growth of > 2 organisms	Contaminated specimen (not clean). Needs to be repeated.
Mixed growth and one organism >10 ⁵ cfu	Not a clean specimen, but the organism found may be causing illness. If found on ANC screening, check symptoms, repeat culture.
One organism >10 ⁵ cfu	Most likely urine is infected. Look at the drug sensitivities and treat with the safest, cheapest oral drug that is effective against that organism (e.g. nitrofurantoin, Amoxicillin/Ampicillin and cotrimoxazole are cheapest; In G6PD deficiency Cipro is safer than Nitrofurantoin/Fosfomycin)
Antibiotic resistance to antibiotics	If no symptoms, discuss with doctor. Do not give antibiotics. Consider follow up, counsel on preventing UTI, and repeat MSU

TREATMENT FOR UTI

- For routine treatment of UTI, *see Figure 14.2 on the next page.*
- If the patient has recent UTI treatment, there could be a resistant bacterial infection (*see p.162*). Ask the patient to follow up in the clinic for the urine culture result.
- Multi-drug resistant bacteria are increasing. Try to always send urine culture to confirm diagnosis and sensitivity. Change treatment based on culture results.
- Alternative treatments if bacteria are resistant:
 - Cotri BID for 3 days (if the bacteria are sensitive on urine culture)
 - Fosfomycin 3 gm po x 1 (stat) dose or 1 gm IV x 1 (stat) dose
 - Meropenem 1gm IV TID, discuss with doctor for how long to treat

In cases of recurrent cystitis, think about bladder stone, kidney stone, STIs, or resistant bacteria.
 Men do not usually get cystitis. Think about STIs or prostatitis in a man with UTI symptoms.
 Recurrent UTIs in children should be investigated with ultrasound.

Figure 14.2 Flowchart for UTI and pyelonephritis ≥ 3 years old (see Appendix 10 for < 3 years old)^{*update}



¹Note: Nitrofurantoin and ciprofloxacin can cause haemolysis in G6PD deficiency. If G6PD deficient **do not use nitrofurantoin**. You can still use ciprofloxacin but the patient should stop the drug and to return to IPD if symptoms of **jaundice** or **dark urine** occur.

TREATMENT FOR PYELONEPHRITIS^{UPDATE}

DRS AB-CABDE/S if unwell:

1. Admit to IPD
2. Send urine culture
3. Antibiotics
 - Patient not vomiting/septic: PO **ciprofloxacin** 500mg BID for **7 days** (10 days if pregnant)
 - Patient vomiting/septic: IV **ceftriaxone** 1g OD: treat with IV for 24 hours after afebrile then change to PO **ciprofloxacin** or a sensitive antibiotic (depending on urine culture results) to complete **7 days**.
 - If the patient has received antibiotics for UTI or pyelonephritis recently, the patient may be at risk for multi drug resistant bacteria, see p.162. Discuss with doctor.
4. Treat pain and fever
5. Monitor urine output
6. Advise to drink plenty of water (3-4 litres/day for adults)
7. IV fluids if not able to drink water/ signs of shock
8. Ultrasound scan of kidneys (if available) to look for any abnormal anatomy (in children) or signs of obstruction and hydronephrosis (stone)

It is important to check the urine culture result and change antibiotics if the bacteria are resistant.

PREVENTION OF UTI AND PYELONEPHRITIS

- Drink at least 2 litres of water per day
- Urinate at least 3-4 times per day so urine does not stay in bladder for a long time
 - In females, it is important to urinate immediately after intercourse
- Encourage good hygiene
- Avoid constipation, so urine does not stay in the bladder (bladder cannot empty well because of stool)

14.2 PROSTATITIS

DEFINITION

Inflammation of the prostate. Can be associated with STI.

SIGNS AND SYMPTOMS

- Fever
- Pain and tenderness in the rectum or when pass stool
- Often very painful rectal examination
- Cloudy urine
- Haematuria (blood in urine)
- Dysuria (pain or burning when passing urine)
- Frequent urination

DIAGNOSIS

- **Rectal examination**
- **Examine urine:** cloudy or bloody urine
- **Urine dipstick** and **urine sediment** positive

TREATMENT

DRS AB-CABDE/S if unwell

1. Treat in IPD until the patient's temperature returns to normal.
2. Prevent dehydration: drink plenty of water (3-4 litres/day for adults).
3. If the patient cannot drink, give IV fluids and monitor urine output.
4. Treat pain and fever
5. Avoid constipation – advise high fibre diet
6. **Antibiotics**
 - **Ciprofloxacin** 500 mg BID oral for **4 weeks**.
 - If the patient cannot take oral medication: **Ceftriaxone** 1 gram OD IV/IM until the patient can tolerate oral medication.

14.3 KIDNEY STONES

DEFINITION

The formation of stones in the urinary system (in bladder or in kidney), can cause partial or complete obstruction. Stones formed in the kidney can travel down and block the ureters or urethra. Stones in the kidney cause kidney pain. Stones in the ureter cause renal colic.

In patients with repeated urinary infections look for stones.

SIGNS AND SYMPTOMS

- Severe acute lumbar or pelvic pain; intermittent (**renal colic: patient cannot lie still and has pain that spreads from flank to pubic area**) or constant.
- Blood in the urine (**haematuria**).
- The patient passes **stones in the urine**.
- If also has infection may have fever, chills, dysuria etc.

DIAGNOSIS

Urine dipstick: Often positive for blood. If positive WBC/nitrite there could also be an infection.

Urine sediment: Often positive for RBC. If positive WBC/bacteria there could also be an infection.

Ultrasound kidney or bladder to look for stones and any abnormal anatomy which would make stones more likely. Bladder stones are more common in children and if very big or cannot pass, should refer for surgical removal.

TREATMENT

- Admit to IPD.
- Drink 3-4 litres/day for adults. If unable to drink, give IV fluids.
- If fever and chills (secondary infection) treat as for pyelonephritis.
- Treat the pain according to the severity:
 - **Paracetamol**
 - **Ibuprofen, diclofenac, aspirin** PO or IM are alternatives
 - **Buscopan** (hyoscine butylbromide) IM/IV depending on severity
 - Child 6-12 yrs: 5-10mg TID (max 30mg/d)
 - Child >12 yrs or Adult: 20mg QDS (max 100mg/d)
 - Repeat the same dose after 30 minutes if still pain
 - **Do not buscopan use for pregnant women**
 - **Tramadol** PO 50-100mg, not more often than 4 hours (max 400mg/d)

Consider referral:

If pain is not relieved with maximal analgesia.

If there are signs of urethral obstruction (e.g. suprapubic pain and no urine output)

If there is chronic obstruction to prevent kidney damage

PREVENTION

Drink plenty of fluids, as dehydration is a risk factor. Avoid food that could cause stones (peppers, cashew nuts, cocoa, grapefruit/orange juice, black tea, Cola).

14.4 ACUTE KIDNEY INJURY

DEFINITION

Acute kidney injury (AKI) is a sudden loss of kidney function. It is very important to treat AKI quickly as patients can become very unwell and it can lead to complications including death. It may also lead to chronic kidney disease.

Normal urine output should be at least 0.5ml/kg/hr in adults and 1ml/kg/hr in children

SIGNS AND SYMPTOMS

Most often will have symptoms of the cause (e.g. diarrhoea causing dehydration, flank pain from renal stone). May also complain of:

- Fatigue
 - Headache
 - Nausea/Vomiting
 - Loss of appetite
 - Low urine output (oliguria)
 - **No urine output (anuria) **DANGER SIGN****
 - Oedema
1. Pre-renal (problem before the kidney)
 - **Dehydration e.g. from diarrhoea, not drinking enough when unwell (most common cause)**
 - Problem with blood vessel supply to kidney
 2. Renal (problem in the kidney)
 - Drugs causing damage to the kidneys e.g. NSAIDs
 - Acute kidney diseases
 3. Post-renal (problem after the kidney causing a blockage to the flow of urine)
 - Kidney stones e.g. blocking the ureter
 - Tumours e.g. bladder/urethra
 - Large prostate

DIAGNOSIS

- **Urine output**
- **Ultrasound** to rule out any cause of obstruction (e.g. renal stone) or complications e.g. hydronephrosis (swelling of the kidney)
- **BUN and creatinine**

BUN and creatinine are blood tests that show kidney function. If the BUN increases much more than the creatinine increases (often BUN:Creat >20:1) then it is a sign that it is a problem before the kidney e.g. dehydration.

Normal range (Note: normal ranges can be slightly different for each laboratory, confirm especially for children):

 - BUN: Adults 5-23mg/dL, Child >1mo 5-18mg/dL
 - Creatinine: Adults Males: 0.67-1.17mg/dL; Females: 0.61-0.95 mg/dL (higher in males because they have more muscle mass – creatinine is a product of muscle), Child 0.03-0.88

Note: BUN can also increase if there is an upper GI bleed (see p.100)
- **Creatinine Clearance**

You can use the following equation to help you calculate the estimated creatinine clearance. This is another way that tells you how good the kidneys are working. The lower the creatinine clearance the worse the kidneys are working. This is useful to know when prescribing drugs in renal failure e.g. do not use gentamicin if Creatinine Clearance <20ml/minute or decrease the dose of ampicillin or cloxacillin if Creatinine Clearance <10ml/minute.

$$\frac{(140 - \text{Age}) \times \text{Mass}(\text{kg}) \times (0.85 \text{ if female})}{72 \times \text{Serum Creatinine}}$$

TREATMENT

- If likely due to dehydration then give **NSS** fluid bolus and assess for response by monitoring the urine output.
- Carefully monitor fluid input and output. Consider inserting a catheter.
- Treat the underlying condition.
- Stop any drugs that may have caused the kidney failure e.g. NSAIDs.
- Do not give any drugs that are contraindicated in renal failure.
- Change doses of drugs according to the creatinine clearance.

No urine output (anuria) after fluid replacement is a DANGER sign. This means the patient may need dialysis (artificial kidney treatment). If have catheter, make sure it is not blocked and causing no urine to come out. If no urine output discuss with doctor about referral.

14.5 ACUTE GLOMERULONEPHRITIS

DEFINITION

Acute Glomerulonephritis (AGN) is an inflammation of the filter of the kidneys. One of the common causes that can be treated is Post-Streptococcal Glomerulonephritis. This disease usually follows a skin infection (e.g. *impetigo* see p.257) or throat infection (e.g. *tonsillitis* see p.229). It is more common in children over the age of 3 years.

SIGNS AND SYMPTOMS

50% of AGN are very mild and the patients do not seek medical care.

In other cases, the patient can have:

- Smoky, rusty coloured urine
- Fluid retention (oedema) especially of the face, but it can be generalised (lung or cerebral oedema) in severe cases
- Low urine output with concentrated urine (oliguria)
- Hypertension usually mild, but it can be severe in 5-10% cases
- If oedema is generalised there may be signs of circulatory congestion and pulmonary oedema: difficulty breathing, crackles at lung base

CAUSES

There are many causes of acute glomerulonephritis. It can sometimes follow other infections like pneumonia, typhoid, leptospirosis, malaria, hepatitis C, or measles. The kidney develops inflammation in the tissue and cells which allows blood and protein to leak into the urine.

DIAGNOSIS

Urine dipstick: protein (proteinuria), blood (haematuria).

Urine sediment: Red and white blood cells, hyaline, granular and red blood cell casts.

If available, check **ASO (anti-streptolysin O) titre**. If increased, the diagnosis is more likely Post Streptococcal Glomerulonephritis.

Ask for history of previous skin or throat infections. Look at the skin to find signs of old impetigo.

TREATMENT

- Admit to IPD, rest.
- Restrict salt intake.
- Restrict fluid intake to 500ml to 1L per day in adults, 50ml/kg/day in children (max 1L).
- Antibiotics e.g. **amoxicillin** or **cloxacillin** (see tonsillitis and impetigo) are recommended if the infection is still present.
- In case of severe oedema (ascites or pulmonary oedema):

PO Furosemide	Child 1m-12yrs:	0.5-2mg/kg 2-3 times daily (max 80mg/d)
	>12yrs/Adult:	20-40mg OD (max 600mg/d)

If there is no response to furosemide even before the maximum dose, consider urgent referral for dialysis (renal replacement therapy).
- Treat complications: hypertension (see p.35), acute pulmonary oedema (see p.44)
- Acute phase usually lasts 6-8 weeks, haematuria and proteinuria usually disappear in 1 year, need regular follow up.

PREVENTION

Effective treatment (finish 10 days of medicine) of tonsillitis or impetigo. Treatment within 10 days of onset can prevent AGN. Prevent other infections that can cause glomerulonephritis.

14.6 NEPHROTIC SYNDROME

DEFINITION

In nephrotic syndrome, large amounts of protein are found in the urine (proteinuria) and blood levels of protein decrease (hypoalbuminaemia). Low protein in the blood cause generalised oedema.

SIGNS AND SYMPTOMS

- Generalised painless oedema, location depends on position and activity (e.g. sacral and periorbital oedema in the morning which improves during day when standing up)
- In severe cases there is pulmonary oedema
- High BP
- Normal urine function in the beginning but may develop reduced urine output (oliguria)
- Protein in the urine (massive proteinuria)

CAUSES

Nephrotic syndrome may be due to kidney disease (primary glomerular disease) or can be a complication of other diseases like diabetes mellitus or infection (secondary glomerular disease). The exact cause can only be found by doing a renal biopsy.

- It is most common in children 2-12 years old.
- In children <15 years old, the most common cause of nephrotic syndrome is Minimal Change Disease and is usually responsive to steroids.

DIAGNOSIS

At SMRU, the diagnosis is clinical. For children, the most common cause is Minimal Change Disease and over 90% will respond to steroids. If the child is at least 1 year old and less than 12 years old, has normal BP (*see Paediatric BP ranges, Appendix 12a-boys and 12b-girls*), no visible haematuria (tea colour urine), and no kidney failure (very high creatinine), you can try a course of steroids. For adults, it is better to refer.

These tests may help with diagnosis if available:

- Urine dipstick protein $\geq 3+$, blood maybe slight positive (if blood 1+, think of other diagnosis)
- 24-hour urine collection – proteinuria $>3\text{g/d}$ (adult) or $>50\text{mg/kg/d}$ (child)
- Albumin (low)
- Sodium (high)
- Cholesterol and triglyceride (high)

TREATMENT

Find and treat the underlying cause (e.g. diabetes mellitus, infection)

All patients should be first treated in IPD. Drug therapy of nephrotic syndrome consists mainly of steroids (such as prednisolone) and diuretics.

Steroids (*see Figures 14.3, p.132 and 14.4, p.133 for dosing*)

- **Stopping steroids suddenly is dangerous** and can lead to **death** from hypotension. All patients should be supervised regularly until the treatment is completed. Tell the patient that they must not stop suddenly and they must be very careful not to run out of tablets.
- **Each case must be considered carefully, if treatment cannot be supervised and the patient cannot follow up, do not begin steroid treatment.**
- Always take prednisolone with meals because it can cause gastric ulcers. Consider prescribing 20mg OD **omeprazole** to protect the stomach.
- Be aware of the side effects of prednisolone (high BP, gastric ulcers, osteoporosis (weak bones), weight gain, acne, glaucoma etc.)

When patients have been on steroids for more than 2 weeks it is important to decrease the dose slowly. When decreasing prednisolone if you do not have 1mg tablets or unable to cut tablets use the recommendation as a guide and discuss with a doctor to create a decreasing regime

2. Diuretics:

Note: Diuretics relieve oedema but do not treat the disorder and should only be used if there is pulmonary oedema or moderate to severe ascites

Use a combination therapy of:

Furosemide

Adult: 40mg OD
Child: 1mg/kg OD

AND/OR spironolactone (check renal function before giving)

Adult: 100-200mg OD
Child: 1m-12yrs 1-3mg/kg OD
12-18yrs 50-100mg OD (max 400mg/d)

Reduce according to clinical response. **Note:** be alert to signs of hypovolemia or electrolyte imbalance when using diuretics.

3. Treatment of other diseases:

Remember that there is a high risk of infection because of the loss of immune proteins and treatment with steroids. Therefore, treat any other infection.

For example:

- Give **albendazole** (3-day course for strongyloides) to prevent the spreading of worms **BEFORE** starting steroids
- Be sure that your patient has no active TB or amoebic disease (steroids make them worse).
- Treat for high BP with **enalapril**
- We do not have the drugs for elevated cholesterol, so cannot give this treatment

4. Prophylaxis of other diseases

During the oedema the patient has a high risk of infection: consider **penicillin V** (500 mg PO BID) prophylaxis and **pneumococcal vaccine**.

5. Other important management:

Avoid immobilisation (because of high risk of thrombosis especially if albumin <20g/l) – encourage gentle exercise e.g. walking around the clinic

Careful fluid restriction e.g. intake < 1L per day

Give a high calorie/high protein diet

Weigh patient every day. Aim to lose up to 1kg/day.

Keep in IPD until the patient's condition is improving, then discharge with a **weekly follow-up** (check weight and dipstick)

Patients who recover on prednisolone can relapse (have more episodes of nephrotic syndrome).

Ask the patient to return to OPD as soon as he/she slight oedema. Discuss with doctor and consider giving the treatment again.

FOLLOW UP

Nephrotic syndrome can last a few years and sometimes can cause renal failure

It is important to follow patients regularly for first 6 months and then case by case for at least 2 years if possible

Advise the family that if in between follow up the patient gets the symptoms again to come back to clinic.

Note: when decreasing steroids check urine dipstick every 1-2 weeks to make sure that the nephrotic syndrome is not worsening: **if has proteinuria again discuss with doctor and consider referral**

Figure 14.3 How to use prednisolone for nephrotic syndrome 1yr to <10

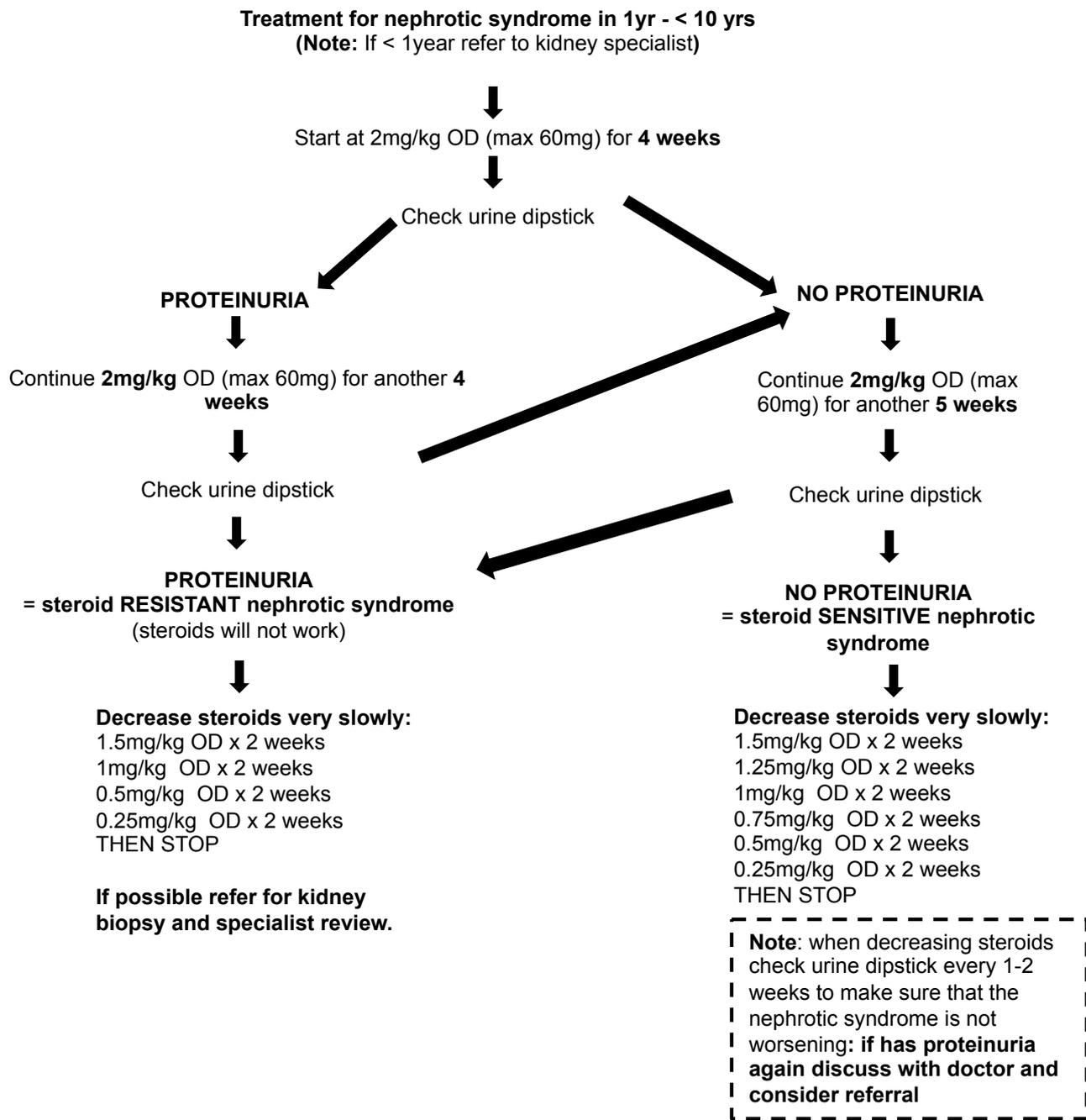
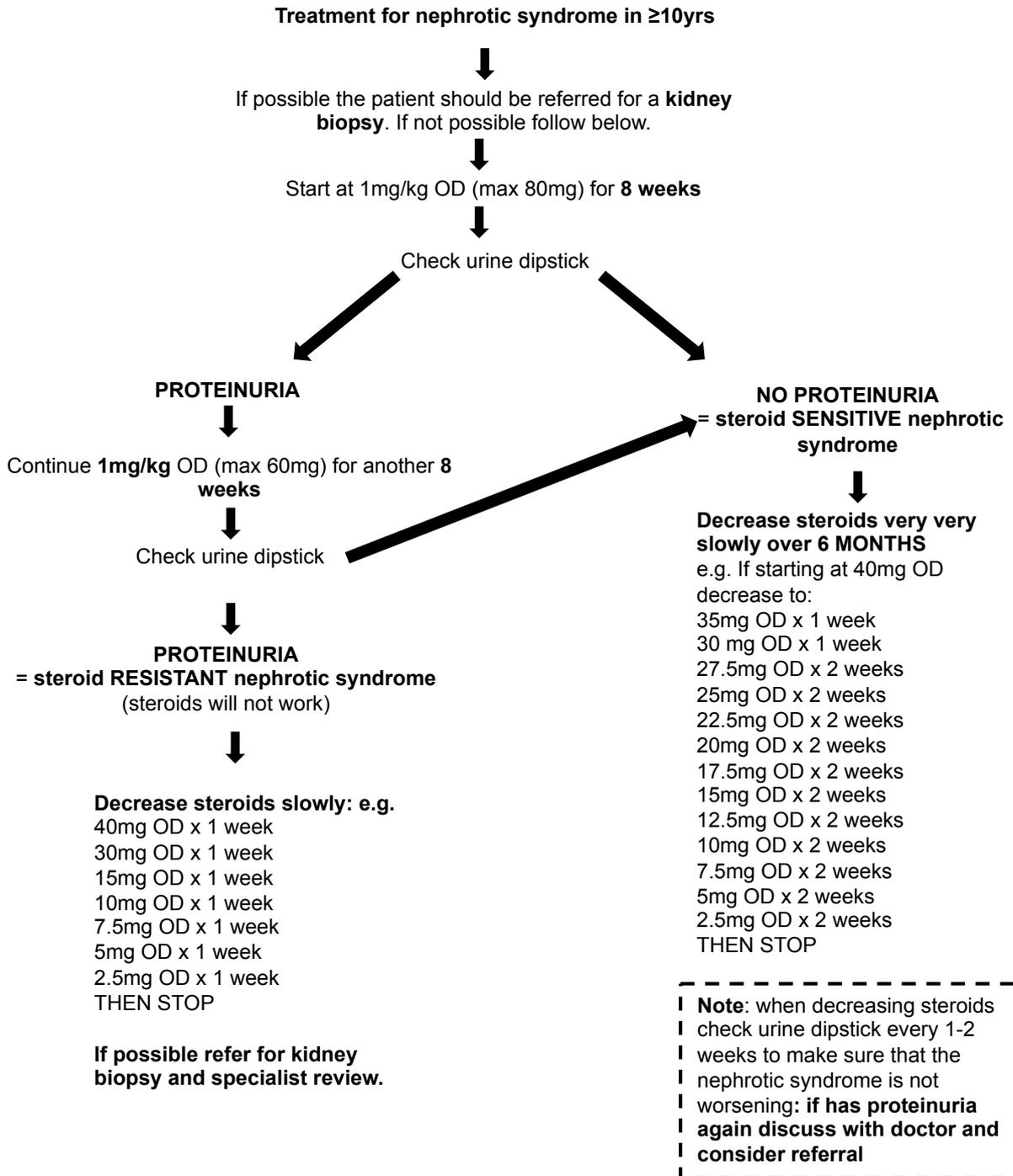


Figure 14.4 How to use prednisolone for nephrotic syndrome ≥ 10 year



CHAPTER 15: HAEMATOLOGY DISEASES

15.1 ANAEMIA *UPDATE

DEFINITION

Red blood cells (RBCs) have haemoglobin (Hb). Hb carries oxygen from the lungs to the tissues. RBCs stay in the blood circulation for 100 to 120 days. When the RBC is old, the spleen and liver will remove from the blood. New RBCs are made in the bone marrow and replace the old ones. If more RBCs are destroyed or lost, the bone marrow will increase the production of new RBCs to send into the blood.

Anaemia is the condition where the haematocrit (Hct) or haemoglobin (Hb) are below normal levels in the circulating blood (the number of RBC is decreased). When anaemia happens, the RBCs may not carrying enough oxygen to the tissues of the body. This can be an acute or chronic condition. Anaemia can affect anyone. However, pregnant women and young children are most at risk. The signs and symptoms depend on the severity of anaemia and if the anaemia is acute or chronic.

Anaemia can occur from:

- increased RBC loss (e.g. haemolysis and haemorrhage), AND/OR
- decreased RBC production (e.g. nutritional deficiencies and bone marrow depression), AND/OR
- normal production of RBC but have shorter life or abnormal features (e.g. Thalassemia, SAO)

15.1.1. ACUTE ANAEMIA

SIGNS AND SYMPTOMS

ACUTE SYMPTOMATIC ANAEMIA – RAPID FALL IN HB (e.g. acute bleeding, severe malaria, PPH)

- | | |
|---|--|
| Fatigue, tiredness | Fast heart rate at rest (adult >120/min) |
| Difficulty breathing at rest | Fast respiratory rate at rest (adult >40/min) |
| Palpitations at rest | Low BP (systolic <100 mmHg) |
| Pallor (conjunctivae, palm of hands, nail beds) | Often you can hear a heart murmur. |

ANAEMIC HEART FAILURE

- | | |
|-------------------------------------|---|
| Severe difficulty breathing at rest | Acute pulmonary oedema |
| Extreme weakness | Enlarged liver (hepatomegaly) |
| Chest pain in some cases | Full jugular veins |
| Very pale | Peripheral oedema and sometimes ascites |

CAUSES

Acute bleeding	RBC destruction
<ul style="list-style-type: none"> GI tract, genital tract Artery damage in accident Pregnancy related hemorrhage (e.g. ruptured ectopic pregnancy and PPH) 	<ul style="list-style-type: none"> Malaria (see <i>Malaria Guideline</i>) Blood transfusion with wrong ABO group type Oxidative drugs (e.g. primaquine, methylene blue, some antibiotics) in subjects with G6PD deficiency Auto- immune disease where the immune system by mistake destroys the RBCs Accidental intravenous administration of distilled water

DIAGNOSIS

Acute anaemia may be a clinical diagnosis and should be confirmed by laboratory tests if the patient is seen at the SMRU clinic. Often anaemia has more than one cause and if there are more than one cause for anaemia the laboratory test results may not give a clear diagnosis.

Laboratory tests (see *Figures 15.1 and 15.2, see next page*):

- Hematocrit
- Haemoglobin (can be done with Hemocue machine at the clinical site)
- Complete blood count (CBC); the following blood indices are particularly important:
- Iron analysis in serum. Low ferritin level can be very low in iron deficiency. If the ferritin is normal or high, there could be other causes of anaemia.
- There are other tests that can be done to find the cause of the acute anaemia. Discuss with the doctor.

Figure 15.1 Hb/Hct treatment levels in anaemia*update

	Hb (g/dL)	Hct %
Males ≥15 years	< 12	< 36
Females ≥15 years (non-pregnant)	< 11	< 33
Females (pregnant)	< 10	< 30
Child <15 years	< 11	< 33

Pregnant women and children <2yr: treat all anaemia. Some Hb fall is physiological in pregnancy.

Non-pregnant adults and older children: give nutrition counselling, treat anaemia only if they have symptoms.

Figure 15.2 How to interpret the CBC*new

Index	What it is	If lower than normal	If higher than normal
Red blood cell count (RBC)	Number of red blood cells	Acute or chronic blood loss; deficiency in Iron, vitamin B12, or folate; haemolysis; bone marrow damage; leukemia or lymphoma	Dehydration; kidney problems; thalassemia; genetic RBC defects; pulmonary disease; congenital heart disease
Reticulocytes	Immature red blood cells in the circulating blood; reticulocytes are bigger than mature RBCs	Bone marrow suppression	Anemia, recent blood loss (e.g. menstruation), red blood cell hemolysis
Hemoglobin (HGB)	Carries oxygen in RBC	Acute or chronic blood loss; deficiency of Iron, vitamin B12, or folate; haemolysis; bone marrow damage; leukemia or lymphoma; thalassemia and genetic RBC defects	Dehydration; kidney problems; pulmonary disease; congenital heart disease
Hematocrit (HCT)	How much of the blood volume is RBCs		
Mean corpuscular volume (MCV)	Average size of red blood cells		
Mean corpuscular hemoglobin (MCH)	The amount of hemoglobin in each RBC	Iron deficiency; thalassemia and genetic RBC defects	Vitamin B12 or folate deficiency; very high reticulocyte count
Mean corpuscular hemoglobin concentration (MCHC)	The average amount of hemoglobin in an amount of RBC (ml)		Vitamin B12 or folate deficiency
Red cell distribution width (RDW)	Variation in RBC size; if high then many different sizes of RBC in the blood		Sickle cell disease, hereditary spherocytosis
			Iron deficiency, vitamin B12 or folate deficiency; recent blood loss
White blood cell count (WBC)	Number of white blood cells, which protect the body against infection	Autoimmune diseases, immunosuppression, bone marrow failure, cancer chemotherapy, viral infections	Infection, inflammation, leukemia, intense exercise, stress, corticosteroids
Neutrophils (N)	Number or percentage of neutrophils; most common WBC	Immunosuppression, bone marrow failure, chemotherapy	Bacterial infection, inflammation, leukemia, intense exercise, stress, corticosteroids
Lymphocytes (L)	Number or percentage of lymphocytes	Immunosuppression, HIV-AIDS, bone marrow failure, chemotherapy	Viral infections, leukemia, lymphoma
Monocytes (M)	Number or percentage of monocytes	Immunosuppression, bone marrow failure, chemotherapy	Chronic infections, autoimmune diseases, leukemia
Eosinophils, absolute (E)	Number or percentage of eosinophils	NA	Parasitic infections (e.g. worms), asthma, allergy
Basophils, absolute (B)	Number or percentage of basophils	NA	Allergy
Platelet count (PLT)	Number of platelets; need for blood clotting	Viral infections; bone marrow failure; vitamin B12 deficiency; leukemia or lymphoma; sequestration (take up) in the spleen; some medications	Leukemia, myeloproliferative disorders (which cause some blood cells to grow abnormally in bone marrow), inflammatory conditions
Mean platelet volume (MPV)	Average volume of a platelet; new platelets are bigger than old ones	Aplastic anemia, thrombocytopenia	Some inherited disorders

EMERGENCY TREATMENT (FOR SEVERE OR ACUTE ANAEMIA)

If signs of hypovolaemic shock follow DRS AB-CABDE/S on Figure 4.8, p.16.

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment (see p.13) should be done. You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step**

Figure 15.3 DRS ABCDE for severe anaemia and hypovolaemic shock

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR SEVERE ANAEMIA/HYPOVOLAEMIC SHOCK
DRS	Danger Response Send for help	Gloves Safe place Call for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Oxygen
B	RR, SpO ₂ , cyanosis Chest indrawing/ tracheal tug Listen to chest	
C	HR, BP, Cap refill Urine output, Temp Listen to HS	Put in 2 biggest (16G or 18G) IV cannula – take bloods e.g. Hct, CBC, MS, dextrose etc. Fluid bolus NSS 1L (DO NOT GIVE if suspect heart failure) Crossmatch and transfuse blood If very low BP raise legs to level above head Try to stop the bleeding e.g. compression of artery
D	Check dextrose Any drugs needed e.g. antibiotics, paracetamol	Give dextrose if low Give medications according to cause
E	AVPU/GCS Expose and examine all over body	Review notes and charts History, further investigations, treatment plan Transfer to maternity facilities e.g. if miscarriage/abortion.
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

Development of severe anaemia is very rapid with malaria, especially in children.
It is the first cause of death in young children with malaria.

NON-EMERGENCY TREATMENT OF SEVERE OR ACUTE ANAEMIA

(no signs of hypovolaemic shock)

Treat the anaemia:

If Hb <6 /Hct <18, discuss with doctor about transfusion.

Anaemic heart failure is very difficult to treat successfully. If possible, prevent heart failure by giving treatment before reaching this stage. Treat the pulmonary oedema (see p.43).

All patients with anaemia should be dewormed.

Give **ferrous sulphate (FS)** and **folic acid (FA)**. (For the SMRU IV iron protocol^{new}, see Appendix 14)

One tablet (200mg) of ferrous sulphate contains 65mg of iron)

Treatment dose Adult: 200mg TID **Folic acid** Adult: 5mg OD

Prophylactic dose Adult: 200mg OD **Folic Acid** Adult: 5mg/week

After 6 weeks treatment dose change to prophylactic dose for a total of 3 months (if Hb/Hct normalised). A response to oral medication usually appears in <2 weeks (Hb should raise by 1g/dl every 7-10 days). Ferrous sulphate should be continued for 3-6 months after the Hb level has returned to normal to refill the body's iron store. Administration of **vitamin C** may help the body to absorb iron.

If there is no response to treatment after 3-6 months, see *treatment for chronic anaemia, next page*.

If you know the cause of anaemia, FIRST check severity, THEN treat the underlying cause.

1. Malaria

Give anti-malaria drugs, *see Malaria guidelines*

Give ferrous sulphate only after the malaria smear is negative

Admit to IPD if there are signs of acute anaemia / anaemic heart failure, and if severe or hyper PF malaria.

Give blood transfusion if Hb ≤ 6 g/dL or Hct $< 20\%$. If there is severe or hyperparasitaemic malaria, you can transfuse earlier especially if the patient is clinically unstable (ie. shock, acute kidney injury). Discuss with doctor first.

2. Septic shock

- Treat with the appropriate antibiotic
- Give ferrous sulphate only after no fever for 48 hours and clinically improved

3. Drug related haemolysis

- Stop the drug
- Admit to IPD if the patient is unwell, has symptoms, or if you are worried the Hb/Hct will drop more.
- Refer to the *Haemolysis SOP*, *see Appendix 13*.

PREVENTION

Prevent (malaria) infections and treat early. Test for G6PD deficiency before giving haemolytic drugs (*see Figure 15.4, p.141*). Provide FS and FA to all pregnant women in prophylaxis doses and provide advice on nutrition. Deworm all pregnant women (after the 1st trimester) and children of school age.

15.1.2. CHRONIC ANAEMIA

SIGNS AND SYMPTOMS

Chronic mild anaemia may be asymptomatic. This is because the anaemia has been very slow to develop (e.g. chronic hookworm infection, repeated malaria attacks). If not treated, mild anaemia can worsen and make the patient unwell. In pregnant women and children this can cause impaired foetal development and delayed development. Young children may have increased risk of infection. Some people with genetic problems such as thalassemia can have mild anaemia without symptoms because they have low levels of haemoglobin since birth (*see Section 1.2, p.3*).

Chronic anaemia

- Tiredness
- Affects ability to work (therefore, lower income, poorer care for children)
- In children: reduced growth, delayed development, not able to do well at school
- Difficulty breathing and palpitations when working or walking (**but normal breathing at rest**)
- Pallor (conjunctivae, palm of hands, nail beds)
- Normal heart rate and respiratory rate at rest.

Severe chronic anaemia – when Hb < 6 g/dL with normal PR and RR at rest

- Extreme tiredness and weakness
- Difficult breathing and palpitations on minimal effort
- Very pale
- Often heart murmur
- Normal heart rate and respiratory rate at rest

CAUSES

- **Nutritional deficiencies**
- (lack of iron (ferrous), folate or vitamin B12 in diet)
- **Hookworm and ascaris infestation**
- **Repeated pregnancies** (maternal anaemia)
- **Prolonged breastfeeding without starting foods** (infant anaemia)
- Peptic ulcer
- Alcohol excess
- Haemoglobinopathies
- Chronic bleeding, heavy menstruation
- Cancers
- Chronic infections (HIV, TB)
- Liver and kidney disease
- Tropical splenomegaly
- Aplastic anaemia (bone marrow failure)

DIAGNOSIS

Diagnosis is the same as for acute anaemia, see above.

TREATMENT

- If you do not know the cause for anaemia, follow the Non-Emergency treatment, *see previous page*.
- Hookworm, trichuris or ascaris in stool (can also treat if you suspect worms but stool test negative)
 - De-worm
 - Give FS and FA treatment dose.
- Poor nutrition, pregnancy and breastfeeding
 - Give nutrition advice
 - Give FS and FA prophylaxis dose for the duration of the pregnancy. (*See obstetric guidelines*)

If a patient remains anaemic despite treatment, consider the following diagnoses:

- Poor compliance
 - Compliance for some people is difficult. They remain anaemic because they cannot tolerate the side-effects of oral FS which include vomiting, epigastric pain or diarrhoea/constipation. Discuss with the doctor about alternatives in these patients.
 - Vitamin B12 deficiency**
 - There is usually a high MCV. The laboratory technician can check for multi-segmented neutrophils (> 5 lobes) and large red blood cells on a thin smear of routine malaria smear. These patients respond well to **Vitamin B12 IM injection** (1mg) 3 x per week for 2 weeks. After these two weeks give one injection once a month for 3 months in addition to **B complex** 2 tablets BID (or vitamin B12 tablets) and **folic acid** supplementation.
- Alcohol
 - There is usually a high MCV. Ask the patient about how much alcohol they drink, advise them to stop/decrease if it is high.
 - Hypothyroidism**
 - If no other cause for anaemia is found and MCV is high consider checking thyroid function.
 - Genetic RBC disorders (eg thalassemia)**
 - See next Section 15.2
- Non-adherence: patient not taking FS or FA
- Poor absorption: need to take FS with acidic things (Vit C or orange juice)
- Underlying haemoglobinopathy: need to check Hb typing

About half of all maternal deaths in the tropics are due to anaemia
Many people in rural areas along the border are anaemic because of poor nutrition, repeated malaria attacks, many pregnancies, continuous breast-feeding and hookworm infections.
These common causes of anaemia in this area are very easy and cheap to treat.

PREVENTION

- Prevention is important if the female patient has heavy menstrual bleeding.
- Eat foods that have iron such as meat, meat organs, eggs, spinach, kales, green leafy vegetables.
- In pregnant women, give FS and FA prophylaxis and counsel on nutrition. Deworm all pregnant women (after the 1st trimester) and children of school-going age.
- Prevent infections, diagnose and treat infections early (e.g. malaria, typhoid, dysentery).

15.2 THALASSAEMIAS AND ABNORMAL HAEMOGLOBINS*UPDATE

DEFINITION

Thalassaemia and abnormal haemoglobins (haemoglobinopathies) are genetic diseases which cause low production of haemoglobin in the RBCs. Haemoglobin is made of two alpha (α) and two beta (β) chains. Thalassaemias cause decreased number of haemoglobin chains: In α thalassaemia the α chains are less and in β thalassaemia the β chains are less. Some abnormal haemoglobins (e.g. HbE, HbS, HbC) have the normal number of chains but the structure of the chains is abnormal.

There are many variations of the disease. This disease severity depends on if the chains are less or if the structure is abnormal. The severity can be from very severe to almost asymptomatic. On the Thailand-Myanmar border β -thalassaemia and HbE occur in approximately 15% of people while α -thalassaemia occurs in at approximately 25% of people.

1. SILENT ALPHA THALASSAEMIA and ALPHA THALASSAEMIA trait: problem in 1 or 2 of the 4 alpha genes.

<u>SYMPTOMS</u>	None to mild, well-tolerated anaemia, often noticed in pregnancy
<u>DIAGNOSIS</u>	CBC, Hb electrophoresis gives only possible diagnosis. Need special tests to diagnose.
<u>TREATMENT</u>	Folic acid, Vitamins B

2. BETA THALASSAEMIA trait: one of the beta-chains is affected.

<u>SYMPTOMS</u>	Mild, well-tolerated anaemia, often noticed in pregnancy
<u>DIAGNOSIS</u>	CBC, Haemoglobin electrophoresis
<u>TREATMENT</u>	Folic acid; Vitamins B; May need iron in infancy and pregnancy

3. HAEMOGLOBIN E TRAIT and HOMOZYGOUS HAEMOGLOBIN E: one of the beta-chains is affected.

<u>SYMPTOMS</u>	Very mild to mild, well-tolerated anaemia, often noticed in pregnancy
<u>DIAGNOSIS</u>	CBC, Haemoglobin electrophoresis
<u>TREATMENT</u>	Folic acid; Vitamins B; May need iron in infancy and pregnancy

4. THALASSAEMIA Intermedia: usually both beta-chains are affected but with different problems (e.g. HbE trait and beta-thalassaemia trait together)

<u>SYMPTOMS</u>	Well-tolerated anaemia that gets worse with age, splenomegaly
<u>DIAGNOSIS</u>	CBC, Haemoglobin electrophoresis
<u>TREATMENT</u>	Check Hb regularly Folic acid; Vitamin B, do not overload with iron Give blood only at times of severe anaemia Splenectomy can sometimes help (may need to update some vaccines before surgery)

Beta Thalassaemia minor and intermedia should be suspected in all patients with mild anaemia that does not improve with ferrous sulphate or folic acid.

5. HAEMOGLBIN H DISEASE: 3 out of 4 alpha genes are affected

<u>SYMPTOMS</u>	Mild to severe anaemia
<u>DIAGNOSIS</u>	CBC, RBC staining, molecular methods (Haemoglobin electrophoresis only indicative)
<u>TREATMENT</u>	Might require transfusion. Folic acid; Vitamin B

6. BETA THALASSAEMIA Major: both beta-chains are affected by beta-thalassaemia trait

<u>SYMPTOMS</u>	Severe anaemia, starting in the first year of life Child does not grow and develop well Child has many infections Abnormal bone growth, especially in the face Enlarged liver and spleen (hepato-splenomegaly)
-----------------	--

- | | |
|--|--|
| Without transfusion | <ul style="list-style-type: none"> • Death usually occurs within the first year of life |
| With enough chronic blood transfusion | <ul style="list-style-type: none"> • Improves child growth and development, and school attendance • Infections are less, overall health improves, bone deformities improve • Symptoms of iron overload (liver disease and cardiac toxicity) appear after ~10 years • Repeated blood transfusions from different donors causes the patient develop antibodies to fight against the different kinds of blood. This can cause haemolysis. This can be prevented by doing cross match (mix donor and recipient blood on slide) and special tests on the donor and patient blood. We do only cross match at SMRU. • Death is usually due to cardiac iron overload. |
| With not enough chronic blood transfusion | <ul style="list-style-type: none"> • Anaemia with reduced growth, slow development and bone deformity. • Enlarged spleen (splenomegaly) • Intermittent fever • Bleeding • Death usually occurs at 20-30 years of age from cardiac iron overload |

DIAGNOSIS
CBC, Haemoglobin electrophoresis

TREATMENT

- Transfusion is the only effective treatment, but chronic blood transfusion causes increased iron levels. This damages some organs, causing death (consider giving desferrioxamine at each blood transfusion, this is called 'chelation therapy' which can help decrease iron overload).
- Regular transfusions help to keep Hb >8g/dL, Hct >24%.
- Give regular Folic acid, vitamin C.
- If splenomegaly is present, discuss the possibility of having surgery to remove the spleen (splenectomy) but the benefit of this is only temporary.

Pregnancy makes the anaemia of haemoglobinopathies worse and this may be the first time a patient presents with acute or chronic anaemia

15.3 G6PD DEFICIENCY

DEFINITION

This disease is caused by a deficiency of the enzyme G6PD (glucose-6-phosphate dehydrogenase) in the red blood cells. RBCs need the G6PD enzyme cells to function and protect from oxidative stress from external agents (e.g. infection, primaquine). When the G6PD enzyme is abnormal. RBCs can function well but cannot stop the oxidative stress. So the RBCs break down (haemolysis). G6PD is a genetic disease. It is present from birth and can be passed to parents to children. Patients may have **severe** deficiency (males and females) or **intermediate** deficiency (females only).

Some infections and drugs cause acute haemolytic anaemia (RBC destruction) in G6PD deficient patients. However, reactions may be different in each patient. Some patients have no symptoms whilst other patients will need a blood transfusion even if both patients took the same drug at the same dose.

SIGNS AND SYMPTOMS

- Most patients have no symptoms. Acute haemolytic anaemia might occur after taking certain drugs (see below) or having an acute illness:
- Jaundice, pallor, dark urine, sometimes abdominal and back pain.
- Neonatal jaundice with or without anaemia.
- Symptoms of anaemia: fatigue, difficulty breathing, tiredness, palpitations

If a patient develops pallor, jaundice or dark urine after taking a drug described below, you should suspect G6PD deficiency. If the G6PD test is normal (especially in females) discuss with the doctor to do other tests.

DIAGNOSIS

Qualitative blood tests like Carestart or fluorescent spot test (used at SMRU clinic site) give a normal/abnormal result and will tell you if a patient has severe G6PD deficiency. Quantitative tests can give results as a number (the quantity of the enzyme). There is a high number for G6PD normal patients, lower for G6PD intermediate and very low for G6PD deficient patients. There is no test available which will predict exactly the risk of having haemolysis or the severity when taking certain drugs.

If there is acute anaemia or recent blood transfusion, wait for 2 months before testing for G6PD again because you may get a false normal patient is at baseline.

TREATMENT

- Stop any drug that could have caused the haemolysis. Usually the haemolysis will improve and treatment is not needed. Stopping the drug is enough.
- Treat any infection
- Check the patient urinates enough, encourage the patient to drink plenty of fluids
- Blood transfusion can be indicated (*see below*)

Try to avoid/be careful when prescribing the following drugs:

If you really need to give these drugs for treatment, tell the patient that if they become jaundiced or they see their urine becoming dark, they should stop the tablets and come to clinic immediately.

Figure 15.4 Haemolytic drugs in G6PD deficiency

Likely cause haemolysis in G6PD deficiency	Possibly cause haemolysis in G6PD deficiency
<p>Methylene Blue Nitrofurantoin Primaquine, Tafenoquine Quinolones (including ciprofloxacin, norfloxacin, ofloxacin, nalidixic acid) Sulphonamides (include co-trimoxazole) Silver sulfadiazine cream (used for burns) Naphthalene moth balls</p>	<p>Aspirin Chloroquine (acceptable in malaria) Vitamin K analogue (menadiol sodium phosphate) Quinine (acceptable in malaria) Vitamin C especially in high doses</p>

PREVENTION

Avoid drugs or chemicals that may cause haemolysis in known G6PD patients.

If you diagnose a patient as G6PD deficient, make a clear note in their lemma so future health workers are aware.

15.4 BLOOD TRANSFUSION

Indications for transfusion

Transfusion is only possible where blood can be tested for ABO group and screened for malaria, hepatitis B and HIV.

When you have to decide whether to transfuse:

Weigh up the benefits of the transfusion with the risks of transmitting disease e.g. hepatitis, HIV.

Transfuse only if necessary; **the clinical state of the patient takes priority.**

To decide if you need to give an URGENT transfusion, do not look only at the lab result. Also look at the patient: check for pallor, weakness, check the pulse, RR and BP.

The clinical status of the patient is more important to make the decision than the Hb/Hct result.

Transfuse URGENTLY when:

Signs of severe acute symptomatic anaemia or anaemic heart failure

AND/OR

Acute severe bleeding

AND/OR

Severe or hyperparasitaemic malaria (see *malaria guidelines*)

Consider transfusion:

Signs of severe chronic anaemia with Hb <6g/dL or Hct <20%. Discuss the case with the doctor*

*There is no international agreement about the level of Hb to give a transfusion in a patient when there are no signs of shock. Some doctors will transfuse a patient with Hb higher than 6g/dl, other doctors will not transfuse a patient even if Hb is 4. This decision will depend on the patient's age, general health conditions, social situation and the cause of the anaemia.

Do NOT transfuse when:

Signs of moderate chronic anaemia

After transfusion all patients should be treated with a treatment dose of ferrous sulphate and folic acid and de-wormed. For patients with thalassaemia major, give only folic acid and de-worm.

Steps to follow to give a transfusion:

For the PATIENT:

1. Explain the risks and benefits of transfusion
2. Check the patient's ABO blood group and rhesus group (+ or -).
3. Insert the largest cannula possible in a large vein - the smaller the cannula, the slower the blood flow.
4. Give an infusion of NSS to keep the vein open or give blood directly.
5. Look for a donor with the same blood group as the patient.
6. In an emergency, if you cannot find a donor of the same group, follow the rules of blood group compatibility (see *Figures 15.5 and 15.6, below*).

Figure 15.5 Blood group compatibility

PATIENT	CAN RECEIVE BLOOD FROM
A	A, O
B	B, O
AB	AB, A, B, O
O	O
Group O = Universal donor Group AB = Universal acceptor	

Figure 15.6 Blood group antigens

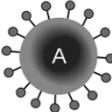
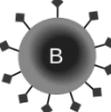
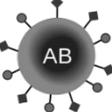
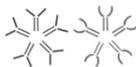
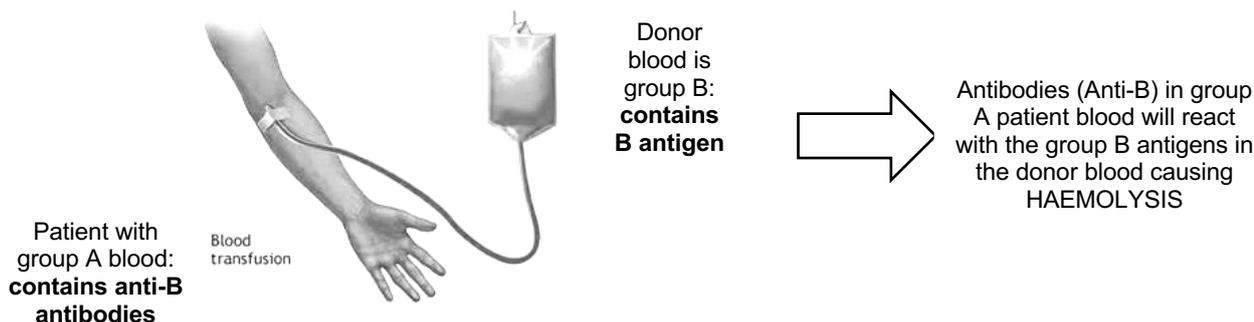
	Group A	Group B	Group AB	Group O
Red blood cell type				
Antibodies in Plasma			None	
Antigens in Red Blood Cell				None

Figure 15.7 Example of blood group incompatibility

For example:



For the DONOR:

CHECK THE GENERAL CONDITION OF THE DONOR:

- No pregnant women, no people under 17 or over 65yrs
- NO fever
- No jaundice in previous 6 months
- No donation of blood in previous 3 months
- BP normal
- No clinical anaemia
- No behaviour risk factors for STI and/or HIV

PROVIDE PRE-COUNSELING FOR THE DONOR (for pre-HIV testing)

- This should be done by staff who are trained to give pre-donor counselling

TAKE BLOOD FROM THE DONOR IF:

- Malaria smear negative
- Hb >11g/dl (Hct >33%) - if patient condition is urgent, can use donor blood if Hb >9g/dL (Hct >27%)
- Cross match shows no clotting
- Hepatitis B and HIV negative (if tested, Hepatitis C and VDRL negative)
- Consider testing G6PD, especially if the patient is having acute haemolysis. In this case it is better to use G6PD normal blood. If the patient's anaemia is from blood loss, the G6PD test is probably not needed.

Give the donor a drink and tell them to lie down for about 10 minutes after procedure completed.

Give the donor a prophylactic dose of ferrous sulphate and folic acid for 2 weeks.

For cross matching the blood: put one drop of the patient's and one drop of the donor's blood on a glass and mix. If there is clotting do not take blood from this donor for the patient.

Give the blood transfusion to the patient:

Calculate the amount of blood to give:

Adult	1 bag
Children < 1yr	15ml/kg
≥ 1yr	20ml/kg (max of one bag)

If severely malnourished give 10ml/kg

- There is high risk of heart failure and volume overload
- A blood transfusion can be repeated depending on the severity of the anaemia
- Watch carefully for signs of pulmonary oedema

1. **Make sure you are giving the right blood to the right patient.**

2. **Rate of transfusion:**

The transfusion should usually last approximately **4 hours, with the following exceptions:**

For patients with **low BP and acute bleeding** (until systolic is >90mmHg): give it **over 10 minutes.**

For patients **at risk of cardiac failure** (e.g. severe malnutrition, old people, heart / kidney problems, chronic anaemia) give it **over 4-6 hours** and consider giving **furosemide 20mg PO** half-way

3. **When to check vital signs:**

Before starting

After 5 minutes, then 15 minutes, and 30 minutes

Then after every hour until 1 hour post transfusion.

Note: If severely unwell, have risk factors for heart failure or pulmonary oedema, or with malaria (see *SMRU malaria guidelines*), check vital signs every 15 minutes.

4. **Never mix blood with D5W (this can cause haemolysis) or ringer (this can cause clotting): you can mix blood with NSS.**
5. **Never add medication to the blood.**
6. **Do not shake the blood.**
You can STOP the transfusion when the cells (red part of the blood) have been given, especially if there is risk for pulmonary oedema. Patients need only the red blood cells to increase the Hb.
The plasma (clear part of the blood) is less useful for the patient and increases the risk of pulmonary oedema.

Note: in cases of acute bleeding, also give the plasma part of the blood.

RISKS DURING BLOOD TRANSFUSION

Observe the patient carefully during the blood transfusion. Check vital signs regularly.

It is important to recognise the symptoms of reaction to blood transfusion so you can stop the transfusion and prevent serious complications.

For suspected transfusion reaction:

- Stop the transfusion and disconnect the set from the needle / cannula.
 - Using a new infusion set, keep the line open with fluids unless suspect pulmonary oedema.
 - Check that the patient received the correct blood / recheck the patient's blood group.
 - Reconsider indication for transfusion.
 - If the patient condition is still severe and blood transfusion is needed, find another donor
-

MOST COMMON CAUSES OF TRANSFUSION REACTION:

1. Haemolysis

SYMPTOMS

Fever, chills, lumbar back pain, anxiety, fast pulse, low BP, dark urine, burning sensation at IV site

TREATMENT

- Stop the transfusion
- Give NSS fast if the patient is going into shock (*see p.16*)

2. Pulmonary oedema

AT RISK

Old people, patients with known heart / kidney problems, or chronic anaemia

SYMPTOMS

Increased respiratory rate, difficult breathing, cough, headache, crepitations/crackles in both lung bases.

TREATMENT

See treatment acute heart failure p.43

- Put the patient in a sitting position
- Give oxygen if available
- Give furosemide IV adults 40mg, repeat the dose after 30 minutes if no improvement

3. Allergic reactions

(a) Skin reactions

SYMPTOMS

Urticaria, big red itching lesions

TREATMENT

- Give **chlorpheniramine** PO adults 4mg
- If no other symptoms and the skin rash goes away in 30 minutes, discuss with the doctor if you can start the transfusion again, but observe carefully

(b) More severe allergic reactions (anaphylaxis)

SYMPTOMS

Oedema difficult breathing, wheezing, high BP, then low BP, sometimes diarrhoea and vomiting.

TREATMENT

- *See anaphylactic shock, p.18.*

CHAPTER 16: HIV AND AIDS

DEFINITION

Acquired immune deficiency syndrome (AIDS) is a collection of symptoms and infections caused by damage to the immune system from the human immunodeficiency virus (HIV) in humans.

- CD4 T-cells are one kind of lymphocyte (WBC) that co-ordinate the immune system's response to certain infections like viruses.
- HIV can infect and kill CD4 T-cells
- HIV can also kill and infect other kinds of cells
- When many CD4 T-cells are killed by HIV, the patient cannot fight against infections or some cancers

Some organisms can only cause disease in people with low immunity; these diseases are called **Opportunistic Infections** (OIs). AIDS is an advanced stage of HIV infection when the infected person develops severe opportunistic infections and even some kinds of cancer.

PROGNOSIS

- Adults infected with HIV will progress slowly towards AIDS and can stay without any symptoms for several years (average 10 years).
- Without treatment, patients who are symptomatic can die in an average of 2 years.
- If an infant contracts HIV from a mother, this course is much shorter. If no treatment, mortality is 50% at 24 months of age.
- People with HIV infection can often live a full and productive life for many years.
 - These patients are diagnosed as **person living with HIV** (or PLWH).
 - Taking medication can prevent opportunistic infections.
 - Antiretroviral therapy (ART) helps to control the disease and improve the patient's life, but does not kill all of the virus (does not cure HIV infection)

TRANSMISSION AND PREVENTION

Figure 16.1 Transmission and prevention of HIV infection

ROUTE OF TRANSMISSION	PREVENTION
Sexual Contact	Abstain from sexual contact OR Be faithful to one uninfected partner OR Use male or female condoms AND Early diagnosis and treatment of sexually transmitted infections (STI). Post exposure prophylaxis (PEP) (medicine you give immediately after the exposure). In the case of rape PEP may reduce the risk of HIV transmission (see p.11).
Contaminated syringes and needles and other sharps e.g. intravenous drug users, health workers, tattoos	Avoidance of injecting drug use. Do not share needles and syringes and always use a new sterilised needle and syringe. Do not share cutting implements e.g. tattooing needles, ear piercing needles, razor blades. Universal precautions for health workers If have occupational exposure PEP may reduce the risk of HIV transmission (see p.11).
Infection by blood and blood products e.g. blood transfusion by HIV contaminated blood	Follow protocol for blood transfusion Screening of donors with a questionnaire to assess risk of HIV infection. HIV testing of blood donors before transfusion (should be provided with pre and post-test counselling if available). If not available screen the blood but do not inform the donor of the result.
Mother to child transmission	See SMRU Prevention of Mother to Child Transmission (PMTCT) guidelines, Appendix 20

DIAGNOSIS

HIV testing

WHY SHOULD YOU TEST FOR HIV?

1. Screening for blood transfusion

HIV can be transmitted through blood transfusions so it is important to screen all donated blood for HIV. The primary concern is transfusing safe blood NOT the diagnosis of HIV in an individual.

Unless you have voluntary counselling and testing (VCT) provided for blood donors, AND the donor accepts VCT, the screening of blood should NOT be used to diagnose HIV.

The purpose of screening is to ensure the blood transfusion is safe.

2. Diagnosis of HIV infection

Before testing, your clinic needs to be able to offer the patient the following:

Figure 16.2 Requirements for HIV testing

<p>CONFIDENTIALITY The information about a person's status (negative or positive) must never be passed on to anyone without that person's permission. People are better able to discuss their feelings if they know that the counsellor will not tell anybody else without their permission.</p> <p>PRE-TEST COUNSELLING This consists of information and support given before the HIV test to enable people to make an informed choice about whether to take the test.</p> <p>INFORMED CONSENT After pre-test counselling, the person understands what HIV and AIDS are and what his or her individual risk of HIV are. The decision to have the test is up to the person. You have to respect his or her decision and cannot test if the person does not wish to be tested. Informed consent needs to be obtained from the person, not the relatives.</p>	<p>POST-TEST COUNSELLING This is provided after the test result. It is essential to help those with a positive test to cope with the news, to live positively, and to be referred for appropriate clinical care, nutritional support and psychosocial support. Post-test counselling is also important in order to advise those with a negative result about how to prevent HIV infection in the future and to STAY negative.</p> <p>LABORATORY TESTING Testing can be done either with rapid tests in the clinic or with ELISA or Western Blot in the hospital. A minimum of 2 different tests should be used. To make the right diagnosis, protocols should be followed strictly, and quality must be assured.</p> <p>REFERRAL FOR APPROPRIATE CLINICAL, NUTRITIONAL, PSYCHOLOGICAL AND SOCIAL SUPPORT SERVICES There is a lot that can be done for HIV positive persons to provide them with the necessary health and psychosocial care and support. For the camp setting much of this can be provided and links between VCT services and treatment, care and support need to be established. For other sites discuss with the doctor to see what facilities are available if unsure.</p>
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SIGNS AND SYMPTOMS

Primary HIV infection:

- This is the stage that begins immediately after the person is infected.
- Clinically the patient can have **acute retroviral syndrome** (fever, rash, enlarged lymph nodes) for some days or weeks.

In primary HIV infection even if the test is negative, the person can transmit the virus to others as the HIV test will only become positive when the body starts to produce antibodies (2 weeks to 3 months after the infection).

Post-acute infection symptoms:

- Symptoms in HIV are used to assess how severe the disease is.

Clinical staging according to WHO (World Health Organisation):

1. Clinical Stage 1

- No symptoms.
- Persistent generalised lymphadenopathy.

2. Clinical Stage 2: Mild Disease

- Weight loss 5-10% of body weight.
- Recurrent upper respiratory tract infections e.g. sinusitis, tonsillitis, pharyngitis or otitis media.
- Minor skin, mouth or nail manifestations such as fungal nail infections, recurrent oral ulcers.
- Herpes zoster or history of herpes zoster within the last five years.

3. Clinical Stage 3: Advanced HIV Infection (usually associated with a CD4 of less than 350cells/mm³)

- Severe weight loss >10% of body weight.
- Persistent oral candidiasis.
- Severe bacterial infections such as pneumonia and pyomyositis (infection of muscle).
- Pulmonary TB: current or within the last year.
- Unexplained diarrhoea for longer than one month.
- Unexplained persistent fever for longer than one month.

4. Clinical stage 4: Severe disease (AIDS) (usually associated with a CD4 of less than 200cells/mm³)

- HIV wasting syndrome (severe malnutrition).
- Severe disseminated extra-pulmonary TB.
- Severe infections (e.g. cryptococcal meningitis, oesophageal candidiasis, pneumocystis carinii pneumonia (PCP), cerebral toxoplasmosis).
- Cancers (invasive cervical cancer, lymphoma and Kaposi's sarcoma).

TREATMENT

There are many different parts involved in the treatment of HIV. The following topics will be discussed:

- General management of a patient with HIV
- Anti-retroviral therapy
- Treatment of common HIV related illnesses and opportunistic infections (OI)
- Prophylaxis to prevent OIs
- PMTCT and HIV in pregnancy, *see Appendix 20*

16.1 GENERAL MANAGEMENT

Management should address all the patient's needs, not only medical needs. Many people may be involved in the patient's care, for example a VCT counsellor, medics, RH staff, and community social workers. It is important to keep confidentiality and only share the HIV status with the patient's consent and only if **absolutely necessary** for the care of that person.

MANAGEMENT POINTS

1. Offer and refer to psychosocial support available in your setting (e.g. refer to support groups for PLWHs, follow-up counselling for persons and their family member/s, refer for community support services).
2. Determine the most likely **stage of HIV infection** according to the WHO staging (*see above*), ask about present symptoms, past medical history and do a physical examination.
3. Look for and treat other **infections** or **symptoms** associated with HIV.
4. Screen for **tuberculosis**:
 - a. Check for symptoms of TB
 - b. *See TB section in Respiratory chapter* for the diagnosis of TB
5. Take **blood** for further assessment including FBC, ALT, CD4 count and syphilis serology.

CD4 count

When caring for a person with HIV the CD4 count is a very important test that helps in management. The CD4 count is important because:

- It is the most useful test for assessing immune function and is very important in assessing the patient and the amount of immune suppression.
- Recommendations for antiretroviral treatment and prophylaxis against OIs are based on the amount of immune suppression. Normal laboratory ranges are between 500 to 1400/mm³.

6. Determine the need for **prophylaxis of opportunistic infections** and antiretroviral therapy based on clinical stage or CD4 count
7. Nutritional support
 - a. Provide nutrition counselling.
 - b. If available offer the supplementary ration provided by TBBC for all those with chronic illness, including HIV and AIDS.
8. For women and couples **discuss HIV and pregnancy**; refer for discussion of family planning options to prevent unwanted or unplanned pregnancy.
9. Assess for **STIs**: ask about symptoms such as urethral discharge and do an RPR test for syphilis.
10. Provide counselling on **safe water and hygiene** including how to store water safely in the home, hygienic food preparation and handling, and hand washing.
11. Counsel regarding **risk of transmission** of HIV with sexual partners, advise condom use, provide condoms and advise the person on where they can get more condoms.
12. Provide **follow up appointments**: see the person regularly within the first few months after diagnosis to ensure that they are properly assessed, have an opportunity to ask questions and that they are getting all the necessary support.

16.2 ANTI RETROVIRAL THERAPY*UPDATE

Figure 16.3 When to start anti-retroviral therapy (ART) for HIV*update

Adults (including pregnant women) and adolescents	Initiate ART regardless of WHO clinical stage and at any CD4 count. As a priority, initiate those: <ul style="list-style-type: none">• severe HIV clinical disease (WHO clinical stage 3 or 4)• CD4 count ≤ 350 cells/mm³
Children and infants	Initiate ART regardless of WHO clinical stage or at any CD4 count. As a priority, initiate those: <ul style="list-style-type: none">• All children under 2 years of age• Children younger than 5 years of age with WHO clinical stage 3 or 4 or CD4 count ≤ 750 cells/mm³ or CD4 percentage $<25\%$.• Children 5 years of age and older with WHO clinical stage 3 or 4 or CD4 count ≤ 350 cells/mm³.

There are 4 classes of drugs currently in use:

NRTI's (Nucleoside Reverse Transcriptase Inhibitors): 3TC, d4T, ddI, AZT, TDF, ABC

NNRTI's (Non-Nucleoside Reverse Transcriptase Inhibitors): Nevirapine (NVP), Efavirenz (EFV)

PI's (Protease Inhibitors): Ritonavir, Lopinavir, Atazanavir, Indinavir and Nelfinavir.

INIs (Integrase Inhibitors): Dolutegravir (DTG), Raltegravir

- The best available treatment combines 3 or 4 drugs (usually 2 NRTI's and either an NNRTI or a PI or an INI).
- Such therapy requires close follow-up because of possible side-effects.
- Refer to the ART protocols in your clinic for further information on recommended regime, dosages and potential side effects.

Therapy is life-long as these drugs do not cure HIV
If the drugs are stopped the virus begins to multiply again. It is important to tell the patient this.

Regular follow-up is essential to monitor whether the drugs are taken, the clinical response and the side effects.

VACCINE

At this moment there is no HIV vaccine available.

16.3 HIV RELATED ILLNESS AND OPPORTUNISTIC INFECTION

16.3.1. CHRONIC DIARRHOEA

SIGNS AND SYMPTOMS

Diarrhoea lasting >2 weeks, often accompanied by nausea, weight loss, abdominal cramps and dehydration. Diarrhoea is often intermittent, watery and without mucous or blood. In approximately 50% of cases no cause is found.

TREATMENT

Rehydration (**ORS**) or **IV fluids**). Make sure the patient is receiving supplementary feeding, and stress the importance of hygiene (hand washing, drinking only boiled water and thoroughly cooking meat and vegetables).

Try to find the cause by stool examination and give specific treatment. If no cause is found:

1. Diarrhoea with blood (dysentery): Treat with **metronidazole**. If there is no response, or when there is fever, add **ciprofloxacin** for at least 7 days (discuss length of treatment with a doctor).
2. Non-bloody diarrhoea: If you suspect worms give **mebendazole** or **albendazole**. Diarrhoea without blood does not need antibiotics in most cases. In HIV patients consider treating with **cotrimoxazole** for 5 days and/or **metronidazole** for 10 days. If no response after treatment discuss with a doctor.

16.3.2. PROLONGED FEVER

SIGNS AND SYMPTOMS

Fever >37.5°C (lasting > 2 weeks) with no or minimal other symptoms.

CAUSES

There are many different causes of prolonged fever. Children and pregnant women may have different causes from adults. Discuss with the doctor for the complete differential diagnosis (DDx).

- Malaria
- Bacterial infections
 - Pneumonia, UTI, pyomyositis, bacteraemia (bacteria in blood, but no sepsis)
- TB or atypical mycobacteria
- Viral infections
 - Upper respiratory tract infections (URTI)
 - Cytomegalovirus (CMV) –CMV is very common. It is spread by close contact, blood, intercourse, and mother to child during delivery. In persons with a normal immune system, CMV infection is asymptomatic. In immunocompromised patients CMV can cause symptoms similar to EBV.
 - Epstein-Barr virus (EBV) – EBV is very common. It is spread by saliva. EBV causes fever, pharyngitis, lymphadenopathy and fatigue even if the immune system is normal.
- Cancer
 - lymphoma (cancer in the lymph nodes)

TREATMENT

If you find no cause of the fever (Fever DK = fever don't know), treat with:

Amoxicillin for 7 days: Adult 500mg-1gm TID
 Child 80-100mg/kg/day divided TID (maximum dose 500mg per dose or 1.2 grams per day)

OR

Cotrimoxazole: Adult 2 single strength tablets or TMP 160mg/SMX 800mg per day
for 7 days Child 6-12mg of TMP/kg/day divided BID (maximum dose 960mg TMP per day)

Discuss with doctor or refer for other investigations if no improvement or condition is worsening.

16.3.3. COUGH AND/OR SHORTNESS OF BREATH

SIGNS AND SYMPTOMS

Persistent or worsening cough, shortness of breath, chest pain, difficulty breathing. Treat according to the symptoms and consider:

a) Bacterial Pneumonia

SIGNS AND SYMPTOMS: Quick onset, high fever, cough with sputum (may be purulent).

DIAGNOSIS: Clinical diagnosis, CXR if indicated.

TREATMENT: Admit to IPD:
Ceftriaxone (IV): 1-2 gm IV OD (dose and duration depends on severity and/or culture results).

b) Pneumocystis carinii Pneumonia (PCP)

SIGNS AND SYMPTOMS: Fever, fatigue and weight loss for weeks before developing respiratory symptoms. Followed by dry cough (without sputum), increasing shortness of breath, and minimal or absent chest signs.

DIAGNOSIS: Clinical diagnosis.

TREATMENT: Admit to IPD:
Cotrimoxazole (PO): 120mg/kg (sulfamethoxazole/trimethoprim combination dose) 3-4 divided doses for 21 days

Folic Acid (PO): 5mg OD (when taking high dose cotrimoxazole as it decreases the level of folic acid in the body)

If severe dyspnoea (usually indicated by hypoxaemia (low oxygen saturations) ADD:

Prednisolone (PO): (if severe, use IV hydrocortisone initially)
Child: 1mg/kg BID x 5 days, then 1mg/kg OD for 5 days then 0.5mg/kg OD for 5 days and decrease gradually.
Adult: 40mg BID x 5 days, then 40mg OD x 5 days, then decrease slowly

Note: All patients with PCP should start on cotrimoxazole prophylaxis and ART as they are in clinical stage 4

c) Tuberculosis

SIGNS AND SYMPTOMS: Signs and symptoms are the same as for patients who are not infected with HIV. One or more of: cough of any duration, fever of unknown cause for > 2 weeks, weight loss in the last 3 months, drenching night sweats. Extrapulmonary disease is more common.

DIAGNOSIS: Manage as TB suspect
Note: In patients who are HIV positive AFB sputum test is often negative even in pulmonary TB

TREATMENT: Same drugs, protocols, duration and side effects as for treatment of other TB patients.
Note: All HIV positive patients diagnosed with TB should start **cotrimoxazole** prophylaxis (does not matter what the CD4 count is).

16.3.4. ORAL CANDIDIASIS (THRUSH)

SIGNS AND SYMPTOMS

White patches or spots on tongue, palate, cheek or gums that can be removed manually (see Appendix 1). May have burning sensation in the mouth on eating.

TREATMENT

Nystatin Give 1 lozenge to be sucked QID for 7 days or 1ml of oral suspension (100,000 IU) QID for 7 days (total 400,000 IU per day). Oral suspension should be swilled around mouth and then swallowed.

If no improvement:
Fluconazole (PO)
Adult: 200mg OD x 7 days
Child: 3mg/kg OD up to 21 days

16.3.5. OESOPHAGEAL CANDIDIASIS

SIGNS AND SYMPTOMS

Pain and difficulty swallowing food usually associated with oral thrush. This is the major cause of weakness and weight loss in AIDS.

TREATMENT

Fluconazole (PO) Adult: 200 - 400mg OD x 14-21 days
Child: 3mg/kg OD x 21 days

16.3.6. CRYPTOCOCCAL MENINGITIS

SIGNS AND SYMPTOMS

Severe, persistent and untreatable headache, malaise, confusion and convulsions. Symptoms associated with bacterial meningitis are often absent (fever, stiff neck, photophobia, nausea and vomiting).

DIAGNOSIS

Lumbar Puncture: Send CSF for India ink test and/or fungal culture. Screening of serum Cryptococcal Ag should be done if CD4 count is <100cells/mm³. If laboratory diagnosis is not possible, discuss with doctor and refer.

TREATMENT

Stage 1: Initiation Phase	Amphotericin B (IV) <u>AND</u> Fluconazole (PO)	Child & Adult: 1mg/kg OD x 2 weeks Child: 12mg/kg OD (max 800mg/d) x 2 weeks Adult: 1200mg OD x 2 weeks
Stage 2: Consolidation Phase	Fluconazole (PO)	Child: 6-12mg/kg OD (max 800mg/d) x 8 weeks Adult: 400-800mg OD x 8 weeks
Stage 3: Maintenance or Secondary Prophylaxis	Give secondary prophylaxis after recovery: Fluconazole (PO)	Child: 6mg/kg OD (max 200mg/d) <2yrs: do not stop prophylaxis 2-5yrs: Stop when on ART for at least 1 year and CD4 count >25% 2 separate times 6 months apart Adult: 200mg OD Stop when on ART for at least 1 year and CD4 count >200cells/mm ³ 2 separate times 6 months apart

Only start ART treatment 4 weeks after starting antifungal treatment

16.3.7. CEREBRAL TOXOPLASMOSIS

DEFINITION

This is an infection of the brain that is caused by reactivation of the parasite *Toxoplasma gondii* in immunocompromised patients. It causes multiple lesions in the brain. It almost always occurs in patients with a CD4 count <100 cells/mm³.

SIGNS AND SYMPTOMS

Headache, sometimes with fever. Focal neurological symptoms e.g. one-sided weakness, paralysis, decreased consciousness, new seizures.

DIAGNOSIS

Serum toxoplasma antibodies IgG and IgM

On a brain CT scan you can find 'ring enhancing' lesions in the brain. This is only available at some hospitals.

TREATMENT

If suspect toxoplasmosis because of symptoms, first give cotrimoxazole to see if there is a response. The lesions in the brains should resolve within 3 weeks of starting treatment.

Cotrimoxazole (PO): Child & Adult: TMP/SMX 10mg/50mg/kg/day divided in 2 doses x 6 weeks

Folic Acid (PO): 5mg OD (when taking high dose co-trimoxazole as it decreases the level of folic acid in the body)

Note: All patients with toxoplasmosis should start on ART (as they are in clinical stage 4) but only after at least 2 weeks of cotrimoxazole treatment

16.3.8. PENICILLIUM MARNEFFEI INFECTION (PENICILLIOSIS)

DEFINITION

This is a major cause of HIV associated disease in Thailand.

SIGNS AND SYMPTOMS

Fever, anaemia, weight loss, enlarged lymph nodes and enlarged liver. If the patient has severe disease they may have generalised papular skin lesions. Severe disease can cause death quickly.

DIAGNOSIS

Blood or skin lesions for fungal culture.

TREATMENT

Stage 1: Initiation Phase	Amphotericin B (IV)	Adult & Child: 0.7mg/kg/day IV x 2 weeks
Stage 2: Consolidation Phase	Itraconazole (PO)	Child: 5mg/kg BID x 10 weeks Adult: 200mg BID x 10 weeks
Stage 3: Secondary Prophylaxis	Start secondary prophylaxis after finishing consolidation phase: Itraconazole (PO)	Child: 5mg/kg OD (max 200mg OD) <2yrs: continue prophylaxis, even when taking ART 2-5yrs: Stop when on ART for at least 1 year and CD4 count >25% 2 separate times 6 months apart Adult: 200mg OD Stop when on ART for at least 1 year and CD4 count >200cells/mm ³ 2 separate times 6 months apart

16.4 PROPHYLAXIS OF OPPORTUNISTIC INFECTIONS

Each infection makes the PLWH weaker, causing a further decrease of the CD4 count. This lowers immunity and makes other infections more likely. That is why it is important to try to prevent and treat infections as soon as possible. Fortunately, some opportunistic infections can be prevented by regularly taking certain drugs. This is called **prophylaxis**.

There are two kinds of prophylaxis:

Primary prophylaxis: Prevents the first occurrence of an infection.
Secondary prophylaxis: Prevents new infections in someone who has already had one or more infections and recovered.

COTRIMOXAZOLE PROPHYLAXIS

This mainly prevents from *Pneumocystis jirovecii* (previously known as *Pneumocystis Carinii* Pneumonia or PCP) and toxoplasmosis. It is also effective against certain types of bacterial pneumonia and intestinal infections.

Give cotrimoxazole to:

- All HIV-exposed infants at 6 weeks of age
- All HIV-infected children < 5 years
- All HIV infected people > 5 years with no signs of active PCP **AND**
 - CD4 count <350cells/mm³ **OR**
 - WHO Clinical Stage 2, 3 or 4 (see *HIV stages, p.147*).
- HIV infected persons diagnosed with tuberculosis.
- Patients with previous PCP or previously treated toxoplasmosis (=secondary prophylaxis)

If there are signs of active pneumonia, give treatment doses not prophylaxis doses
(see treatment of different opportunistic infections above)

Dose for cotrimoxazole primary and secondary prophylaxis

Cotrimoxazole (PO)

Adult: 2 single strength tablets (=960mg) OD
(*1 single strength tablet = 480mg = TMP 80mg + SMX 400 mg)

Child:	Syrup (200/40 mg per 5 ml)	Tablet 400/80
<5kg	2.5ml	--
5-15kg	5ml	½ tablet
15-30kg	10ml	1 tablet
>30kg	--	2 tablets

Note: If there is allergy to cotrimoxazole use Dapsone Adult: 100mg OD; Child: 2mg/kg OD (max 100mg OD). Exclude G6PD deficiency first. In HIV infected pregnant women who need cotrimoxazole prophylaxis use the same dose as other adults.

When to stop cotrimoxazole primary and secondary prophylaxis

<2yrs:	Do not stop prophylaxis
2-5yrs:	Stop when on ART for at least 1 year and CD4 count >25% 2 separate times 6 months apart
>5yrs/ Adults:	Stop when on ART for at least 1 year and CD4 count >200cells/mm ³ 2 separate times 6 months apart

Note: If ART not available prophylaxis is life-long

Children born to HIV infected mothers

ALL children born to HIV infected mothers should receive cotrimoxazole prophylaxis starting at 6 weeks (see dose above).

- If the child is unable to tolerate cotrimoxazole, use dapsone 2mg/kg OD.
 - a. First check G6PD test. If G6PD abnormal discuss with a doctor.
- Stop cotrimoxazole prophylaxis when the child is confirmed HIV negative, 6 weeks after stopping breastfeeding.

FLUCONAZOLE PROPHYLAXIS

Fluconazole prophylaxis is used only as a **secondary prophylaxis** if the patient has already had cryptococcal meningitis.

Give fluconazole to:

Patients with proven cryptococcal disease and recovered; prophylaxis given after 10-12 weeks of treatment.

Dose for fluconazole secondary prophylaxis

Fluconazole	Adult:	200mg OD
	Child 2-5yrs:	6mg/kg OD (max 200mg)

When to stop fluconazole secondary prophylaxis

<2yrs:	Do not stop prophylaxis
2-5yrs:	Stop when on ART for at least 1 year and CD4 count >25% 2 separate times 6 months apart
>5yrs/ Adults:	Stop when on ART for at least 1 year and CD4 count >200cells/mm ³ 2 separate times 6 months apart

16.5 PMTCT AND HIV IN PREGNANCY^{*UPDATE}

Refer to the Guideline for Prevention of Mother to Child Transmission (PMTCT), see Appendix 20

CHAPTER 17: INFECTIOUS DISEASES

17.1 GENERAL DEFINITIONS

Virus:	<ul style="list-style-type: none">• A very small and simple infection particle.• They replicate (copy themselves) inside the cells of other organisms• Examples: HIV, hepatitis B virus, measles.• Anti-viral drugs (e.g. acyclovir) are used against viruses. They may not work well because viruses change quickly and become resistant.
Bacteria:	<ul style="list-style-type: none">• A complex infection particle that come in different sizes and shapes e.g. rods (e.g. diphtheria), spheres also known as cocci (e.g. streptococcus pneumoniae) and spirals known as spirochetes (e.g. leptospirosis).• Antibiotics work against bacteria. Like viruses, changes in the bacteria are causing resistance to drugs but it occurs slower than viruses.
Fungus:	<ul style="list-style-type: none">• Includes yeasts (e.g. candida), mould (e.g. that grows on food that has not been eaten for too long) and mushrooms.• Antifungal drugs (e.g. fluconazole, nystatin) are used to treat fungal infections. Resistance to anti-fungal drugs also occurs.
Protozoa:	<ul style="list-style-type: none">• Organisms made up of one cell.• Examples: malaria, amoeba, giardia, trichomoniasis
Pathogenic:	<ul style="list-style-type: none">• Pathogenic organisms are organisms that cause disease.
Non-pathogenic organism:	<ul style="list-style-type: none">• Some micro-organisms live in the body and are a normal part of how the body works (e.g. your gut has lots of bacteria that live there normally and these are called non-pathogenic). These organisms do not cause disease and may actually keep you healthy.
Immune system:	<ul style="list-style-type: none">• The process in the body that occurs to fight infection. It does this by increasing the number of white blood cells (WBC).• WBC have many functions including producing antibodies (see below) and toxins to fight the infection.• In some conditions e.g. HIV, diabetes, malnutrition, cancer, the immune system does not work very well (this is known as being immunocompromised). These people are more at risk of getting infections.
Antigen:	<ul style="list-style-type: none">• Anything that causes the body to make an immune response (the body will produce antibodies against it).
Antibody (also known as immunoglobulin):	<ul style="list-style-type: none">• The body makes these as part of the immune response so it can remember the infection particle and fight against the infection in the future.• IgM (immunoglobulin M) antibodies are produced quickly after an infection.• IgG (immunoglobulin G) antibodies are made later and may be found in the blood for a long time.
Immunity:	<ul style="list-style-type: none">• To have immunity means that the body has previously been infected or immunised. If the body becomes infected again the body can remember and fight the infection without causing any symptoms/disease.
Infectious:	<ul style="list-style-type: none">• Means that it is possible for the infection in a person to be transmitted to someone else e.g. common cold, measles, HIV.
Vaccination (also known as immunization):	<ul style="list-style-type: none">• When you inject a small amount of antigen into the body it can produce an immune response (i.e. produces antibodies) but not big enough to cause an infection. The antibodies will fight against the same infection in the future without causing any symptoms and the person will not become ill.
Immunoglobulin:	<ul style="list-style-type: none">• Sometimes it is possible to give people antibodies (immunoglobulins) that are already made. When the patient has been exposed to an infection the immunoglobulin can fight the infection e.g. rabies immunoglobulin• Because these antibodies are not made in the body sometimes the body can fight against them and the antibody will not help the patient. This is why they are only used for special cases when there is a high risk of infection.

17.2 BACTERIAL DISEASES

For bacterial infections it is important to take bacterial cultures before starting antibiotic therapy. Most of the time this will be blood and urine culture, and sometimes on sputum, pus or other. Start antibiotic therapy as soon as possible if a patient is unwell. In unwell or emergency patients do not delay antibiotic therapy if you cannot get the culture (e.g. lumbar puncture). For fever management in infants^{update}, see Appendix 15.

17.2.1. BACTERIAL MENINGITIS^{UPDATE}

URGENT REPORT
See Appendix 7

DEFINITION

Bacterial meningitis is a bacterial infection (mostly *Streptococcus pneumoniae*, *Neisseria meningitidis* or *Haemophilus influenzae*) of the membranes covering the brain (meninges). The bacteria are transmitted from person to person through droplets. For other causes of meningitis see *viral meningo-encephalitis* (p.169 and 195), *TB-meningitis* (p.85, 156, 157, 195, and 251), *Cryptococcal Meningitis* (p.151).

SIGNS AND SYMPTOMS

Young children

- Fever (38.5°C or more), unwell, drowsy, not sucking well, vomiting, convulsions, coma
- Crying a lot (cannot console) or lying very quietly without moving
- Swollen (=bulging) fontanel
- Usually no neck stiffness
- Sepsis: **haemorrhagic (purpura), non-blanching rash** (if put pressure on the rash with a glass the rash will not go away)

Older children and adults

- Fever (38.5°C or more), headache, vomiting
- Light hurts the eyes (**photophobia**)
- Neck stiffness
 - *move the chin towards the chest*: this results in pain and resistance in a patient with meningism
- Positive signs of meningism:
 - **Kernig's sign**: *Bend the hip and then straighten the leg*: if positive will get pain and resistance
 - **Brudzinksi sign**: *Bend head forward*: (causes pain) and you can see hips bend
- Convulsions and coma
- Sepsis: **haemorrhagic (purpura), non-blanching rash** (if put pressure on the rash with a glass the rash will not go away)

****Always think of meningitis in febrile patients with severe headache, confusion, agitation or coma****

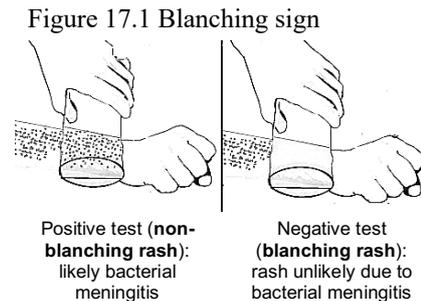


Figure 17.1 Blanching sign

Figure 17.2 Kernig and Brudzinski signs



In TB meningitis the fever is not very high and can be sporadic. Suspect TB meningitis in young patients with neurological signs (e.g. hemiplegia, paraplegia). There may be a gradual onset and behaviour changes.

Cryptococcal meningitis is more common in patients who are immunocompromised (e.g. HIV/AIDS, p.151). Temperature can be normal or only slightly elevated, and there is a severe persistent headache.

DIAGNOSIS

For the Paediatric Meningitis protocol see Appendix 16

Clinical presentation and lumbar puncture (LP) if possible. See *contraindication to lumbar puncture, next page*. Always do a malaria blood smear. Malaria and meningitis can occur together.

Figure 17.3 Contraindications to lumbar puncture

Do NOT perform a lumbar puncture if there are signs of raised intracranial pressure or risk of bleeding:

- Unequal pupil size
- Non-reactive pupils
- Very slow heart rate (<50 in adults)
- Irregular breathing
- Severe respiratory distress
- Low platelets or a bleeding disorder
- GCS <15
- Seizure
- Focal Neurological sign

Lumbar puncture (see table below for interpretation):

- When you do a lumbar puncture, you should:
 - Test the opening pressure (can use a manometer or state if the fluid comes out very fast or in drops)
 - Check the appearance of the cerebrospinal fluid (CSF)
 - **Send the CSF for culture, if an organism can be found, it will help the treatment plan.**
- If possible, also check:
 - Microscopy for WBC + (if possible) gram stain, Ziehl Neelsen stain, India ink stain
 - Glucose (also check blood dextrose at a similar time as the LP to compare the CSF and blood glucose)
 - Total protein

Figure 17.4 How to interpret CSF results

Cause	Normal CSF	Bacterial	Viral	TB	Cryptococcal
Appearance	Clear	Cloudy	Clear	Slightly cloudy	Slightly cloudy
WBC	<5/mm ³	>200/mm ³ Mostly neutrophils (May be <100mm ³ in early cases)	>10mm ³ Early infection neutrophils Late infection more lymphocytes	>10/mm ³ Mostly lymphocytes	>10/mm ³ (may not be raised in HIV/AIDS cases) Mostly lymphocytes
Glucose	> 2/3 blood dextrose	Low	Normal	Low	Low
Total protein	0.15-0.4 g/L	High	High	High	High
Microscopy	None	Pus Gram stain positive	None	AFB in ZN stain (but rare)	Positive in India Ink
Opening pressure	20-60 drops/min	High	Usually normal	Variable	High

Do not delay starting antibiotics waiting to do a lumbar puncture because the patient might die.

If you cannot perform a lumbar puncture but you are concerned about meningitis: start antibiotics.

TREATMENT^{update}

1. Admit to IPD
2. Give antibiotics: duration and choice depend on suspected bacteria or culture result. Empiric choices below.
 - **Ceftriaxone** 2g BID
If the patient is >60 years think about adding ampicillin (to treat for Listeria infection). Some organisms like *S. aureus* (cellulitis) or *O. tsutsugamushi* (scrub typhus) are not treated by ceftriaxone. Discuss with the doctor if you think there is another cause for the meningitis. If the CSF culture is negative, discuss with the doctor to change the treatment.
3. **Dexamethasone**
 - If given before the antibiotic, dexamethasone reduces risk of hearing loss, neurologic complications and death). Dexamethasone does not help if given after the antibiotic.
 - **Adults:** IV 0.4mg/kg every 12 hours (max 10mg) for 4 days (reference Uptodate) or 10mg QID for 2-4 days (reference MSF guidelines). Dexamethasone improves the outcome in adults with *S. pneumoniae* meningitis.
 - **Children ≥6 weeks old:** Use only if *H. influenzae* meningitis is suspected (e.g. gram neg coccobacilli on gram stain), give 0.15mg/kg (max 10mg) QID for 2-4 days.
 - If there is a different cause for meningitis or if CSF culture is negative for *S. pneumoniae*, stop dexamethasone.
 - The benefit of dexamethasone in developing countries is not as clear as in developed countries. This may be from high rates of HIV infection, TB meningitis, and/or malnutrition. Do not use dexamethasone for these patients.
4. Give supportive treatment: fluids and oxygen
5. Treat fever with paracetamol
6. Treat convulsions with diazepam
7. Give special nursing care if the patient is in a coma (see *Coma section*, p19).

PREVENTION

Preventive vaccination can be used to protect individuals at risk (for example, people without a spleen). Those in close contact with a patient with meningococcal meningitis (family/household) should be given immediate prophylaxis to prevent them from contracting the illness (**ciprofloxacin** PO STAT Adults: 500mg; Child: 15mg/kg).

VACCINATION

Several vaccines have been proven to be safe and effective with infrequent and mild side effects (e.g meningococcal vaccine). In our region there is no routine vaccination for meningitis.

17.2.2. LEPTOSPIROSIS

DEFINITION

Leptospirosis is caused by a spiral bacteria (spirochetes) called *Leptospira*. These bacteria live in animals (especially rats, but also dogs, cats and cattle) and are excreted in their urine. Once excreted, they can remain alive in the soil for months. *Leptospira* can enter the human body through damaged skin, mucous membranes and conjunctivae following contact with contaminated water (e.g. by animal urine) or through close contact with infected animals.

RISK FACTORS

1. Farmers and miners
2. Walking without shoes in rivers, sewage and canals
3. Swimming in rivers and lakes
4. Working in abattoirs (factories where animals are killed for food)

SURVEILLANCE
See Appendix 7

SIGNS AND SYMPTOMS

- Sudden high fever with chills and rigors.
- Conjunctiva suffusion (eyes are red, no pus).
- Severe muscle pain (particularly calves) and tenderness.
- Headache.

May have other symptoms: decreased urine production, abdominal pain, nausea and vomiting, diarrhoea, cough and pharyngitis, chest pain, arthralgia (joint pain).

The acute phase lasts 5-9 days and can be very mild or very severe. In many patients the disease stops here. In some patients these symptoms persist or return after stopping for a few days and **complications** appear.

COMPLICATIONS

1. **Meningitis** with severe bitemporal and frontal headache.
2. **Liver and Kidney failure (Weil's disease):** high fever over 40°C, jaundice, oliguria/ anuria, (accompanied by haemorrhagic pneumonia, cardiac arrhythmias and circulatory collapse). In some patients you will find an enlarged liver and spleen (hepato-splenomegaly).
3. **Haemorrhagic pneumonia with acute respiratory distress syndrome:** can happen also without liver and kidney failure. Patient coughs up blood (haemoptysis) and often chest examination is normal (no crackles).
4. **Uveitis** (very red eye, blurred vision, eye pain, irregular pupil, photophobia, headache).
5. **Liver failure** usually gets better, but **kidney failure** and **respiratory distress syndrome** have poor prognosis.

DIAGNOSIS

- Clinical, but some investigations could be helpful:
- Dipstick: protein and blood in urine.
- Biochemistry: raised creatinine, CK (creatinine kinase) and bilirubin.
- Definite diagnosis by special blood test (serology), but it is not available.

TREATMENT

- Should be started as early as possible, but it is now thought effective also if started late:
- Treat the fever and the pain with paracetamol
- Give IV fluids
- Antibiotics:
 - Mild infections**
 - PO **doxycycline** 200mg OD (OR 100mg BID) x 7 days.
 - In pregnant women: PO **amoxicillin** 1g BID x 7 days
 - In children <8yrs: PO **amoxicillin** 25mg/kg BID x 7 days
 - Severe infections** (very unwell or with complications)
 - IV **ampicillin**
 - Adults: 2g TID**
 - Child: 100mg/kg/day in 3 divided doses**
 - **Then** switch to PO **amoxicillin** when improving e.g. 48 hours after fever stops (total 7 days of antibiotics)

PREVENTION

Collection of rubbish to reduce rat population, education of people at risk, **doxycycline** (200mg weekly) prophylaxis for high-risk groups.

VACCINATION

There is a vaccine for animals available, but this works only for a few months. There is a vaccine for humans, but it is of limited benefit and is not used in our region.

17.2.3. SCRUB TYPHUS*UPDATE

DEFINITION

Scrub Typhus is a bacterial disease caused by *Orientia Tsutsugamushi*, a type of rickettsia. The disease transmitted by the bite of a mite that inhabits moist grasslands and jungle. Rodents are normal carriers. Scrub typhus is common in our region. **Scrub typhus is one of the most common causes of 'Fever Don't Know' (Fever DK) in the tropics.** Left untreated many people recover, but some will die.

SIGNS AND SYMPTOMS

- Fever
- Severe headache
- Red eyes (conjunctival injection)
- Enlarged, painful lymph nodes (adenopathy) first near the site of the bite, then generalised
- Skin lesion at the site of the infecting mite's bite: small, round, hard red papule becoming bigger with a dead (necrotic) centre, covered by a black hard surface (**eschar**). Look for it especially on the patients' back, inguinal area and scrotum
- After a few days of fever, a typical (maculopapular) rash appears, starting on the trunk and extending to the limbs
- Sometimes signs and symptoms of meningitis/encephalitis
- Rarely atypical bronchitis, enlarged spleen, inflamed heart (myocarditis), strange behaviour (neuropsychological signs) and kidney failure

People living in areas where scrub typhus is common have a less severe illness, often with NO RASH and NO ESCHAR.

DIAGNOSIS

The diagnosis is clinical: history and examination findings suggestive of scrub typhus and a negative malaria smear. Many times there is nothing suggestive of scrub typhus on history or examination. In the presence of a negative malaria smear and no other obvious finding on history and examination, think of scrub typhus.

TREATMENT*update

- Treat the fever and the pain
- Antibiotic

Doxycycline	Child >8yrs and Adult:	200mg OD (OR 100mg BID) x 7 days
Azithromycin	Pregnant:	500mg on first day then 250mg OD x 4 days
	Child 6mths - 8yrs:	10mg/kg OD x 3 days

Cotrimoxazole, erythromycin, gentamicin and amoxicillin are NOT EFFECTIVE in scrub typhus.

If the fever does not go down within 48 hours after starting treatment: the patient very likely does not have scrub typhus: think of other diagnoses (dengue, leptospirosis, typhoid fever, etc.)

PREVENTION

- Reduction of vector populations and personal hygiene improvement (including de-lousing) are most important. Advise people to avoid mite-infested areas, use thick repellents and protective clothing.
- Patients should wash themselves and disinfect their clothes by washing in hot water or impregnate with 1% permethrin.
- Advise **doxycycline** prophylaxis (200mg weekly) for those working in high-risk areas.
- Regular preventive treatment of medical/nursing staff is recommended in endemic areas.

VACCINATION

There is no vaccine available.

Murine Typhus:

On the Thailand-Myanmar border another form of typhus is common: **Murine Typhus** (or endemic typhus). This is an acute infectious disease with fever, headache, and rash; all quite similar to, but milder, than scrub typhus. Murine typhus is caused by a related micro-organism (*rickettsia typhi*), and is transmitted to humans by rat fleas. The animal carriers include rats, mice and other rodents. Treatment is the same as for scrub typhus.

17.2.4. TETANUS

SURVEILLANCE
See Appendix 7

DEFINITION

Tetanus is an acute, often fatal, disease characterised by a prolonged contraction of muscles caused by a toxin produced by the bacterium *Clostridium tetani*. Infection generally occurs through wound contamination, and often involves a cut or deep puncture wound. As the infection progresses, muscle spasms in the jaw develop, hence the common name: 'lockjaw'. This is followed by difficulty swallowing, general muscle stiffness and spasms in other parts of the body. The toxins (or spores) are widely distributed in soil and animal faeces.

Neonatal tetanus: is a form of generalised tetanus that occurs in newborn infants. It occurs in infants born to mothers who have never been immunised for tetanus. It usually occurs through infection of the unhealed umbilical stump, especially when the stump is cut with a non-sterile instrument.

SIGNS AND SYMPTOMS

Average time between exposure to tetanus and symptoms is 7 days (3 to 21 days)

- Contaminated wound
- Slight fever
- Sweating
- Muscle spasms and stiffness (e.g. lockjaw)
- Difficulty swallowing
- Generalised muscle spasms.

DIAGNOSIS

There are no laboratory findings characteristic of tetanus. The diagnosis is entirely clinical and does not depend upon bacteriologic confirmation.

TREATMENT

Refer patient to hospital. If unable to go to hospital:

1. Maintain an open airway
2. Keep patient in a room as silent as possible with minimal people interrupting (sounds can cause additional spasm)
3. All wounds should be cleaned. Necrotic tissue and foreign material should be removed (see p.269).
4. Antibiotics:
 - **Metronidazole IV** 500mg TID for 7 days.
 - **If needed add Cloxacillin:** Adult: 500mg QID; Child: 15mg/kg QID for 5 days
 - If the wound was exposed to soil (e.g. wounds on the feet, wound caused by wood or bamboo), or if there is no improvement with cloxacillin Consider adding **ciprofloxacin** Adult: 500mg BID; Child 15mg/kg BID (max 500mg BID) for 5-7 days or **gentamicin IV** if the infection is severe .
5. Supportive treatment:
 - **Diazepam IV** for spasms
 - **Paracetamol IM/IV** for pain
6. **Booster vaccine: Tetanus toxoid vaccine** 0.5ml IM into upper arm or buttock
7. Serotherapy:
 - **Immune Globulin (TIG)** 250 units IM STAT with part of the dose infiltrated around the wound.
 - If the injury occurred >24 hours ago, there is serious infection or after burns give **Tetanus Immune Globulin (TIG)** 500 units IM STAT
 - **Note:** Inject the vaccine and the immunoglobulin in two different sites using separate syringes for each

PREVENTION & VACCINATION (see Appendix 2 for childhood vaccination schedules, and wounds p.269)

Figure 17.5 Tetanus post-exposure vaccination recommendations

RISK	PATIENT VACCINATION COMPLETE			PATIENT VACCINATION NOT COMPLETE (< 3 doses)
	Last booster was: < 5 years	> 5 years	> 10 years	
LOW *	None	None	Booster	Start or complete vaccination (full course of 5 doses)
HIGH **	Antibiotics	Antibiotics Booster	Antibiotics Serotherapy Booster	Antibiotics Serotherapy Start or complete vaccination

* Low risk wound: minor wounds, scratch.

** High risk wound: deep wounds, war wounds, wounds with bone fractures, wounds with devitalised tissue, extensive burns, foreign bodies, wounds older than 6 hours.

17.2.5 TYPHOID FEVER

SURVEILLANCE
See Appendix 7

DEFINITION

Typhoid fever is a bacterial infection caused by *Salmonella typhi* (now known as *Salmonella enterica* serovar typhi). It is transmitted by contaminated food, water or dirty hands. The time between exposure with the bacteria and symptoms is 10 - 15 days.

SIGNS AND SYMPTOMS

Typhoid is suspected in a patient with:

- Prolonged fever $\geq 38^{\circ}\text{C}$ for more than 7 days.
- No other identified cause of fever **and** at least **one of the following**:
 - Abdominal pain
 - Diarrhoea or constipation
 - Relative low pulse (bradycardia)

Symptoms are non-specific in the first week, so the diagnosis can be difficult.

Other symptoms that can be present: tiredness, headache, dry cough, patient does not want to eat (anorexia).

In the 2nd week:

- Rash (pink spots on the abdomen and the chest – called Rose coloured spots).
- Relative bradycardia (the pulse does not increase with high fever).
- Enlarged liver and spleen (hepato-splenomegaly).

In the 3rd-4th week:

Complications can happen even when the patient seems to be cured:

- Intestinal perforation/bleeding or peritonitis
- Septic shock.
- Pneumonia
- Confusion with signs of meningitis.

DIAGNOSIS

Typhoid is confirmed by a positive blood (or bone marrow) culture for *Salmonella enterica* serovar typhi. May also get relative leukopenia (normal WBC despite septicaemia).

TREATMENT

- Admit to IPD: give fluids: **ORS** or IV fluids (**NSS** or **RL**)
- Treat the fever with **paracetamol**.

Antibiotics:

1st choice:

Ciprofloxacin PO	Adult	500mg BID x 5-7days
	Child	15mg/kg BID x 5-7days

For severe cases/ those who cannot swallow:

Ceftriaxone IV:	Adult	1g OD x 7 days
	Child	50mg/kg OD x 7 days

Switch to PO ciprofloxacin when condition improving and can take oral antibiotics (total 7 days of antibiotics)

Note: Resistance of *Salmonella typhi* to ciprofloxacin has been described in our area. In case of suspected resistance (poor response to ciprofloxacin treatment) continue treatment for 10-14 days or switch to azithromycin or ceftriaxone).

- If signs of acute abdomen (hard abdomen, severe pain, altered bowel sounds): REFER IMMEDIATELY
- For severe presentations with neurological disorders (hallucinations, altered mental status): **dexamethasone** IV loading dose 3mg/kg in 30 minutes, then 1mg/kg every 6 hours for 2 days.

The response to treatment is slow. Patients can still have fever after 4-5 days of treatment. Be patient. However, if the fever is still high at day 7, re-think diagnosis or suspect resistance to antibiotics.

PREVENTION

This disease is contagious. Clean water and clean food are important for prevention. Advise the family and the neighbours to use latrines and to wash their hands after passing stools and before eating. If you notice an increased number of cases, inform the doctor and prevent spreading of the disease in order to avoid an epidemic.

VACCINATION

There is a live oral vaccine available, but in this area there is no routine vaccination for typhoid fever.

17.2.6 MELIOIDOSIS*UPDATE

DEFINITION

Infection caused by the bacteria *Burkholderia pseudomallei*, which is found in soil and water. Infection happens through the skin, contamination of wounds, ingestion and inhalation.

PATIENTS AT RISK

People with diabetes, alcohol use, chronic kidney disease, chronic lung disease, immunocompromised persons (e.g. HIV, TB) and rice farmers are at risk.

SIGNS AND SYMPTOMS

- Suspect if pain in chest, bone, joints, cough, skin infections, lung nodules, pneumonia
- Usually get symptoms 9-21 days after becoming infected but may be many years later
- Fever and signs of infection depends on the site of infection e.g. pneumonia, osteomyelitis, septic arthritis, cellulitis, skin abscess & ulcer, meningo-encephalitis, brain abscess
- Most common presentation is pneumonia and septicaemia like signs and symptoms
- Can be mistaken as pneumonia or tuberculosis

DIAGNOSIS

Blood and/or sputum culture is a reliable diagnostic tool and usually take 2-3 days to see the growth of bacterial in the culture media. Consider sending urine, pus, throat swab or rectal swab samples for culture. CXR and abdominal/pelvic ultrasound can be used to find internal abscesses.

TREATMENT*UPDATE

- Admit to IPD: give fluids: **ORS** or IV fluids (**NSS**)
- Treat the fever with **paracetamol**.
- Antibiotics (doses for adults), ALWAYS start with initiation therapy:

Initiation Therapy:

Ceftazidime: 2g (or 40mg/kg) TID for 2 weeks

If suspect neurologic involvement, bone, joint, genitourinary (prostate), or skin/soft tissue infection:

ADD

Cotrimoxazole: 10/50mg/kg (maximum 320/1600mg – 4 tablets of 480mg of cotrimoxazole) BID for 2 weeks.

Maintenance Therapy:

Cotrimoxazole (Trimethoprim+Sulfamethoxazole): 8/40mg/kg BID for 12-20 weeks

PREVENTION

- Rice farmers should wear boots, which can prevent infection through the feet and lower legs.
- Health care workers can use standard contact precautions (mask, gloves, and gown) to help prevent infection.

VACCINATION

There is no vaccine available for melioidosis.

17.2.5. RESISTANT BACTERIAL INFECTIONS

DEFINITION

Antibiotic resistance is when bacteria change so that the antibiotics that we use against them stop working. This is an increasing problem worldwide. Resistance may occur because health care providers prescribe too many antibiotics (e.g. for viral illnesses when they will not work) or patients do not complete full courses of antibiotics. Being able to buy antibiotics or yaa-chud without a medical prescription is also a big problem causing resistance.

If we over-prescribe and are not careful with antibiotics there will be no antibiotics that work in the future for our children, grand-children etc!

TO STOP BACTERIA FROM BECOMING RESISTANT WE NEED TO:

1. Prescribe antibiotics only when needed. **DO NOT** prescribe antibiotics for viral infections.
 2. Educate patients not to buy antibiotics or yaa-chud from the pharmacy/shop.
 3. Educate patients to finish the course of antibiotics prescribed even if they feel better.
-

Bacteria may be resistant to a specific antibiotic, or it may have a special pattern of resistance such as ESBL or MRSA (refer to infection control guideline):

ESBL (EXTENDED SPECTRUM BETA LACTAMASE) PRODUCING BACTERIA

DEFINITION

Bacteria that produce ESBL are able to break down antibiotics that have a beta lactam ring. They are resistant to most B lactam antibiotics (e.g. penicillins, cephalosporins) (see Appendix 17 for antibiotic classes). The main bacteria that produce ESBL are enterobacteriaceae like *E. coli* and *Klebsiella*. (Therefore, ESBL UTIs are common.)

TREATMENT

If the patient has bacteria that produce ESBL then the patient could become very unwell. It is important to treat that infection with a sensitive antibiotic e.g. gentamicin, ciprofloxacin or meropenem for 7-14 days.

MRSA (METHICILLIN RESISTANT STAPH AUREUS)

DEFINITION

MRSA is a type of *Staphylococcus aureus* bacteria that is resistant to penicillins. This means that it is resistant to cloxacillin which is normally used for *S. Aureus* infections e.g. cellulitis.

It is sometimes found on people's skin and does not cause any harm. However, if someone is unwell/ immunocompromised and they get MRSA in the blood they can become severely unwell.

TREATMENT

Other very expensive antibiotics (e.g. vancomycin, linezolid) are needed to treat MRSA. If MRSA becomes resistant to these antibiotics, there is no other drug to use.

17.3 PARASITIC DISEASES

17.3.1. LYMPHATIC FILARIASIS*UPDATE

DEFINITION

Lymphatic filariasis is a parasitic disease caused by thread-like worms.

The clinical signs and symptoms can be different in different patients because of:

- parasite differences
- immune reaction to the parasites
- how strong is the infection

The disease spreads from person to person by mosquito bites (lymphatic filariasis). The parasites (worms) enter the body through the skin, are transported through the lymph system and settle in lymph nodes. Different forms of lymphatic filariasis along the Thailand-Myanmar border are *Wuchereria bancrofti* and *Brugia malayi*. In other parts of the world, *Onchocerca volvulus* and *Loa loa* are common but they are not endemic in this area.

SIGNS AND SYMPTOMS

- May be asymptomatic (no signs or symptoms).
- Fever with headache, lymphadenopathy, itchy skin (dermatitis), sometimes bacterial super infection.
- Swollen lymph nodes mainly in the groin.
- Arm, breast, leg or scrotal swelling due to lack of lymph drainage.
- Chronic infections lead to:
- Lymph oedema of the legs.
- Ascites
- Glomerulonephritis with haematuria.
- Chyluria (passing white urine: urine mixed with chyle (lymph fluid) from ruptured lymph vessels).

COMPLICATIONS

With high eosinophilia, severe pulmonary inflammation can develop, tropical pulmonary eosinophilia (see p.239). Discuss with doctor. Can present with dry cough (especially at night), wheeze, dyspnoea, fever and sometimes coughing blood.

DIAGNOSIS

Blood smear, preferably at night between 9pm to 3am, to see microfilariae (young worms) in the blood.

Lymph node biopsy in lymphatic filariasis or specific antibody test.

Urine examination for proteins.

TREATMENT*update

Basic principles for filariasis patients:

- Wash the affected parts twice daily with soap and clean, cool water, and dry them carefully
- Raise the affected limb at night
- Exercise the limb regularly
- Keep the nails clean
- Wear comfortable shoes
- Treat wounds or abrasions

Acute Attacks:

- Bed rest
- Elevation of affected limb without bandaging
- Cooling of limb
- Pain control with paracetamol, NSAID or tramadol
- Antibacterial or fungal cream if needed
- Paracetamol if fever
- Keep good hydration

After acute attack treat with:

- **Diethylcarbamazine (DEC)** (is available via Thai hospital)
- Watch for side effects: fever, headache, myalgia, anorexia, abdominal discomfort
- DEC is effective against microfilariae and adult worms of *Wuchereria bancrofti* and *Brugia malayi*. A single dose kills only 40% of adult worms, but longer dose is not more effective

Dosing: (WHO recommendations: <https://www.who.int/lymphatic-filariasis/epidemiology/treatment/en/>)

Adults Single dose of Albendazole 400mg + DEC 6mg/kg
and OR
children DEC 6mg/kg alone for 12 days

*There are different treatment protocols that can be used, discuss with the doctor.

Note: Do not give DEC during the acute attack.

Note: If there is co-infection with onchocerciasis or loiasis DO NOT use DEC because of severe adverse reactions (skin or eye symptoms, shock).

PREVENTION

- Prevent mosquito bites: use mosquito nets and repellents
- Seasonal mass treatment with diethylcarbamazine (DEC) and albendazole or ivermectin are recommended in areas where filariasis is common to decrease transmission of disease
- Vector control

VACCINE

A vaccine is not available and is unlikely to be developed in the near future

17.4 VIRAL DISEASES

17.4.1. DENGUE FEVER

SURVEILLANCE
See Appendix 7

DEFINITION

Dengue fever is a viral illness transmitted by the *Aedes* mosquito bite. These mosquitoes bite during the daytime and are more common in the rainy season. Dengue mosquitoes lay their eggs in still water both inside and outside the house (e.g. rain collecting in a tyre or bucket, or water used to flush the toilet)

Dengue can present in 2 ways:

1. **Dengue Fever (DF)**
2. **Severe Dengue:**
 - Dengue Haemorrhagic Fever (DHF): Dengue fever with signs of haemorrhage
 - Dengue Haemorrhagic Shock Syndrome (DHSS): Dengue fever with signs of haemorrhage and shock

You are more likely to get severe dengue if you have been infected with a different strain of the dengue virus before. There are 4 different strains.

SIGNS AND SYMPTOMS

Probable Dengue:

Fever for 2-7 days AND negative malaria smear, no other identified cause of fever and **2 of the following:**

- Nausea, vomiting
- Rash (typical rash: red maculopapular or petechial rash on the limbs)
- Muscle aches and pains
- Tourniquet test* positive
- Low WBC
- Any warning sign

Warning Signs:

- Abdominal pain or tenderness
- Persistent vomiting
- Fluid overload e.g. oedema
- Mucosal bleeding
- Lethargy, restlessness
- Hepatomegaly >2cm
- High Hct with rapid decrease in platelet count

Severe Dengue:

Severe plasma leakage:

- Shock e.g. fast HR, low BP, Cap refill >2s, cold extremities fast RR
- Fluid overload causing respiratory distress

Severe bleeding:

- e.g. GI bleeding

Severe organ involvement:

- Liver: AST or ALT ≥ 1000
- Neuro: impaired consciousness
- Heart and other organs

Note: Shock usually develops on the 3rd or 4th day after the fever has decreased.

****Danger stage is day 3 to day 7****

Other signs and symptoms that can be present:

- Severe headache especially behind the eyes (common)
- Skin rash: diffuse redness on the neck, face and chest
- Lymph node enlargement (lymphadenopathy)

***Tourniquet Test:** Inflate a blood pressure cuff on the upper arm to midway between systolic and diastolic blood pressure for 5 minutes. A positive test is when there are more than 20 petechiae in a 2.5cm square on the front of the forearm. 20% of patients with a viral illness that is not dengue will have a positive test.

DIAGNOSIS

1. CBC may show low WBC, low platelets, high haematocrit in severe dengue (plasma leaks out so the blood is more concentrated with RBC).
2. A drop in Hct suggests that there is some bleeding, this may be hidden e.g. in the abdomen.
3. Dengue serology lab test. How to interpret results (see next page):

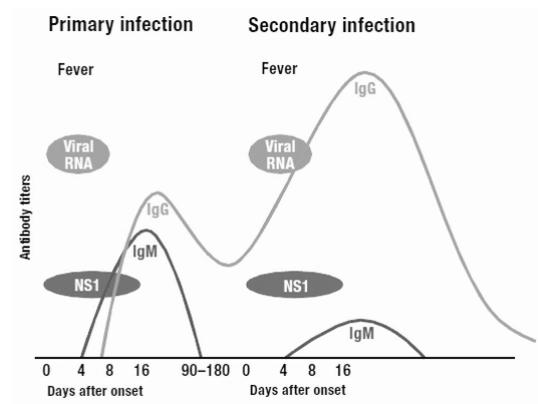
- **Dengue RDT NS-1:** a protein on the virus which means that the body is currently infected with the virus
- **Dengue RDT IgM:** initial antibodies formed against the virus– the body develops IgM antibody 3-5 days after onset of infection, and can last up to 180 days
- **Dengue RDT IgG:** long-term antibodies produced against the virus, may be present for many years after infection

Note: If second dengue infection, the IgG increases much quicker (may be seen at 4-5 days).

Figure 17.6 Interpretation of rapid dengue test*

NS-1	IgM	IgG	Interpretation
+	-	-	Acute infection (0 to 5 days post symptoms) that the body has not made any immune response against
+	+	-	Acute infection that the body has started to make an immune response against, no previous infection
+	-	+	Acute and previous infection but no acute immune response (no IgM antibodies) to this new infection → more likely to be at risk of severe dengue
+	+	+	(uncommon) Acute and previous infection and there is an acute immune response (IgM antibodies) to this new infection → more likely to be at risk of severe dengue
-	+	-	Recent infection that the body has started to build up antibodies to but no acute infection or long-term immunity yet (IgG)
-	-	+	Previous infection (could be many years ago)
-	-	-	Negative = no current or previous infection Note: may be false negative if the sample is taken too early: if strong suspicion consider repeating test in 1 week.

17.7 Immune response to dengue infection



* If only NS-1 rapid test is available (no IgM or IgG), NS-1 positive is treated as acute infection

TREATMENT

There is no drug to cure dengue. Treatment is to prevent complications.

1. Dengue Fever

- Treat the fever with **paracetamol**.
- **Do not give ASA or ibuprofen - can make bleeding from platelet problem worse.**
- Hydration: start with **ORS**. If the patient is unable to drink, start an infusion of **NSS** (see chart below). See *Appendix 8 for preparation of ORS*.
- Monitor the vital signs and the urine output and observe for signs of shock, especially at day 3-7 or when the fever decreases.

2. Severe Dengue

- Treat the fever with **paracetamol**.
- **Do not give ASA or ibuprofen - can make bleeding from platelet problem worse.**
- Hydration: See *Figures 17.8 and 17.9 next pages*.

If you notice an increase number of cases, inform the local public health department. A rapid response can avoid an epidemic.

PREVENTION

When considering prevention of dengue it is important to remember that the *Aedes* mosquito bites during the day, and that it likes to lay eggs in still water. IPD patients should stay under the mosquito net even during the day, to prevent transmission to others.

Protection for yourself:

1. Long-lasting, impregnated bed nets for those who sleep in the daytime (e.g. patients in IPD)
2. Long sleeves, trousers, socks
3. Insect repellents
4. Burning mosquito coils

Protection for your community:

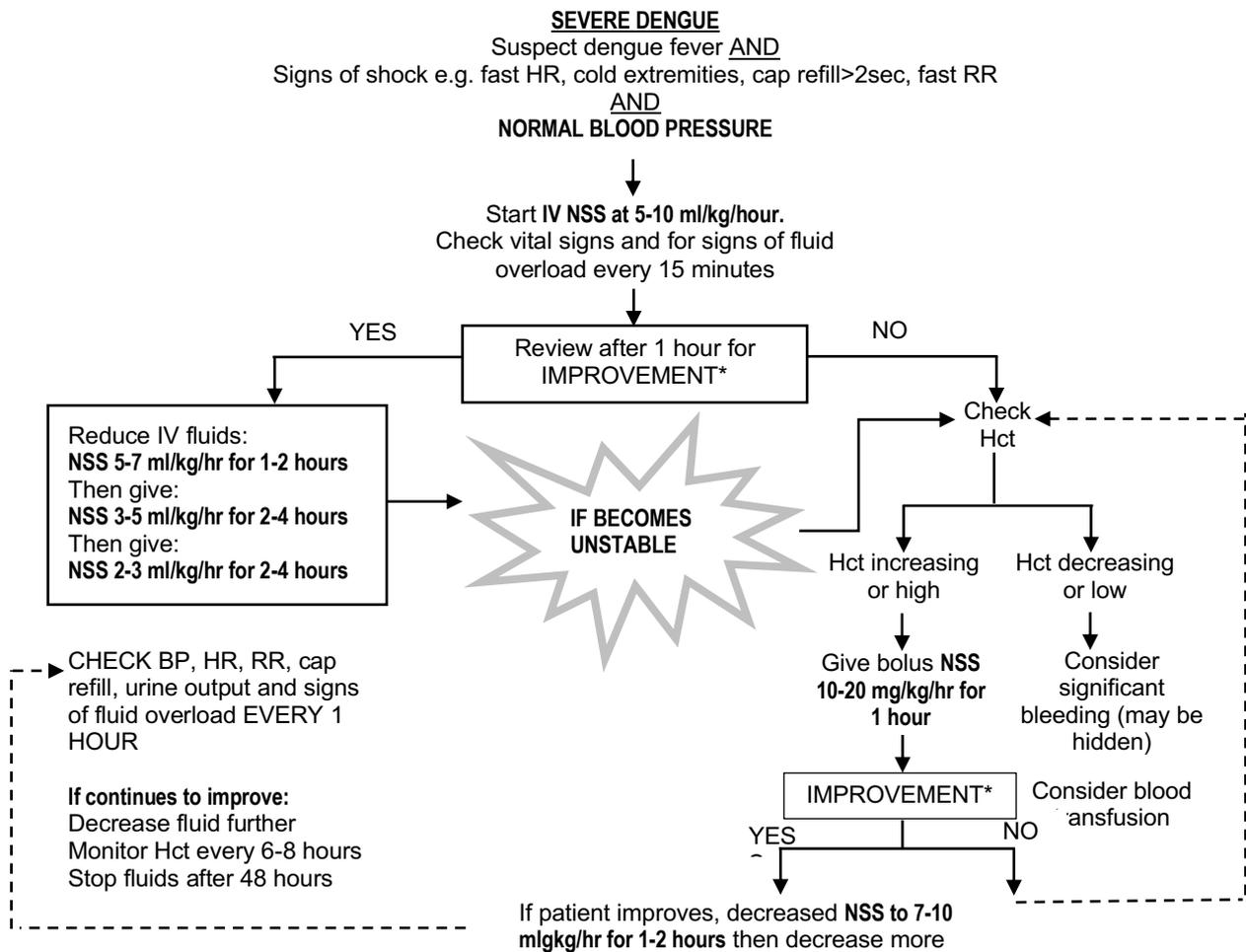
1. Covering containers that have water
2. Avoid leaving containers outside that can fill up with rain water e.g. turn buckets upside down
3. Empty containers (e.g. buckets, tyres) that collect water e.g. after it rains.
4. Clean drains from leaves so that they do not block and water does not drain away
5. Killing the mosquito larva in the water e.g. putting abate bags in containers
6. If have still water that is difficult to cover e.g. water used to flush toilet you can leave the tap dripping slowly, this moves the water so the mosquito does not want to lay it's eggs there.

It is very important to try to keep patients with dengue under a bed net in the day time so that they do not get bitten by mosquitoes and transmit the dengue to other patients and staff.

VACCINATION

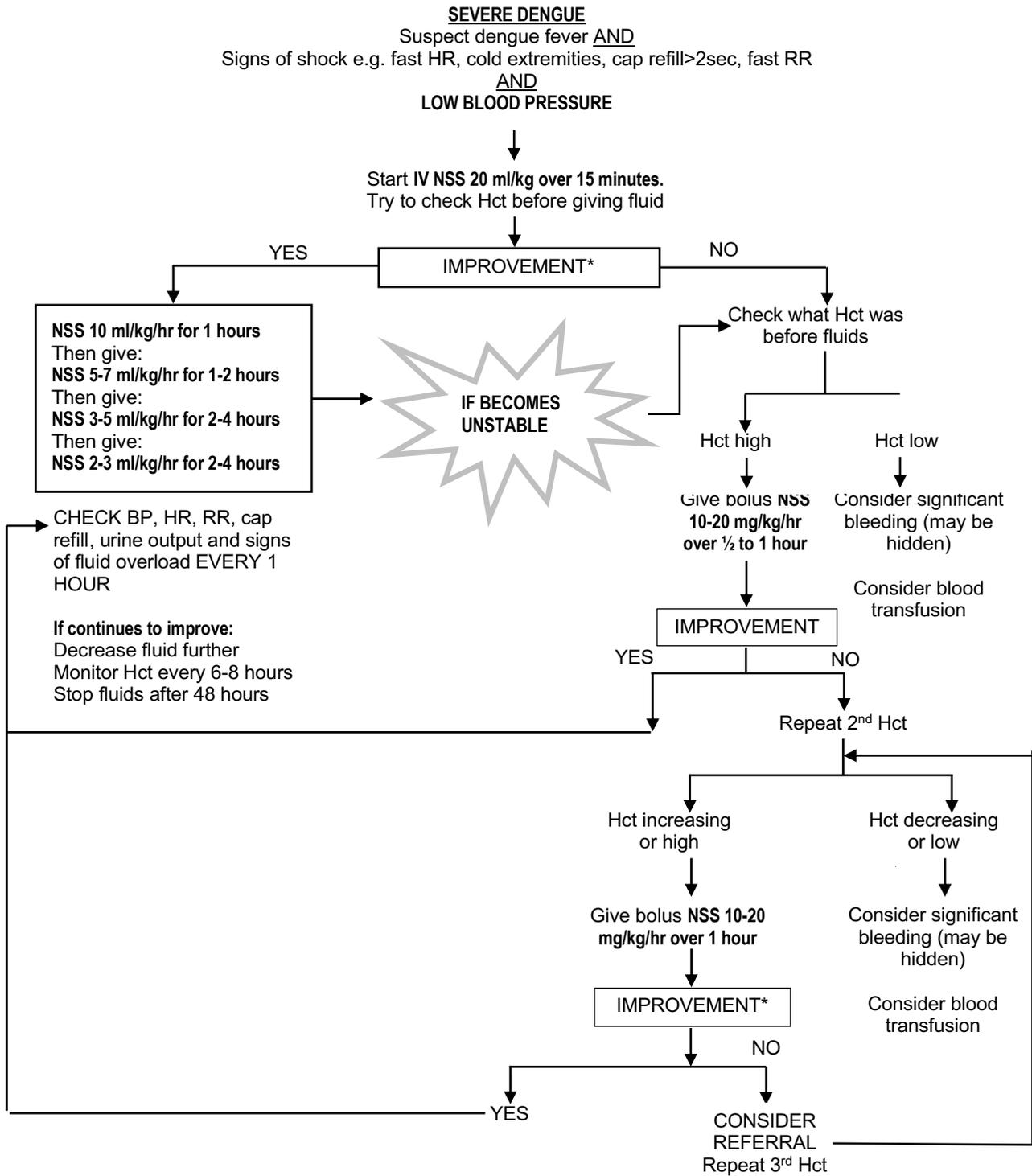
There is no vaccine available.

Figure 17.8 Treatment of Severe Dengue with NORMAL blood pressure



*Check BP, HR, cap refill and urine output

Figure 17.9 Treatment of Severe Dengue with LOW blood pressure



* Check BP, HR, cap refill and urine output

17.4.2. CHIKUNGUNYA*^{NEW}

URGENT REPORT
See Appendix 7

DEFINITION

An acute viral infection that is transmitted by the mosquitoes *Aedes aegypti* and *Aedes albopictus*. These mosquitoes also transmit dengue and Zika viruses. The incubation period is 3-7 days (up to 14 days) like dengue virus.

SIGNS AND SYMPTOMS

Most common symptoms

- Sudden onset of high fever
- Joint pain (hands, wrists, shoulders, ankles). This may be the first symptom, even before fever (in 70% of patients)
- Rash 3 days after illness starts but this can be different between patients. Starts on limbs and trunk. Can cause bullous lesions in children.

Other symptoms

- Headache
- Face swelling (not oedema)
- Nausea, vomiting, diarrhea
- Lymphadenopathy (cervical)
- conjunctivitis

COMPLICATIONS

- Respiratory failure
- Myocarditis or heart failure
- Acute hepatitis
- Renal failure
- Bleeding
- Meningoencephalitis or seizures
- Eye problems
- **Chronic arthritis or joint pain**

Figure 17.10 Bullous lesions on an infant with chikungunya infection



DIAGNOSIS

- PCR (1 ml in EDTA tube) up to day 7. Do not take PCR sample if symptoms are >7 days because it will be negative.
- We do not have a rapid diagnostic test for chikungunya at SMRU routinely

TREATMENT

1. Supportive treatment only
2. **Paracetamol**
 - If pain is not controlled with paracetamol, add **NSAID** or **ASA**. Avoid these drugs if you suspect dengue because it can affect the platelets and increase the risk for bleeding.
3. **Tramadol** can be used for severe pain
4. For chronic arthritis:
 - Prednisolone (should NOT be used during the acute infection) – deworm before starting treatment
 - Methotrexate if prednisolone is not helping
 - Avoid using NSAID (gastritis) or Tramadol (addiction) for long duration

PREVENTION

Same as for dengue, see p.166

17.4.3. ENCEPHALITIS

URGENT REPORT
See Appendix 7

DEFINITION

Acute inflammation of the brain commonly caused by a viral infection (e.g. herpes simplex). Sometimes encephalitis may be a complication of other infections such as rabies, measles, syphilis or toxoplasmosis.

One important form of encephalitis is **Japanese encephalitis**.

- This is the most important and common encephalitis in South-East Asia, India and areas in the Southern Pacific.
- Transmission to humans is from a mosquito bite (in rice fields)
- The virus can live in birds and pigs
- Every year there are 30,000-50,000 cases
 - 30% will have death
 - 30% will have severe neurological problems.
- After infection there is lifelong immunity.

SIGNS AND SYMPTOMS

The majority of infections do not cause any symptoms.

- Headache and fever might be the only symptoms for 1-6 days
- Other signs can be:
 - Photophobia (fear of strong light)
 - Weakness or hypertonia
- Neck stiffness
- Convulsions

COMPLICATIONS

Can progress to:

- Paralysis, seizures
 - Coma, death
- Neurologic problems:
- Hemiparesis, deafness, mental retardation
 - Unstable emotion

DIAGNOSIS

Lumbar puncture. Specific antibodies can be found in the CSF (this will need to be investigated in a special laboratory). Blood glucose, malaria smear (to differentiate from cerebral malaria).

Do NOT perform a lumbar puncture if there are signs of raised intracranial pressure or risk of bleeding:

- Unequal pupil size
- Non-reactive pupils
- Very slow heart rate (<50 in adults)
- Irregular breathing
- Severe respiratory distress
- Low platelets or a bleeding disorder
- GCS <15
- Seizure
- Focal Neurological signs

If you cannot perform a lumbar puncture but you are concerned about encephalitis or meningitis, start antibiotics until you have the CSF results

TREATMENT

1. Antiviral treatment:
 - If available treat with IV acyclovir – but it is very expensive. Other options include PO valacyclovir (a pro-drug of acyclovir which acts faster than acyclovir) or PO acyclovir
2. Symptomatic treatment:
 - Pain relief (*see p.31 and 220*).
 - For seizures (*see p.21*)
 - See coma section for treatment of comatose patients (*see p.21*).
 - Physiotherapy: massage, move the limbs to preserve muscle tone and prevent contraction
 - If you cannot exclude bacterial meningitis, treat with appropriate drugs for bacterial meningitis until a definitive diagnosis can be made (*see p.156*).

PREVENTION

Mosquito (vector) control is not a solution in many areas, as there are too many breeding sites (irrigated rice fields) in our area. In some places alternate wetting and drying of the rice fields have succeeded in reducing vector populations. Personal protection (e.g. using repellents and/or mosquito nets) could prevent transmission of the virus. In outbreaks, one of the measures is to eliminate the pig population.

VACCINE

A Japanese encephalitis vaccine is available, *see Appendix 2 for vaccination schedules in Thailand and Myanmar.*

17.4.4. MEASLES

URGENT REPORT
See Appendix 7

DEFINITION

Measles is a very contagious viral infection that is spread by inhalation of respiratory droplets from infected individuals. It is common in childhood and can result in severe complications. Mortality from measles can rise to 30% during epidemics, mostly due to pneumonia. There is no treatment for the disease itself. The main goal is to decrease mortality by preventing and treating the complications of measles. Malnourished children are especially at risk from the complications of measles.

SIGNS AND SYMPTOMS

Prodromal/ Catarrhal phase (2-4 days):

- Fever (>38.5°C) more than 3 days, **and**
- Red eyes (Conjunctivitis), runny nose, cough.
- Sometimes white spots on the mucosa of the mouth (Koplik's spots).

*For photo, see
Appendix 1*

Eruptive phase (4-6 days):

- After two to three days, red spots appear on the whole body (red rash), they blanch (disappear with pressure e.g. from clear glass unlike a meningitis rash), begins on forehead then spreads down to neck, chest then abdomen and legs.
- As the rash worsens the initial symptoms improve
- The rash goes away around day 5 in the same order that it appears (head to feet)

Post eruptive phase (1-2 weeks):

- Skin desquamation – skin looks striped

Note: When adults get measles, they can be unwell, more unwell than children.

COMPLICATIONS

- Pneumonia
- Otitis Media
- Diarrhoea leading to dehydration and malnutrition
- Purulent conjunctivitis, keratitis
- Corneal ulceration leading to blindness (increased risk when Vitamin A deficient)
- Encephalitis
- Acute malnutrition
- Death (mortality is higher in adults and infants)

DIAGNOSIS

This is a clinical diagnosis. A serum blood can be sent for measles IgG and IgM antibodies for confirmation.

TREATMENT

There is no treatment for the disease itself. The aim of treatment is to prevent complications:

- Treat the fever, diarrhoea and dehydration with **paracetamol** and **ORS**.
- Oral hygiene by rinsing mouth. Apply **1% gentian violet** to mouth sores.
- Give **treatment dose** of **vitamin A** and repeat day 2 and day 8
- Daily eye wash. Treat conjunctivitis with **Terramycin Eye Ointment (TEO)**.
- Treat secondary infections: Pneumonia, *see p.236*
 Otitis media, *see p.58*
- Encourage eating and drinking to avoid dehydration and malnutrition. Advise the mother to continue breast-feeding and to give normal food to older children.
- If the measles case is staying IPD and not isolated, we should try to prevent measles in the exposed patients. Vaccinate all other unimmunised children > 6 months. Children and adults who have not had measles infection should also receive the vaccine.

PREVENTION = VACCINATION

Measles or MMR (measles, mumps, rubella) vaccine. *See Appendix 2 for childhood vaccination schedules.*

All suspected case should be reported to the local health department, because there is a high risk of epidemic.

17.4.5. POLIOMYELITIS

URGENT REPORT <i>See Appendix 7</i>

DEFINITION

Poliomyelitis is an acute viral infection. It infects the spinal cord of a patient and causes paralysis. Transmission from human to human is by contact with stool (stool-hand-oral or eating food or drinking water that is contaminated by stools). The disease can be prevented by a polio vaccine.

SIGNS AND SYMPTOMS

- Most of the infected patients have no symptoms.
- **Non paralysis form:** fever, muscle pain, headache, vomiting, backbone pain, usually recovery within 10 days
- **Paralysis form:** rapid (low tone) paralysis on one side of the body. Starts at the legs and goes to the head. The muscles become soft and cannot get reflexes. Sensation is normal. Respiratory muscles paralysis can cause death.

DIAGNOSIS

The diagnosis is clinical. Suspect poliomyelitis in all patients with acute paralysis. Polio virus can be detected in stool samples, need 2 samples 48 hours apart.

TREATMENT

- Keep in IPD, bed rest.
- Treat the pain.
- Prevent sores.
- Physiotherapy to prevent wasting of muscles and stiffness.

Do NOT give any IM injections to a patient with suspected poliomyelitis in the febrile phase. You will make the (paralysis) polio worse.

PREVENTION & VACCINATION

- Oral polio vaccine is available, *see Appendix 2 for childhood vaccination schedules.*
- All suspected cases must be reported to the local health department. Vaccinate all children under 5 years of age living in the same area of a suspected case even when they have been vaccinated before.

17.4.6. RABIES*UPDATE

DEFINITION

Rabies is a virus and infects animals (e.g. dogs, cats, bats). It is transmitted to animals and humans by close contact with saliva from infected animals (bite, scratch, licks on broken skin, and mucous membranes). After symptoms start, both animals and humans will die. If the infection is treated soon after transmission and before the symptoms start, rabies can be prevented by post exposure vaccination.

SIGNS AND SYMPTOMS

Time between exposure to rabies and symptoms is 1-3 months but can be a few years.

- Itching, pain or numbness at the site of the bite (starting 20-90 days after the bite – although can be longer or shorter).
- Fever chills, weakness, headache.
- **Furious rabies** signs of hyperactivity, agitation, muscle spasm, fear of water (hydrophobia) or;
- **Paralytic rabies:** paralysis spreading from the bitten area.
- In both furious and paralytic rabies partial paralysis progresses to complete paralysis followed by coma and death in all cases, usually due to respiratory failure. Without intensive care, death occurs during the first seven days of illness.

DIAGNOSIS

This is a clinical diagnosis. Think of rabies if there is a history of an animal bite or contact with broken skin, plus neurological features.

TREATMENT

There is no effective treatment for rabies available to a person who is showing signs and symptoms of a rabies infection. In this case, treatment is symptomatic and palliative (e.g. relieve pain with painkillers or diazepam. *See pain p.31 and palliative care p.220.*

Symptomatic disease can be prevented by:

1. Local wound care

- Wash and flush a wound or point of contact:
 - For skin: wash with soap or detergent and a lot of running water for 15 minutes. Apply ethanol or povidone iodine.
 - For mucous membranes e.g. eyes/mouth: rinse with clean water or NSS
- If the wound is a bite: excise the necrotic tissue. Suturing (closing the wound) should be avoided if possible or should be re-assessed at 48-72 hours. Rabies immunoglobulin must be applied before any suturing.
- Give anti-tetanus treatment and antibiotics (*see wound care p.269 and tetanus p.160*) to treat other infections

2. Post-exposure prophylaxis (PEP) treatment for rabies

- Treatment includes vaccine +/- anti-rabies immunoglobulin (RIG)
- If already received pre-exposure vaccination (3 vaccines), then only need to give post-exposure vaccine
- If no previous pre-exposure vaccination, need to consider rabies vaccine and immunoglobulin (*see next page*)

If the rabies vaccine or immunoglobulin are not available at your clinic refer to hospital. Below is a recommendation for treatment if available but check your local protocol.
Pregnancy or infancy are NEVER contraindications to rabies post-exposure treatment.

Figure 17.11 Categories of exposure for rabies treatment from WHO 2018

Category I: Touching, feeding of animals or licks on intact skin:	no PEP treatment
Category II: Minor scratches or abrasions without bleeding, or licks on broken skin and nibbling of uncovered skin:	Rabies vaccine immediately
Category III: Single or multiple transdermal (through the whole skin) bites, scratches or contamination of mucous membrane with saliva (i.e. licks):	Rabies vaccine immediately. Give RIG if there is no previous rabies vaccination. RIG not needed if already had vaccination

Anti-rabies vaccine should be given for any patients in Category II and III exposures as soon as possible.

Immunosuppressed patients e.g. HIV, malnutrition should be evaluated case by case. They should receive the pre-exposure vaccination course. If they are exposed to rabies RIG is recommended even if already vaccinated. This immunoglobulin can be given within 7 days of potential exposure to the rabies virus.

Start rabies treatment immediately. Do not delay by dog observation when rabies is suspected.

How to administer rabies vaccination

- Give vaccine intramuscular (IM) or intradermal (ID).
- See below how to give dose, but you can also use the product information (comes with the vial) for dosing.

For Intramuscular (IM): Use one whole vial of the vaccine. **Do not inject into the buttock region.** Use the shoulder muscles (deltoid). For children < 2 years old, give the vaccine in the anterolateral thigh.

For intradermal (ID - into the skin): Use 0.1 ml into the deltoid. Intra dermal injections reduce the volume of vaccine required and vaccine cost by 60% to 80%. For children < 2 years old, give the vaccine in the anterolateral thigh.

Vaccine schedule^{*update}:

PRE-EXPOSURE PROPHYLAXIS: (PrEP vaccination before any animal bite)

IM regime:	Day 0:	One vaccine vial	(deltoid muscle of one arm)
	Day 7:	One vaccine vial	(deltoid muscle of one arm)
ID regime:	Day 0:	0.1ml per arm	(two arms)
	Day 7:	0.1ml per arm	(two arms)

FOR POST-EXPOSURE PROPHYLAXIS (PEP) TREATMENT: (vaccination after animal bite)

If no previous vaccine (e.g. No PrEP), can use any of the following regimens:

- 2-sites ID on days 0, 3, 7
OR
- 1-site IM on days 0, 3, 7 and between days 14-28
OR
- 2-sites IM on day 0 and 1-site IM on days 7 and 21

*Remember to use RIG if the exposure is category III and no PrEP

If have previous vaccine (finished rabies PrEP or had rabies PEP >3mo before):

- 1-site ID on days 0, 3
OR
- 4-sites ID on day 0
OR
- 1-site IM on days 0, 3

NOTE:

- Staff who gives the vaccine must be trained to give intradermal injections
- Keep proper conditions for vaccine storage
- Decide the duration of maximal vaccine storage after use (discuss with Safety team)
- Make sure you have the 1 mL syringe and short hypodermic needles to give the intradermal vaccine

How to administer Rabies ImmunoGlobulin (RIG):

Infiltrate with RIG into the depth of the wound and around the wound. As much as anatomically feasible should be infiltrated around the wound. Any remainder should be injected at an intramuscular site distant from that of vaccine inoculation e.g. into the anterior thigh.

Volume of RIG: 20IU/kg for Human RIG or 40 IU/kg of Equine (horse) RIG. The total recommended dose should not be exceeded. If the calculated dose is insufficient to infiltrate all wounds, sterile NSS may be used to dilute it 2 to 3 fold so that the immunoglobulin gets to all areas.

PREVENTION AND VACCINATION

Prevent exposure to infected animals. Pre-exposure rabies vaccination should be considered for professionals (e.g. veterinarians, animal handlers or wildlife officers) who have a constant risk of exposure to rabies.

Rabies can be prevented by post exposure vaccination within days of exposure (see above).

17.5 MIXED ORGANISMS

17.5.1. PAROTITIS

DEFINITION

Swelling of the parotid gland (glands that produce saliva that are located below the mouth and in front of the ears). Can be caused by different organisms. Signs and symptoms, and treatment depends on the cause.

Acute Bacterial Parotitis:		
CAUSE:		Mostly caused by <i>Staph Aureus</i> and mixed oral bacteria
SIGNS AND SYMPTOMS:		Painful swelling, fever
TREATMENT:		Cloxacillin AND Metronidazole PO or IV depending on severity
Mumps:		MUMPS SURVEILLANCE, See Appendix 7
CAUSE:		Viral
SIGNS AND SYMPTOMS:		Pain and swelling usually on both sides of the neck lasts 5-9 days, malaise, anorexia, fever, orchitis (painful swelling of testicles), rash, see Appendix 1
TREATMENT:		Symptomatic for pain and fever, soft diet
PREVENTION:		Mumps vaccine (MMR)
Extrapulmonary TB:		
CAUSE:		TB
SIGNS AND SYMPTOMS:		Chronic non-tender swelling of parotid gland, or lump noted in gland, may have other symptoms of TB
TREATMENT:		See suspect TB case management see p.251
HIV Parotitis:		
CAUSE:		HIV
SIGNS AND SYMPTOMS:		Non-painful swelling of gland, may have other HIV symptoms
TREATMENT:		Anti-retroviral therapy
Autoimmune Parotitis:		
CAUSE:		The body causes its own reaction e.g. Sjorgen's disease
SIGNS AND SYMPTOMS:		Recurrent or chronic swelling of one or both glands with other symptoms of the autoimmune disease
TREATMENT:		Specific treatment for auto-immune disease
Melioidosis:		
CAUSE:		<i>Bulkholderia pseudomallei</i>
SIGNS AND SYMPTOMS:		Acute, subacute, or recurrent swelling of the parotid gland. There may be an abscess present. This is the most common presentation of melioidosis in children.
TREATMENT:		See <i>Melioidosis</i> , p.162

CHAPTER 18: MENTAL HEALTH AND SUBSTANCE ABUSE

18.1 MENTAL HEALTH

Many psychiatric diseases do not have clear signs and symptoms. Alcohol abuse, for example, may be a symptom of depression, anxiety or trauma (post traumatic stress disorder / PTSD).

Disorders of mental health (mood, thinking and behaviour) may be due to a psychiatric diagnosis, a personality disorder or caused by physical disorders. Before you diagnose a mental health problem, you should **exclude underlying physical diseases** and **assess for drug or substance abuse**. For example, hyperthyroidism may present as anxiety, or a hypoglycaemic patient may be agitated. When diagnosing a mental health problem, you should always get a detailed medical history.

Also, sometimes mental illness can cause **physical symptoms**, called 'psychosomatic symptoms'.

- These occur if a person cannot manage increased levels of mental stress
- Physical symptoms can be seen in depression, bipolar, anxiety and PTSD, and psychosis.
- If the patient cannot manage high stress levels, the body will develop a physical symptom such as headache, abdominal pain, numbness, dizziness, fainting, or even paralysis.
- Sometimes the patient can discuss physical symptoms more easily than the stress (e.g. family problem)
- It is not possible to fix the physical symptom. You must treat the stress and mental problem.

Many mental health problems should not be treated with medication alone. **Drugs should be combined with counselling.**

During pregnancy and breastfeeding, mental health medication should be lowered to the lowest effective dose and the benefits and risks of the medications should be discussed with a doctor if possible.

The following are the more common psychiatric disorders.

18.1.1. MOOD DISORDERS*UPDATE

DEFINITION

There are two types of mood disorders:

1. **Depressive disorder**
2. **Bipolar disorder (manic depressive disorder)**

DIAGNOSIS

1. **Depressive disorder**
 - There are no manic episodes
 - Have one or more *depressive episode*
2. **Bipolar disorder**
 - Have at least one *manic episode* and one or more *depressive episodes*

*For depressive episode**: Must have **≥5 of these symptoms** and **at least 1 of the bold symptoms**. Symptoms must be present at least 2 weeks before you can diagnose a depressive episode.

- | | |
|---|--|
| <ul style="list-style-type: none">• Feeling sad most of the time• Low interest or pleasure to do normal activities most of the time• Cannot sleep (insomnia)• Weight loss or no appetite | <ul style="list-style-type: none">• Low energy or fatigue• Feel guilty or not competent• Loss of concentration• Suicidal thoughts or activities |
|---|--|

*A depressive episode can also cause **low level of psychomotor activity**: the patient may look sad, not laugh, not want to talk, or want to be alone.

For manic episode: Must have **≥3 of these symptoms**. Symptoms must be present for at least 1 week before you can diagnose a manic episode.

- | | |
|--|--|
| <ul style="list-style-type: none">• Extreme feelings of competence (feel like they can do anything)• Less need for sleep• Talking very quickly | <ul style="list-style-type: none">• Vivid thoughts (clear ideas)• Easily excited• Increased activity (social, sexual)• Seeks out pleasurable/fun activities |
|--|--|

- Try to find a trigger event e.g. death of family member, rape, accident, or new diagnosis like HIV

TREATMENT

Non-medication treatment options:

Counselling (see p.180).

Encourage the patient to keep active, get up at regular times and do plenty of physical exercise.

Medication treatment options:

1. Depressive disorder

1st Line: Selective Serotonin Reuptake Inhibitor (SSRI):

e.g. **Fluoxetine** (1 tablet = 20mg) normal dose 40 - 60 mg OD OR

Sertraline (1 tablet = 50 mg), normal dose is 100 - 200 mg OD.

- Start at 1 tablet/day and wait least 1 week before increasing these medicines. This treatment must be continued for 6 months.
- **Side effects:** Weight gain, nausea, sweating, and occasional mild neurological signs such as tingling in the fingers.
- It can take 6-8 weeks for this drug to take full effect, but the side effects appear in the first week of treatment. This must be explained carefully to the patient.
- **Note: in the first few weeks of SSRI treatment the patient may feel worse and suicide risk is increased, explain this to the patient and the family, see suicide, p.182.**

2nd Line: Tricyclic antidepressant (TCA) (Use if you do not have an SSRI, or if the SSRI is not effective after 8 weeks)

e.g. **Amitriptyline** normal dose is between 75 - 150 mg OD at night

- **Side effects:** Sedation, urinary retention, blurred vision, tachycardia, orthostatic hypotension (drop in BP when stand up), agitation, confusion, dangerous in deliberate overdose
- **Avoid** in patients with cardiac disease, history of seizures, hyperthyroidism, narrow-angle glaucoma and urinary retention.
- **Note: do not give large amounts of TCAs to a patient undergoing unsupervised treatment. Taking an overdose of this medicine can cause death.**

MANAGEMENT OF DEPRESSION

1. After starting treatment follow the patient every 1-2 weeks for 1 month, only give enough treatment for 1 week each time.
2. Tell the patient that it is **dangerous to stop anti-depressants suddenly** – if stop: slowly decrease dose of medications over 1-4 weeks.
3. If no effect in 6-8 weeks, consider increasing the dose or switching medicine. (Remember to slowly decrease dose before switching).
4. If the medications are not effective, refer the patient to a hospital where mental health care is provided.

Women are at risk for depression in the first few months postpartum – sometimes so severe they become psychotic, commit suicide or kill their infant. In these cases think about the mother and baby's safety: use all counselling, family support and medications necessary.

2. Bipolar disorder

- Bipolar disorder is difficult to control, and these patients are at higher risk for suicide. It is best for these patients to be managed by psychiatric specialists, and acute mania may require hospitalization.
- If that is not possible, patients with a manic episode can be treated with **carbamazepine** 200 mg BID and increase as needed, max 1200 mg/day. This can be continued to prevent future manic episodes.
- For severe episodes with agitation, patients can be treated as acute psychosis (see p.178).
- For a patient with a history of both severe depression and mania, carbamazepine can be given together with an SSRI.
- Carbamazepine can affect the platelets, red blood cells, kidneys and liver, if possible check CBC, LFT and renal function every 3-6 months.

Note: if available, **lithium** is inexpensive and may be more effective. Start with 300 mg, normal dose 600-900mg, check thyroid and kidney function every 3-6 months. It also has a small therapeutic window – check lithium levels frequently for overdose. Lithium should not be prescribed if the drug supply is not regular. Low adherence or stopping lithium treatment suddenly may increase the risk of relapse.

MANAGEMENT OF BIPOLAR DISORDER^{*update}

Important points:

1. If depression in bipolar disease NEVER prescribe antidepressants without also prescribing a mood stabilizer, e.g. carbamazepine. Mono-therapy with antidepressant can cause manic symptoms
2. If manic episode and patient is on antidepressants: DISCONTINUE antidepressants to prevent further risk of mania
3. Patients with mania are at high risk of developing depression after a manic episode
4. Pregnant women should not receive carbamazepine, valproic acid or lithium due to the risk of birth defects

18.1.2. ANXIETY DISORDERS

DEFINITION

Anxiety or mental stress often occurs when we are frightened or worried. Anxiety disorders are defined when a sense of fear or worry makes it hard for someone to do normal activities of life (e.g. completing school work or caring for children) or when anxiety is persistent. When feeling anxiety or stress, the heart usually starts beating faster, reactions are quicker and we are more alert. Headaches and sweating are common. This is the body's normal reaction to stress, but problems occur when levels of stress are too high or they are unable to be relieved.

- When these symptoms become chronic the patient may have an anxiety disorder. More severe symptoms from unrelieved anxiety can include sleeplessness, heart palpitations, depression, violence, withdrawal and psychosomatic complaints.
- An acute anxiety attack is an acute episode of severe anxiety with severe psychosomatic symptoms: patients may have chest pain, difficulty breathing, palpitations, dizziness and fear that they are going to die.

TREATMENT

Always look for an underlying mental disorder (depression, PTSD or psychosis) and give specific treatment.

Acute anxiety attack:

- Try to calm down the patient by talking and listening carefully and reassuring.
- Encourage deep breathing and put them in a quiet private place.
- Consider **diazepam** PO only in severe acute anxiety attacks (see below).
- Use counselling techniques (see p.180).

Non-medication treatment options:

- **Cognitive behavioural therapy.** This should be carried out by trained health workers. This form of therapy has a lot of similarities with counselling (see p.180).

Treatment by medication:

- For long-term treatment antidepressants (**SSRIs** or **amitriptyline**) can work well.
- Beta blockers e.g. **propranolol** 40mg OD (increase to TID if necessary) can help with anxiety symptoms of racing heart especially if also have high BP or if tremor/palpitations are the main symptoms. Monitor BP and PR.
- For an acute anxiety attack you can use **diazepam** (5-15 mg PO in 2-3 divided doses for a maximum of 1-2 weeks and reduce dose by half in last few days of treatment) to lower the anxiety.

Diazepam medicine is very addictive: only use it if the patient's anxiety cannot be controlled through counselling.

18.1.3. POST TRUMATIC STRESS DISORDER

DEFINITION

Post-traumatic stress disorder (PTSD) is a condition that occurs as a response to severe and prolonged fear.

- Continual high levels of anxiety that cause problems in the patient's life (e.g. not leave house because afraid).
- This disorder is common after violent situations, or escaped from life-threatening situations

CAUSES

1. Life threatening violence, either a single event or over a long period of time.
2. Violence experienced either directly by the patient or seen by the patient to have happened to somebody else.
3. Escaping from possible violence, or afraid of capture.

SIGNS AND SYMPTOMS

- **Persistent re-experiencing:** images, thoughts or perceptions about the traumatic experience which intrude despite efforts to block them out (the patient tries not to think about it but cannot). It may include distressing dreams and flashbacks (reliving the experience).
- **Avoidance:** patient avoids places, situations, people associated with the trauma, may use alcohol, drugs to help do this.
- **Increased arousal:** constant state of alert, exaggerated startle response (very easily scared), anxiety, insomnia, poor concentration, may have somatic symptoms e.g. high BP, sweating, shaking, tachycardia, headache etc.

TREATMENT

Non-medication treatment options:

- Counselling (see p.180).
- Relaxation therapy.
- 'Survivors of violence' need to feel safe and secure in their environment.
- Empathy: listen and accept what the person is saying. Ask how they feel about the incident, express your support.
- Talk and listen, ask the patient about the history of their problems. For example, when was the first time they felt the headaches, or could not sleep? What things were happening in their lives around that time? Try to locate a probable cause for their symptoms.
- Try to listen to the patient's problems. Do not to judge them based upon their stories, express that you are interested in what they have to say and try to let them express themselves. Above all, let the patient know they are not alone and that you understand the reasons for their stress.
- Group counselling may be helpful – if the patient interacts with others who have had similar experiences, they may feel less alone.

Treatment options by medication:

- Consider antidepressants: **SSRIs** or **amitriptyline** are usually helpful.
- When the patient is suffering from nightmares, a low dose of **haloperidol** (0.5-2mg BID or TID or at night) could be very helpful. Because of possible side effects, use the lowest effective dose and stop if no improvement.
- For other sleeping disturbances, you can use benzodiazepines (e.g. **diazepam** PO 5 mg). However, diazepam is an extremely addictive medicine, so diazepam should not be prescribed for more than 1-2 weeks. **Note:** Long-term treatment with diazepam after a traumatic event can have a negative effect on adaptation, leading to higher rates of PTSD.

18.1.4. PSYCHOSIS*UPDATE

DEFINITION

A severe form of mental illness: the patient is unable to distinguish between the real world and the world of their hallucinations and delusions.

Hallucinations: The experience of hearing, seeing, smelling and even feeling things that are not there e.g. the patient may hear voices talking to them though there is no-one around them, or see things that are not there. It is important to realise that the patient does not imagine these sensations; these are real experiences for them and can be very frightening.

Delusions: Fixed false beliefs that are not shared by other members of the person's culture or society. Ideas that seem strange and bizarre, such as having powers that others do not possess e.g. the patient may say they can read peoples' minds, or say they are from another planet. Delusions are generally so strange that many peoples' first reaction is to laugh. However, in delusions these ideas are fixed, this means that to the patient these beliefs are completely true.

- Due to the extreme nature of hallucinations and delusions, patients are often unable to care for themselves and are likely to be disruptive in the community. Unfortunately, very often people with psychosis may be regarded as "fools" and not considered worthy of medical help. However, with proper medical intervention, psychotic patients can get better.
- Acutely psychotic patients are difficult to talk to, as they are not able to understand what is happening around them. However, medical staff should make attempts to let the patient know where they are and what is happening to them such as telling them that they are in the clinic and that they will receive treatment.

DIAGNOSIS

You may need to get a history from a family member, is this the first time this has happened?

It is important to distinguish medical causes of confusion e.g. infections in elderly, steroid induced psychosis, substance abuse, hypoglycaemia.

TREATMENT^{update}

Non-medication treatment options

Counselling

- Explain to the patient and family that the symptoms are caused by a mental health condition, that it can be treated and the patient can recover.
- Do not blame the patient or their family or accuse them of being the cause of the symptoms.
- Explain that the symptoms may return or worsen even when on treatment. This is common and they should visit a health care provider as soon as possible.
- Avoid alcohol, betel nut, cannabis or other non-prescribed drugs as they can worsen the psychosis.

Medication treatment options:

1st line:

- Start **risperidone** 1mg PO daily. Increase 2-6mg daily until improvement. Maximum dose is 8-10mg/day. This is a newer antipsychotic drug and has less side effects (see below).

2nd line:

- **Give haloperidol** 2.5-5mg PO or IM if patient is agitated or violent. (max 20mg/d). Decrease the dose by half in elderly patients. **Take care for your safety if the patient is violent.** Discuss referral with doctor.

Additional medication:

- **Diazepam** 5-15mg per day in 2-3 divided doses for severe anxiety or agitation for a few days. Do not use long term because it can be addictive.

Monitor these patients closely as these medicines have severe side effects. Try to give the lowest dose of haloperidol that is effective for the patient. The choice of long term medical management needs to be done case by case and should only be prescribed by experienced medical personnel. Treatment should include counselling, psychotherapy and social support.

SIDE EFFECTS

Haloperidol

- Parkinsonism: Tremors, stiffness, akinesia (inability to start movements) or bradykinesia (slow movements), postural instability (feel unsteady).
 - **Diazepam** can treat acute parkinsonism side effects
 - When a patient has symptoms of parkinsonism, the dose of haloperidol treatment is too high: lower the dose.
- Oculogyric crisis: Eye rolling movements that are involuntarily, occurs especially in young men.
- Torticollis: Neck twisting movements, occurs especially in young men.

If patient develops muscle rigidity and high fevers that do not seem related to infectious cause, may be drug side effect: STOP haloperidol immediately.

Risperidone

- Sedation, dizziness, tachycardia, metabolic (weight gain, elevated lipids, insulin resistance)
- Sexual dysfunction
- Neuroleptic malignant syndrome (NMS)
- Caution in patients with cardiac disease

Drug-drug-interaction: carbamazepine can decrease levels of risperidone while fluoxetine can increase levels.

MANAGEMENT

Follow up (see *Counselling, next page*)

- Close follow up until symptoms start to respond to treatment.
- Supervise treatment for 4-6 weeks. Can discuss with family member to do DOT.
- If improving continue treatment plan. Can decrease follow up.
- Still need regular follow up to monitor treatment: check adherence, side effects and dosing. Check weight, BP and blood glucose.
- **Discontinue medication:**
 - **If first episode, relapse or worsening of psychotic symptoms:** Consider to stop medication **12 months after symptoms have resolved.**
 - **Person with symptoms persisting >3 months:** Consider discontinuation of medications if person is in FULL REMISSION of symptoms for several years.
 - Gradually and slowly discontinue medication dose. Patient and family must watch for early symptoms of relapse.

18.1.5. **INSOMNIA**

Many patients with mental illness have sleep problems.

TREATMENT

First counsel the patient:

- Keep regular sleep/wake schedule e.g. do not sleep in the afternoon
- Get physical exercise every day (but not right before bedtime)
- Sleep in a dark room
- Avoid coffee, tea, cigarettes and betel in the afternoon and evenings
- Avoid alcohol
- Avoid electronic screens (mobile phones, TV, computer etc) at least one hour before going to sleep.

Ask if they have any symptoms of a mental health or physical condition. Treat the underlying diagnosis.

- Do they have difficulty falling asleep because they are worrying about something? (**Anxiety disorder**)
- Do they wake up earlier than they want to without any reason? (**Depression**)
- Do they struggle with nightmares? (**PTSD**)
- Is their sleep interrupted by untreated pain? (**Pain**)

If no improvement consider:

- **Amitriptyline:** usually at lower doses than for depression (25-50mg). **Note:** do not use high doses if patient is on an SSRI.
- If severe sleep disturbances **diazepam** 5mg PO may be given for a short period of time. **Be careful: diazepam is very addictive.**
- **Note:** Severe insomnia, where the patient doesn't sleep at all for multiple nights, is a risk factor for suicide (see p.182).

18.1.6. **COUNSELLING**

DEFINITION

Counselling is a method used to help treat people with emotional trauma. Counselling is sometimes referred to as a 'talking cure'. This method is used to help people by talking and discussing their problems with them. The counsellor can help to find solutions to problems and find better ways of dealing with emotional trauma. Counselling generally takes some time to be effective and requires experienced counsellors to be fully effective.

Some of the rules:

Confidentiality: Whatever you learn in the counselling session is not to be told to anyone else without the person's permission. The only exception to this rule is if the person has told you that he/she plans to either harm himself or others. It is through confidentiality that a trusting relationship can develop.

Trust: Without trust, effective counselling cannot occur. This needs to be developed between the counsellor and the person seeking help.

Empathy: The counsellor needs to try to understand the person's situation as best as they can. To empathise means to see the world through another's eyes, to imagine being the person and imagine how it would feel to suffer their problems.

Non-judgemental: When hearing the person's problems and life story you are being placed in a very powerful position. The person has placed their trust in you and is relying upon you to accept them. People who need counselling are often in a very fragile emotional state and need acceptance and support. Not judging the person's behaviour (even though you may disagree with it) is an essential element of counselling.

Listening: The counsellor needs to be a good listener. Allow pauses in conversation, do not try to push the person to speak and let them tell you what they feel comfortable telling you at that time.

Body Language: The way a person sits and their movements often show what they are feeling. During counselling, it is important to make the person aware that you are interested and listening to them. One way of doing this is to follow these rules: **Remember the letters SOLAR:**

- | | |
|-------------------------|---|
| Square: | Sit facing the person, do not sit sideways to them, and look directly at them. |
| Open: | Sit with an open posture, do not cross your arms or lower your head. |
| Leaning forward: | By leaning slightly forward towards the person you are showing them that you are interested. |
| Attentive: | Be attentive to what they are saying, listen to them and nod your head to show you understand. |
| Relaxed: | During the counselling session be relaxed, try not to feel tense or excited; the person will feel this and will become more relaxed themselves. |

The Counselling Session:

Here are some guidelines on how a counselling session can be run:

1. To start

Explain that you want to help them, introduce yourself and your profession (e.g. medic, social worker). Find a **quiet, comfortable and private environment** to talk. Explain that you would like to get to know them better so that you can effectively deal with their specific problem/circumstance. Ask if they have any questions and answer them. Be honest.

2. Family history

Life story e.g. Why did you come to Thailand? How did you come to the camp? What happened to you while in Burma? Obtain their medical history and cultural background.

3. Discover what the problem is

Ask the person what problems they are having. Allow time for the person to talk, allow pauses in the conversation and be patient. Here are some questions you could ask:

- How does it feel when you talk about what happened?
- Does it affect your sleep: do you have nightmares about what happened?
- What effect does the problem have on your life?
- Does it affect your health?
- Do you suffer headaches, or other body pains? If so did they begin after the incident?
- How long have you had the problem?
- How do you think the problem can be solved?
- Discuss possible solutions with them. But do not feel that you must solve their problem.

4. During your discussion, assess the person's mental state

- Are they angry, sad or do they feel nothing? Are they depressed or angry?
- Do they make sense?
- Are they psychotic?
- Do their emotions make sense? For example when telling a bad or sad story are they smiling/ looking happy or when talking of a happy event are they sad/crying?
- Find out if they feel good or bad about themselves, do they have high or low self-esteem (confidence), do they feel powerless, e.g. everything they try or do fails (signs of depression).
- Do they have a history of violence?
- Do they feel violent or suicidal?

All these are things that can be discovered, not through one counselling session but perhaps over a series of interviews as the person becomes more relaxed and begins to trust you more. The first session is mainly to begin the process; successful counselling can take months. These questions do not necessarily need to be asked directly but the counsellor can assess or feel the real answers from the person's reactions and attitude.

5. Positive reflection (This is generally most effective with non-psychotic patients)

- As you listen carefully to the patient, **identify strengths** that they already have that can help them. Remind patients of these strengths: e.g. "You have survived a lot of difficult things. You must be very strong." Or "It seems that you really enjoy talking with your cousin, and she is a great support for you" or "Listening to music seems to help you feel calm."
- Try to identify **ways that they think or do that are contributing to their mental illness**. Reflect, or explain this back to the patient without judging: e.g. "It seems that you are saying that when you are alone you start to think a lot about your baby who died, and that makes you feel more depressed" or "It seems that you always have these severe anxiety attacks before exams."
- Think of **simple changes** that the patient can do that may help their mood: e.g. "When your husband leaves the house, instead of staying there alone, what about visiting your cousin?" or "Do you think you could try to listen to some music while you study to help you feel calm?"
- Sometimes patients have **untrue beliefs** that contribute to their anxiety or depression. If you hear these try to help the patient realize that they are untrue: e.g. Counsellor: "You say you cannot pass your classes. Have you passed classes before?" Patient: "Yes, I usually pass my classes, but I failed one class last year." Counsellor, "Good. So you have passed your classes almost every time, and you have only failed once. Then you must be a generally good student." **Never blame the patient for their untrue beliefs about themselves.**

Always involve the patient in the discussion. As you are reflecting back to them, ask for their feedback. Do they agree with your suggestions? If not, why not? Do they have ideas about what could improve their mood?

At the end of the visit, give the patient one or two simple things to work on as "homework" until you see them next (e.g. "Try talking with your cousin this week at least twice.") Review how those things worked for the patient the next time you see them.

Examples of homework for patients, pick things that the patient identifies as helpful to themselves:

- Exercise: especially walking
- Talking with good supports in their own community
- Religious activity: visiting the mosque, temple or church, or private time praying or meditating
- Keeping a regular sleep schedule
- Eating regularly
- Asking for help from a friend or relative (e.g. to watch children so patient can rest)

DO NOT TRY TO DO TOO MUCH DURING THE FIRST SESSION.

6. Referral

The counsellor may need to decide whether or not the person needs a referral to another service. The person may need medical help, or protection to escape from an abusive relationship. Any referral should attempt to be undertaken with the person's understanding and permission.

Some important points to remember

- Understand that the person is taking a risk in telling you their story; it is very personal information, which you must respect.
- The person is taking a risk to confront painful memories and undergo change; the counsellor is the one to provide strength and security.
- The counsellor must be aware of the effect of hearing sad and disturbing stories and must be prepared to cope with hearing and advising on difficult life situations.
- The counsellor must be aware that they are taking on a lot of responsibility. The counsellor has a lot of power over the person's life. They need to be aware of this and not use this power in a negative way. If unaware of this relationship, the counsellor can unconsciously become a part of the problem.

Finally

The object of counselling is to help the person to find solutions to their problems, to strengthen the person and to lead them to an independent and happier/healthier life. This ideal cannot always be met but by sharing their problems with another who respects and is interested in them, and their problems, the person will leave any counselling session with more confidence and security.

18.1.7. SUICIDALITY/HOMICIDALITY

DEFINITION

Like severe malaria or tuberculosis, mental illness can be a fatal disease if not adequately treated.

Suicide = the patient killing themselves

Homicide = the patient killing someone else

RISK FACTORS

Risk factors for suicide:

- Thinking about suicide
- Bipolar disorder, PTSD, psychosis or recurrent, chronic depression
- History of trying to commit suicide in the past
- Family history of suicide
- Substance abuse (drugs or alcohol)
- Hopelessness (may have loss of relationships or severe debt)
- Isolation: not connected to friends or family
- Severe insomnia
- Other suicides in the patient's community

Risk factors for homicide:

- Substance abuse (drugs or alcohol)
- More common for men
- Have a gun
- Domestic violence

PREVENTION

Gently ask any patient if they have thoughts about hurting themselves, thoughts about hurting someone else, or thoughts that it would be better if they were dead.

****Asking about suicide does not increase the risk of suicide****

- If they do have these thoughts, ask if they have made plans to end their life or to kill someone else (e.g. "if it gets any worse I would drink poison").
- Do they have access to ways that they can easily kill themselves or someone else? e.g. guns in the home, pesticides from farming, a large number of amitriptyline pills.
- What prevents them from committing suicide or homicide? Often they will say "Faith" or "I don't want to leave my children without a father". These are usually strong reasons. If they say, "I really have no reason to live", they are at high risk of suicide.
- If you are not reassured by the answers to these questions, or if they have many risk factors, discuss with a colleague or supervisor right away, and make a **safety plan** with the family or friends.
- Many communities along the border have used "suicide watch" techniques where friends and family take turns watching the person who is at risk to commit suicide. This can be very useful until medication and counselling can improve a patient's symptoms.
- If you have real concerns that the patient might hurt someone else, discuss with a colleague or supervisor right away and consider contacting the person at risk or the local authorities (e.g. village head).

18.2 SUBSTANCE ABUSE (ADDICTION)

Addiction can cause abuse of substances like alcohol, opiates and amphetamines can lead to both short term and long term dangers to a patient through intoxication, addiction and withdrawal. Other substances like betel and tobacco can increase cancer risk and cause other medical problems. Patients who are addicted to any of these substances may have a very hard time stopping their use. If there is a drug treatment program in your area, suggest that patients get help there. Use counselling techniques (see p. 163) and ask the family and community to help.

Addiction is a disease: treat these patients with empathy and respect, even though they can be very difficult.
Addiction can occur with many things such as gambling, eating sugary food or drink, smoking, using a smartphone.

18.2.1. ALCOHOL AND DRUG INTOXICATION

DEFINITION

Acute intoxication:

When the patient has taken too much of a substance (e.g. alcohol or drug) and the body cannot remove it quickly enough. Symptoms can last until the drug disappears from the body. Intoxication can lead to dangerous behaviour (e.g. driving a motorbike after drinking, getting in a fight after using amphetamines) or overdose.

Remember: if a patient with an overdose of alcohol, opiates (e.g. heroin) or diazepam stops breathing but has a stable BP and HR, they can probably survive if someone helps them breathe with a bag valve mask. This may take hours: try to get family members to take turns if not enough staff.

Addiction:

Long term use can lead to addiction of a person to that substance. A patient may be addicted if they have three or more of the following signs:

- A strong desire to take the substance.
- Difficulty controlling taking the substance (e.g. what time of day to start, stop and the amount they take).
- Withdrawal signs and symptoms occur when the person does not take the substance for a certain time (and withdrawal stops when the person takes the substance again).
- The need to take more of the substance each time to reach the same previous effect (tolerance).
- The substance will be the most important thing in the person's life.
- The person continues to take the substance even though he/she knows the bad consequences of taking it (e.g. patient may lose a job or have an accident because of drinking too much, but they still do not stop).

Addicted individuals eventually need the substance in order to function normally.

Withdrawal reaction:

- When addicted patients stop taking their substance, they begin to experience withdrawal. The patient gets signs and symptoms that are usually the opposite of the effects of the drug.
- Symptoms of a withdrawal reaction can persist for several days

If a chronic substance abuser wants to stop using a drug or alcohol be prepared for the acute withdrawal reaction. Long-term follow up must be organised with counsellors, the patient and the relatives, otherwise they may start using the drug again.

18.2.2. ALCOHOL

Acute intoxication

DEFINITION

Alcohol intoxication occurs when alcohol intake is more than the body can tolerate. This causes behavioural or physical abnormalities. This means the person cannot function normally and should not drive a car or motorbike.

SIGNS AND SYMPTOMS

- Smell of alcohol
- Vomiting
- Change in behaviour
- Agitation
- Euphoria
- Loss of control
- Poor coordination
- Drowsy or comatose – with increasing amounts of alcohol intake

TREATMENT

- If in coma see *Emergency treatment of coma p.19*.
- Check glucose and treat according to the result. If you give prolonged hypoglycaemia treatment without vitamin B1, you might cause the patient to develop Wernicke's encephalopathy. Do not delay treatment for hypoglycaemia, but you should give vitamin B1 as soon as possible (before dextrose infusion is best).
- Rehydrate with IV **NSS** when unconscious.
- If history of chronic alcoholism, give **vitamin B1** 250mg IM or in NSS bag (this helps prevent serious permanent brain damage (*Wernicke's Encephalopathy see next page*)).
- Watch for signs of hypoglycaemia (*see p.26*).
- Check urine output and vital signs every hour until the patient is awake.
- Position the patient in lateral coma position, because of the risk of aspiration (*see coma p.19 and aspiration pneumonia p.239*).
- When the patient can swallow advise plenty of fluids (>3L) in order to expel the alcohol from the body.

In case of agitation or violence:

- **Diazepam** 10 mg IV, repeat if needed after 30 minutes.
- Rehydrate (oral or IV). Check for hypoglycaemia and treat if present.

**In acute alcohol intoxication there is a high risk of hypoglycaemia.
Chronic alcohol intake is associated with vitamin B1 deficiency.**

Withdrawal reaction

DEFINITION

When the patient stops alcohol quickly (drinking every day then suddenly stop), they will develop withdrawal symptoms. Alcohol withdrawal can cause death. Severe complications often **occur around 72 hours** after presentation.

SIGNS AND SYMPTOMS

- Slight fever (this is a sign of severity)
- Seizures (this is a sign of severity: most common around 6-18hrs after last drink)
- Tachycardia
- Sweating
- Nausea, vomiting
- Neurological signs such as anxiety, tremor
- Auditory and visual hallucinations (see and hear things that are not there)
- Confusion, hyperactivity, anxiety attacks, poor sleep

Figure 18.1 Short Alcohol Withdrawal Score (SAWS)

Check symptoms and keep a record of the score every day

Symptom	None = 0	Mild = 1	Moderate = 2	Severe = 3	
Anxious					Examine patient and ask questions to get a score.
Feeling confused					
Restless					If <12: the symptoms are mild/well controlled. Consider decreasing diazepam if patient is well.
Miserable					
Memory problems					If ≥ 12: the symptoms are moderate to severe. Patient may be at risk for seizures. Consider increasing diazepam .
Tremor (shakes)					
Nausea					
Heart pounding					
Sleep disturbance					
Sweating					

TREATMENT

- **If patient is agitated or will not take medicine, diazepam** 10 mg IV, can be repeated several times until the patient is calm but still awake.
- **If patient can take oral medicine, give diazepam 10-20mg PO QID for the first 1-2 days.** Then give reducing dose e.g. 10mg BID for 2 days, 5mg TID 2 days, 5mg BID 2 days, 5mg OD 2 days, then stop.
- If patients have a history of drinking very large amounts of alcohol, you may need to give higher doses and continue for a longer time. Discuss with the doctor. Evaluate for signs and symptoms of withdrawal and adjust dose based on patients score.
- Try not to hold or tie the patient down physically, they may become more violent: use medicine and help from family members to keep patient controlled.
- **Vitamins:** give **vitamin B1** (thiamine) 250mg IM or in NSS bag. Follow this with oral: **vitamin B1** 100mg OD, **vitamin B12** PO 1mg OD, **folic acid** 5mg OD.

Be careful: if you give too much diazepam, the patient can stop breathing. Keep this patient in close observation!

Wernicke's Encephalopathy or Korsakoff's syndrome

Chronic alcohol abuse combined with a poor diet can lead to Wernicke's Encephalopathy or Korsakoff's syndrome or both due to low vitamin B1 levels. If the patient has any neurological signs e.g. abnormal eye movements, memory problems, confusion, unsteady walk (when not acutely intoxicated) consider these conditions.

18.2.3. OPIOID/HEROIN/MORPHINE

These drugs can be smoked, inhaled via the nose or injected IV.

Acute intoxication

SIGNS AND SYMPTOMS

- Euphoria (patient feels calm/always laughing)
- Flushed skin (feeling of being hot on the face, red skin)
- Itchy skin (especially with morphine)
- Myosis (small pupils)
- Drowsiness
- Deep and slow breathing
- Hypothermia
- Bradycardia, hypotension
- Constipation

TREATMENT

The antidote for opiate intoxication is not available at SMRU. Treatment is symptomatic and prevention of complications.

Withdrawal reaction

Patients will feel terrible but narcotic withdrawal is less dangerous than alcohol withdrawal. However, watch out for signs they might be suicidal (*see p. 182*).

SIGNS AND SYMPTOMS

- Anxiety
- Increased respiratory rate
- Increasing body secretions: sweating, running nose, tears
- Mydriasis (dilated pupils)
- Pilo-erection (skin hairs becoming straight) ('gooseflesh')
- Tremor
- Minor muscle contractions, muscle pain
- Hot and cold flushes
- Anorexia
- Abdominal pain/cramps, diarrhoea

TREATMENT

Treatment for symptoms:

- Nausea: give **metoclopramide** or **domperidone** if available
- Abdominal pain: give **buscopan**,
- Muscle pain: give **paracetamol** or **ibuprofen**
- Diarrhoea: give **loperamide**.

For severe agitation or anxiety can give **diazepam** 5-10 mg IV, IM or PO.

Methadone and clonidine are used elsewhere but are not available in our setting.

18.2.4. AMPHETAMINES

There are many kinds of amphetamine and they can be mixed together in the same tablet. The tablet may also contain other substances. Amphetamines can be inhaled via the nose, smoked, swallowed or injected IV. Even if used only once, amphetamines can cause acute psychiatric problems.

SIGNS AND SYMPTOMS

Acute Intoxication:

- Increased energy, increased interest in sex
- Insomnia (sleeplessness)
- Anxiety
- Auditory and visual hallucinations

Withdrawal:

- Severe depression (including risk of suicide)
- Very tired
- Increased appetite
- Feelings of paranoia or persecution (e.g. think someone is trying to kill them)

Some types of amphetamine can produce more severe signs and symptoms:

- Severe hyperthermia (very high temperature)
- Disseminated intravascular coagulation (bleeding disorders)
- Rhabdomyolysis (muscle damage)
- Seizures
- Acute renal failure
- Liver toxicity
- Heart problems

TREATMENT

Treatment of symptoms:

- If agitated: give **diazepam**
- If psychotic: treat **as for psychosis** (see p.178).
- Can try SSRIs– **fluoxetine** 40 mg or **sertraline** 100mg (start at ½ the dose and increase to full dose after 1 week)

18.2.5. BETEL NUT

DEFINITION

Betel nut is the seed of the betel palm (*Areca catechu*). Betel nuts are often chewed. People use betel nut to stay alert and decrease stress. It can be mildly intoxicating and decrease appetite. This means that betel nut is a drug. Betel nut is not good for the health if used regularly, it can cause stomach cancers, and problems in the mouth and gums. Many in this area chew betel nut, so it is important to give information on the risks.

SIGNS AND SYMPTOMS

Psychoactive effects:

- Sense of well being associated with euphoria
- Warm sensation in the body
- Increased capacity to work
- Insomnia (sleeplessness)

General effects

- Increased sweating
- Increased production of saliva
- Palpitations: related to tachycardia (increased pulse rate)
- Worsening asthma
- Regular betel chewing causes the teeth and gums to be stained red
- Increased convulsions for epileptic patients

COMPLICATIONS

Oral Cancer

In countries and communities where betel nut use is high, there are higher levels of oral cancer. The mouth mucosa loses its red colour and is replaced by a white coat (leucoplakia). The carcinoma then spreads easily through the mouth. The diagnosis is not easy to make in the early stages. Oral carcinoma is difficult to cure (and expensive). Treatment is not available in most clinics in our region.

Vitamin B1 Deficiency

Betel nut chewing can cause vitamin B1 deficiency. Patients with regular complaints of peripheral beri-beri should be advised to stop betel nut consumption.

18.2.6. TOBACCO

DEFINITION

Tobacco is a plant that has leaves that can be dried and chewed or smoked. The leaves contain the addictive drug Nicotine, which makes it very difficult to stop smoking or chewing tobacco if a patient has started to do it regularly. It has similar mild psychoactive effects to betel nut but is considerably **more** dangerous. All patients who smoke or chew tobacco should be counselled about the complications and urged to stop. Most smokers will experience withdrawal symptoms when they quit smoking, e.g. irritability, difficulty concentrating, restlessness, depression, nicotine craving, insomnia and anxiety.

Passive smoking is inhaling the smoke from someone else smoking e.g. if smoking inside a house then other family members will breathe in the smoke. This can be dangerous to their health, especially children (increased risk for wheezing, asthma, respiratory infection).

COMPLICATIONS

1. **Cancer:** oral for chewed tobacco, and lung cancer for smoked tobacco. These diseases can kill the patient and treatment is very difficult, often not successful and generally not available in our area.
2. **Tooth loss**
3. **Breathing problems:** COPD, pneumonia, worsening asthma. If parents smoke their children are at risk for more respiratory infections, and worse asthma symptoms.
4. **Reproductive problems:** miscarriage, infertility, men can become impotent.
5. **Heart problems:** Increased risk of heart attack.
6. **Brain:** Increased risk of stroke.
7. **If pregnant:** pre-term delivery, stillbirth, low birth weight, sudden infant death syndrome, mental retardation, and cleft lip.

TREATMENT

How to stop:

Stopping smoking reduces the risk of above complications.

It is very difficult to stop smoking, but you can encourage patients to try these things:

- If they often smoke in groups, try to stop smoking as a group. Encourage their friends to stop smoking.
- Think about the bad health effects when they want to smoke.
- Throw away all their cigarettes and tobacco. Try not to go to the places where they usually smoke.
- Replace smoking with healthier activities: go for a walk to relieve stress, drink a glass of water or tea, eat fruit, chew some gum.

If cannot stop then try to smoke outside the house and away from children to avoid passive smoking.

Nicotine replacement therapy: Should be combined with behaviour changes. It will not prevent all withdrawal symptoms but can decrease the intensity of symptoms. Nicotine therapy is safe and not likely to cause any nicotine addiction. Nicotine replacement therapy is not now available at SMRU but it might be available in pharmacies.

Can give in different ways, the most common being:

- **Nicotine gum:** Chew slowly for the nicotine to be absorbed through the mucosa. Use for 3-6 months. **Avoid** drinking soda, coffee or orange juice when chewing as they make your saliva acidic, which reduces nicotine absorption.
 - <25 cigarettes per day: 2mg up to 24 gums each day.
 - >25 cigarettes per day: 4mg up to 24 gums each day.
- **Nicotine skin patches:** deliver nicotine to the blood through a skin patch. There are different brands so check the instructions for the specific brand you're using.

CHAPTER 19: MUSCULOSKELETAL DISORDERS

19.1 DIORDERS OF THE JOINTS

Joint problems can be caused by infection, non-infectious causes, or trauma. In young children, the only sign of a problem may be refusing to walk, so think of joint problems in these patients. Joint problems can be infectious or non-infectious. Joint trauma is not discussed in these guidelines.

Infectious arthritis

- Septic arthritis
- Reactive arthritis

Non-infectious arthritis

- Osteoarthritis
- Rheumatoid arthritis
- Gout

It can be very difficult to decide if the joint is infected or inflamed. It is very important to get a clear history. If in doubt, treat for both infection and inflammation.

19.1.1. SEPTIC ARTHRITIS

DEFINITION

Acute bacterial infection of the joints. Usually only in one joint but sometimes more than one joint (not symmetrical). It is most often spread from the blood into the joint. The most common bacteria causing septic arthritis is *Staphylococcus Aureus*. Gonococcus can also cause infection in sexually active young adults and *Haemophilus influenza* infection can occur in unvaccinated children. Patients with other joint problems (e.g. rheumatoid arthritis) have a higher risk for septic arthritis.

SIGNS AND SYMPTOMS

Newborn or infant:

- Immobile limb with the infected joint (pseudo paralysis)
- Cries when the infected joint is moved
- Irritability
- Fever

Child or adult:

- Voluntary immobility of the limb with the infected joint (pseudo paralysis)
- Intense joint pain
- Joint swelling and redness
- Limping/ not walking (lower limbs)
- Fever

Consider **gonococcal arthritis** if have the following symptoms:

- Migrating joint pain
- Fever
- Skin rash (papular, pustular or vesicular with red base)
- Pain in the back of hands/wrists and ankles (due to tendon inflammation).
- Consider especially if have symptoms of STI e.g. urethral or vaginal discharge, lower abdominal pain

DIAGNOSIS

Clinical

CBC, CRP – WBC and CRP usually raised in septic arthritis

Aspiration of fluid from the joint (where possible) - pus culture, gram stain, cell count (WBC)

Blood culture

TREATMENT

Children ≥3 months to < 5 years:

- Admit to IPD
- Give IV **cloxacillin**. **After improvement, can change to oral cloxacillin** for a minimum of 2 weeks total IV+oral. Treatment duration depends on the bacterial cause, so discuss with the doctor.
- If do not have culture result available and no improvement at day 3 consider adding IV **ceftriaxone**.

Note: For infants <3 months old, discuss treatment with the doctor. You can start IV **cloxacillin** and IV **gentamicin** if the doctor is not immediately available.

Children > 5 years/Adults:

- Admit to IPD
- Give IV **cloxacillin** for 2 weeks, followed by oral **cloxacillin** for a minimum of 2 weeks.
- If do not have culture result available and no improvement at day 3 consider adding IV **gentamicin** for 5 days +/- **ceftriaxone**.

For all patients:

- Drain infected joint fluid with needle as soon as possible (may need multiple drainage)
- If any blood or aspiration cultures grow any organisms, then change to a narrow spectrum antibiotic
- Try to splint and rest the joint until signs of inflammation improve especially if it is a weight-bearing joint like the hip or knee.

If have signs of gonococcal arthritis:

- IV **ceftriaxone** until 2 days after joint improvement begins.
- Then switch to oral **ciprofloxacin** for 2 weeks.
- Add **azithromycin** 1g STAT dose OR **doxycycline** 100mg BID for 7 days (for empirical treatment of chlamydia)

To prevent muscle wasting and joint stiffness, start physiotherapy (moving the limb) early

PREVENTION

Preventive antibiotics may be helpful for high-risk people (e.g. recent land mine injury).

19.1.2. REACTIVE ARTHRITIS

DEFINITION

An autoimmune condition that develops as a response to an infection. It has been associated with gastrointestinal infections (e.g. Shigella, Campylobacter) or genitourinary infections (e.g. Chlamydia).

SIGNS AND SYMPTOMS

May appear months after the gastrointestinal infection. The arthritis symptoms are often in combination with urethritis and conjunctivitis.

TREATMENT

Supportive treatment. Give NSAIDS or steroids to relieve symptoms. If suspect Chlamydia, give appropriate treatment.

Note: Be careful to not to miss a septic arthritis.

19.1.3. OSTEOARTHRITIS

DEFINITION

Osteoarthritis is chronic inflammation of the joints. This is caused by damage to the cartilage which is a cushion that protects the bony surfaces of joints. Once this cushion is damaged, the bony surfaces rub together and cause the patient pain when the joint is used. Osteoarthritis is caused by overuse of joints and so it commoner in older people. The most common joints affected are the hips, knees, spine, feet and hands.

Osteoarthritis typically does not respond to steroid treatment well. Quick improvement of arthritis symptoms is more suggestive of rheumatoid arthritis.

SIGNS AND SYMPTOMS

- Chronic joint pain and stiffness
- Joint swelling and deformity
- Crackling noise on joint movement
- Muscle wasting
- Joint pain gets worse the more they are used throughout the day

DIAGNOSIS

Osteoarthritis is a clinical diagnosis.

X-ray of the affected joint could confirm the diagnosis, discuss with doctor if appropriate.

TREATMENT

Medication treatments:

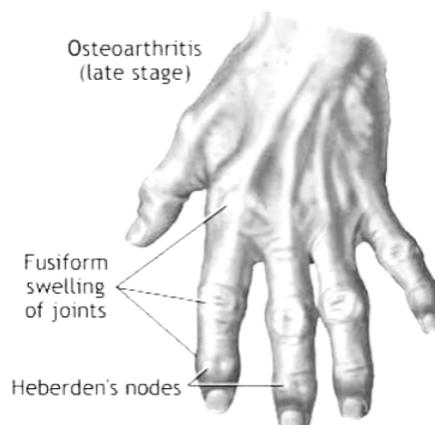
Paracetamol

- Anti-inflammatory medication e.g. **ibuprofen, aspirin**.
 - Often pain relief is needed long-term: be careful of side-effects, especially in older people.

Non-medication treatments:

- Regular gentle exercise is important for reducing stiffness and strengthening muscles and joints (swimming and riding a bicycle can take the weight of joints whilst exercising muscles).
- Weight loss
- Applying local heat before, and cold packs after exercise, can help relieve pain and inflammation, as do relaxation techniques.

Figure 19.1 Signs of osteoarthritis



19.1.4. RHEUMATOID ARTHRITIS

DEFINITION

In rheumatoid arthritis, the body's immune system attacks the lining of the joint and this causes chronic inflammation of the joints. This often leads to severe destruction and deformity of the affected joints. Frequently more than one joint is affected in a symmetrical fashion (which means that if one knee or wrist is affected, the other knee or wrist will also be affected). Hands, feet, wrists, elbows, knees and ankles are commonly involved, and symptoms usually start after 40 years of age. However, rheumatoid can begin in childhood (juvenile rheumatoid arthritis). Rheumatoid arthritis is a chronic condition that often presents with recurrent attacks.

SIGNS AND SYMPTOMS

- Joint stiffness, worst in the morning, which gets better the more they are used throughout the day.
- Swollen, warm and tender joints
- Joint deformity (usually obvious in hands)

Active and passive movements are painful and restricted.

Other features:

Anaemia, skin nodules, pericarditis, lung fibrosis, inflammation of the eye (which can lead quickly to blindness).

Still's disease; joint inflammation together with skin changes and spleen enlargement.

DIAGNOSIS

The diagnosis of rheumatoid arthritis may be difficult as there are other forms of autoimmune arthritis (e.g. psoriasis arthritis, reactive arthritis). There are some laboratory tests (e.g. rheumatoid factor or CCP-antibodies) that can help making the diagnosis, but before you request these investigations, consult the doctor

- Rheumatoid arthritis is a clinical diagnosis.
- X-ray of the affected joint could confirm the diagnosis.
- CRP or ESR can be used to monitor disease response to treatment.
- Check Hct to rule out associated anaemia.

TREATMENT

Medication treatment:

1. Analgesia (see p.31) e.g. **paracetamol**, **tramadol** (if severe pain); Non steroid anti-inflammatory (NSAID) medication such as **ibuprofen**, **diclofenac** or **aspirin**
 - NSAID medication should not be used for long periods of time if possible and it is important to know if the patient has a history, signs or symptoms of gastritis/peptic ulcer.
 - Try to avoid using high doses of anti-inflammatory medication if the patient's pain is better with lower doses.
2. **Methotrexate** OR **chloroquine** OR **penicillamine** (if available).
 - These are called Disease Modifying Anti-rheumatic drugs (DMARDs) and they suppress joint destruction in rheumatoid arthritis. (Always discuss with a doctor before giving these drugs).
 - Treatment with DMARDs is usually required for a long time (at least 6 months). Doses should be adjusted up or down depending on patient response to treatment.
 - There are newer generations of DMARDs (e.g. TNF-Alpha blockers, calcineurin inhibitors), but these drugs are expensive, need cold chain (keep in fridge), and make patients at higher risk for infections (e.g. TB). If the symptoms cannot be controlled with the usual drugs, consider referral.
3. **Prednisolone** – short course
 - Should be given when initially starting DMARDs.
 - Should be given during flare ups ("attacks") of rheumatoid arthritis.
 - **Note:** Use the lowest dose possible. De-worm before starting, never stop steroids suddenly. It can cause adrenal insufficiency – shock more severe than patient condition, nausea, vomiting, abdominal pain (like acute abdomen), unexplained fever or hypoglycaemia). Counsel the patient the possible side effects of long-term steroid use (e.g. peptic ulcer, osteoporosis, glaucoma, more infections).

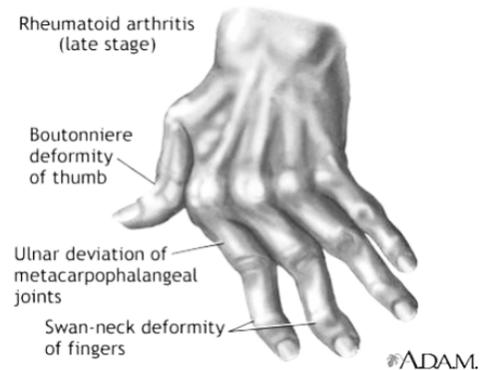
The aims of medication treatment are to:

1. Relieve pain
 2. Slow down or stop joint destruction
- If need to give steroid use with an NSAID, add **omeprazole** in order to prevent gastritis/ulcer
-

Non medication treatment:

- Regular gentle exercise to reduce stiffness and strengthen muscles.
- Wrist splints may give symptomatic help and may improve the function of the joint.
- Applying heat and cold packs can help reduce pain and inflammation.

Figure 19.2 Signs of rheumatoid arthritis



19.1.5. GOUT

DEFINITION

Inflammation of the joints caused by formation of uric acid crystals within the joint. People with gout often have high levels of urate in their blood which can be caused or made worse by certain risk factors (*see below*). Patients often complain of very severe pain, redness and swelling; typically affecting the joints of the big toe. Gout is often misdiagnosed as septic arthritis or cellulitis because attacks occur suddenly. The knees and other joints in the feet are also commonly affected. Some people get only one attack whilst others might get many attacks throughout their life. Most people are older than 30 years at the time of their first attack.

RISK FACTORS

The following risk factors cause levels of urate in the body to be high:

1. Alcohol
2. Obesity
3. Certain foods e.g. red meat (especially organ meat), seafood
4. Medications e.g. hydrochlorothiazide, low dose aspirin
5. Genetic predisposition

SIGNS AND SYMPTOMS

- Severe acute joint pain
- Red, hot and swollen joint
- Fever
- Nodules on fingers, toes and elbows (called tophi) - these happen late in gout and can cause pain, press on nerves and damage joints. There might be white deposits inside the nodule caused by urate crystals.

Figure 19.3 Gout tophi nodule on finger



COMPLICATIONS

Deformity of the affected joints, kidney stones (uric acid stones), renal failure.

DIAGNOSIS

Clinical

Serum uric acid often high (only if available – although can still have gout even if levels are normal).

TREATMENT

Medication treatment

- Anti-inflammatory drugs such as **ibuprofen** (**Note: do NOT use aspirin. It can increase the symptoms**).
- If no response, consider treating with **prednisolone** after consultation with doctor
- In patients with **recurrent attacks, tophi or renal stones**: consider starting **allopurinol** initially 100 mg OD. Can be increased weekly to 200-300mg OD (maximum dose 600 mg OD). If available aim to reduce blood **uric acid levels to < 6mg/dl** (0.36mmol/L).
- **Note:** Do NOT use allopurinol during an acute attack. Only start 3 weeks after attack. Important to take NSAIDs e.g. **ibuprofen** during the first 3 months of taking allopurinol because allopurinol can increase risk of acute gout attack.
- If on hydrochlorothiazide for high BP change to other medication as this can be a cause of gout.

Non-medication treatment:

- Rest and elevate joint, ice pack may be useful
- Drink lots of water

PREVENTION

- Weight loss
- Avoid alcohol.
- Reduce amount of red meat and seafood in diet.
- Eat lots of vegetables.

19.2 DISORDERS OF THE BONES

19.2.1. OSTEOMYELITIS

DEFINITION

Osteomyelitis is an infection of the bone. Bacteria spread from the blood stream to the bone.

- Occurs most commonly in children
- Bacteria in the blood stream come from another location
 - Lungs (pneumonia)
 - Skin (cellulitis, ulcers, wounds, post-trauma)
- Most common bacteria in osteomyelitis:
 - *Staphylococcus aureus*
 - *Klebsiella*
 - Enterobacteria
- Osteomyelitis can become chronic if the acute infection is not treated well. This causes bone sclerosis and deformity.
- Common sites of infection are the tibia, femur, humerus, and the vertebral bodies. Osteomyelitis involving the vertebral bodies can also be caused by tuberculosis.

SIGNS AND SYMPTOMS

- Pain in the bone
- Local swelling, redness, and warmth
- Fever, chills
- Back pain
- General discomfort, irritability (infants), or ill feeling (malaise)
- Fracture without trauma
- Drainage of pus through the skin (in chronic osteomyelitis)

DIAGNOSIS

- CBC shows elevated WBC. CRP may be elevated.
- Blood cultures when the fever is high may help identify the causative organism. If possible, take blood cultures before starting antibiotic treatment.
- Collect pus for culture from the area around infected bones by needle aspiration.
- X-ray will usually NOT give a diagnosis in the early stage of infection.
 - **In infants:** X-ray will be abnormal at the initial presentation so it CAN be used for diagnosis.
 - **In children:** Long bone changes may be seen after approximately 10 days. For pelvic or vertebral osteomyelitis, the X-ray may be normal.
 - **In adults:** X-ray should be done only if symptoms have been >14 days.

TREATMENT

Osteomyelitis always requires prolonged antibiotic therapy, usually **at least 4-6 weeks (minimum 2 weeks IV)**, and may require surgical debridement. Severe cases may lead to the loss of a limb. Never forget pain treatment.

For infants <3 months:

- Admit IPD
- Start IV **cloxacillin AND IV ceftriaxone**

For Child ≥3 months to Adult:

- Admit IPD
- Start IV **cloxacillin**

For all patients:

1. Change to oral treatment if:
 - a. CRP decreases by approximately 50% every 2-3 days and continues to decrease
 - b. No fever > 48 hours
 - c. Clinical condition improved – decreased pain, erythema, swelling
 - d. WBC improving or normal
 - e. Age is ≥1 month (if <1 month old, continue IV treatment for 4 weeks)
 - f. Patient has a normal immune system

If you have a positive culture, you may treat with the appropriate sensitive antibiotic.
(if <3 months old, add oral alternative for ceftriaxone, like **Augmentin**)

2. If no improvement:
 - a. Discuss with the doctor
 - b. Repeat X-ray and think of other diagnosis
 - c. Consider adding **ceftriaxone IV**
 - d. Consider referral for bone biopsy

3. If associated with wounds, diabetes mellitus or ulcer:
 - Start **clindamycin AND ciprofloxacin**
OR
 - **cloxacillin AND ciprofloxacin AND metronidazole**

Longer oral treatment may be needed – months of treatment may be required until CRP (or ESR) is normal

Surgical Treatment:

- Always evaluate if the patient needs surgical debridement in acute osteomyelitis, consider referral for orthopaedic consultation for advice and treatment.
- **Note:** All cases of chronic osteomyelitis should be referred for surgical debridement if possible.

PREVENTION

- Appropriate diagnosis and treatment of primary bacterial infections will reduce the chance of spread of infection from other sites into bones.
- Direct inoculation osteomyelitis can be best prevented with appropriate wound management and consideration of prophylactic antibiotic use at the time of injury (especially in immunocompromised patients e.g. diabetes, steroid use).

CHAPTER 20: NEUROLOGICAL DISEASES

20.1 HEADACHE

Headache, like anaemia, is a symptom and not a disease. Look for the cause.
Only after a specific cause has been found should treatment be given.

CAUSES

- Tension (stress)
- Depression
- Migraine
- Trauma related
- Temporal arteritis
- Cervical arthritis
- Glaucoma
- Brain tumours
- Stroke
- Subarachnoid haemorrhage
- Infections:
 - Localised: e.g. meningitis/encephalitis, sinusitis
 - Systemic:
 - Bacterial e.g. TB, leptospirosis, typhoid
 - Viral e.g. dengue fever
 - Parasitic e.g. malaria
- Drugs: alcohol, nifedipine, caffeine withdrawal.

DIAGNOSIS

The most important part of the evaluation of headache is the **HISTORY**. You should ask:

- How bad is the pain?
- Where is the pain? (ask the person to draw the shape of the headache on his/her own head).
- Is it a new onset or a chronic headache?
- When does it start and how long does it last?
- Anything that makes the headache worse e.g. coughing, poor sleep?
- Are there any associated systemic signs and symptoms?

****DANGER SIGNS****

1. Acute severe headache.
 2. New onset never had headache before.
 3. Progressive (increasing in intensity and severity).
 4. Caused by, or worsens with coughing, sneezing, exercise.
 5. New neurological signs and symptoms (e.g. mental disturbance, memory loss, convulsions, abnormal reflexes, loss of sensation, loss of muscle power).
-

Treat the underlying disease (e.g. infections) and relieve headache with paracetamol. For specific causes of headache see below.

EMERGENCY CAUSES OF HEADACHE

20.1.1. MENINGITIS/ENCEPHALITIS

DEFINITION

Acute inflammation of the membranes covering the brain (meninges) or the brain itself (encephalitis), often caused by infection.

SIGNS AND SYMPTOMS

Severe headache developing over a few hours associated with fever and decreased consciousness. Usually there are no neurological signs (although may have in encephalitis) (see *meningitis*, p.156 and *encephalitis*, p.169). TB meningitis may be much less acute.

TREATMENT

Immediate antibiotic treatment. Viral encephalitis will not respond to IV antibiotics. If possible do an LP before treatment if there are no contraindications (see p.156). Do not delay treatment if waiting for someone to do an LP.

20.1.2. SUBARACHNOID HAEMORRHAGE

DEFINITION

Bleeding on the surface of the brain into the subarachnoid space.

CAUSES

1. Trauma
2. Aneurysm (weakness of the wall of blood vessels)

SIGNS AND SYMPTOMS

- Sudden onset of an **extremely severe headache**. Often starts at the back of the head and described as being hit/kicked on the back of the head.
- May have nausea, vomiting, decreased consciousness and occasionally neurological signs.

TREATMENT

Immediate referral to hospital. This patient needs a CT scan of the head +/- lumbar puncture and may need brain surgery.

20.1.3. STROKE

DEFINITION

Death of brain cells because of a problem in the blood supply to a region of the brain. A stroke has specific signs and symptoms but may be accompanied by a headache. (see p.201).

TREATMENT

See *Stroke*, p.201

20.1.4. ACUTE (CLOSED ANGLE) GLAUCOMA

DEFINITION

When the pressure of the eye suddenly increases which can lead to blindness.

SIGNS AND SYMPTOMS

SYMPTOMS:

Rapid onset severe eye pain and surrounding the eye
Blurred vision
Nausea
Vomiting

SIGNS:

Patient looks unwell
Red eye
Hazy cornea
Non-reactive mid-dilated pupil usually only one eye

TREATMENT:

Immediate treatment with **acetazolamide** and **pilocarpine** then **IMMEDIATE referral to hospital**. See p.84.

NON-EMERGENCY CAUSES OF HEADACHE

20.1.5. TENSION HEADACHE

DEFINITION

Most common form of headache which occurs because of chronic tension of head and shoulder muscles. It is a benign headache, often caused by stress, poor sleep or straining eyes.

SIGNS AND SYMPTOMS

- The headache is usually bilateral (both sides of the head are involved), may be worst around the neck or back of the head and not associated with any neurological signs or symptoms.
- Generally daily and described as 'tight' or 'band like'.
- The pain does not worsen with coughing, sneezing or exercise.

TREATMENT

- Explain to the patient that the headache is caused by chronic tension of head and shoulder muscles due to stress or to worry.
- Try to reduce tension by getting enough sleep, reducing stress at work or in the home environment and make time for exercise e.g. swimming, massages and/or hot baths.
- Use simple analgesics such as paracetamol. **Note:** overuse of painkillers e.g. paracetamol can also make the headaches worse.

20.1.6. MIGRAINE

DEFINITION

Chronic episodes of headache that are **moderate to severe**, which may have a **trigger**, and may be associated with **neurological findings**.

SIGNS AND SYMPTOMS

- The typical migraine attack is a one-sided (sometimes both sides) beating or dull headache that can be worsened by activity.
- Commonly associated with nausea, vomiting, photophobia (not liking light), blurred vision and the sensation of a blocked nose on the side of the pain.
- Pain builds up gradually over hours and may last for several days.
- Visual disturbances (light flashes, zigzags, and/or vision field defects) occur quite commonly and can occur before onset of the headache
- There may be other neurological findings such as aphasia (cannot speak), numbness, tingling or weakness.
- Some people experience symptoms (e.g. change in mood, tiredness, yawning, stiff muscles, strange smell) a few hours or days before the migraine attack take place.
- Symptoms that occur before the headache that can help the patient know that a migraine headache will start are known as an 'aura'.
- There is usually a family history and attacks may have triggers e.g. stress, certain foods, alcohol, menstruation and contraceptives.

Note: symptoms for migraine and stroke can be similar – discuss with doctor if unsure as stroke is an emergency (see *stroke p.28*)

TREATMENT

- Staying in a quiet dark room is often helpful.
- Acute attack: (doses for adults)
 1. **Aspirin** 300-900mg QID (max 4g/day) OR
 2. **Ibuprofen** 400mg TID (max 2.4g/day) OR
 3. **Diclofenac** (50mg at beginning of headache, repeat after 2 hours if needed then after 4-6 hours (max 200mg/d)

Note: do not give aspirin to children
- If the attacks are frequent, refer to doctor for prophylaxis medication: (doses for adults)
 1. **Propranolol:** start at 40mg OD, increase by 40mg every week until good response (maintenance 80-240mg in divided doses). Monitor HR and BP. Advise do not stop suddenly as this can be dangerous.
OR
 2. **Amitriptyline:** start at 10mg OD at night; increase to maintenance dose 50-75mg OD at night, max 150mg OD at night.

20.1.7. DEPRESSION

Headache is very common in depressed people, if there is no obvious cause for the headache then assess the patient's mental health to rule out depression.

TREATMENT

See treatment advice in depression chapter (see *p.175*).

20.1.8. TRAUMA RELATED

DEFINITION

Headache that occurs after trauma. This is different from sub-arachnoid haemorrhage.

SIGNS AND SYMPTOMS

- Non-specific symptoms including headache may often occur after a head injury, regardless of the severity of the injury.
- Headache usually starts within a day or so after the injury and worsens over the next few weeks and then gradually gets better.
- Usually a dull constant ache with pulsating pain that may be localised.

****DANGER SIGNS OF BLEEDING IN THE BRAIN****

Nausea, vomiting, visual disturbances, impaired memory, difficulty concentrating and unstable emotions.
If the patient has any of these symptoms, then discuss with doctor.

TREATMENT

If suspect bleeding in the brain, discuss with the doctor whether need to refer to hospital for more investigation (may need a brain CT/MRI scan).

Exercise of neck muscles, simple analgesics and occasionally **amitriptyline**.

20.1.9. BRAIN TUMOURS

DEFINITION

Mass in the brain that can be benign or cancer

SIGNS AND SYMPTOMS

- Headaches
 - Vary from mild to severe
 - Described as different from any previous headache
 - May be of new onset and worsen over time.
 - If the headache is worsened by exertion and position, and associated with nausea and vomiting, this maybe a sign of increased intracranial pressure due to a mass.
- Neurological signs.
- Other symptoms depending on where in the brain the mass is, e.g. personality change, decreased intelligence, emotional change, seizures.

DIAGNOSIS

The diagnosis must be made with a brain CT/MRI which we cannot do at SMRU.

TREATMENT

Treatment for tumours is mostly not available here. Discuss with a doctor about providing symptomatic treatment of the headache or referral if possible. See *palliative care* p.220.

20.1.10. TEMPORAL ARTERITIS

DEFINITION

Inflammation of the blood vessels of the head that can lead to blindness. Very rarely occurs in people less than 50 years.

SIGNS AND SYMPTOMS

- Elderly patients (50 or older) with a one-sided headache (although both sides can also occur)
- May be associated with malaise, fever, muscle pain, anorexia and weight loss.
- Palpation of the head reveals sensitive and thick (temporal) arteries with or without pulsation.

DIAGNOSIS

Clinical history and examination.

In 95% of cases the CRP is raised (above 90).

TREATMENT

Discuss with doctor – needs early treatment with steroids to prevent blindness.

Prednisolone:

- Always deworm before starting steroids.
- Start at 1mg/kg OD (max 60mg)
- After 1-2 weeks decrease the steroid by 10mg every 1-2 weeks depending on the response to treatment.
- Once below 30mg the dose can be dropped by 2.5mg every 2 weeks.
- From 10mg OD reduce slowly over months until the lowest effective dose is reached.
- Increase the dose again if the symptoms get worse.
- After 2 years of steroids you can try to stop them but for 25% of patients a longer time is needed (some cases for life).

20.1.11. OTHER CAUSES OF HEADACHE

Other causes of headache are: dental, ocular, sinusitis, cervical arthritis, or cough headache

DEFINITION

Dental problems, sinusitis, or eye problems can cause headaches. Muscle or bone problems in the neck e.g. arthritis of the neck often result in headache. Also sudden increase of abdominal muscle tension (e.g. defecation) can cause headache. This pain lasts only a few seconds/minutes and disappears. The cause for cough headache is not known; it may persist for several years.

TREATMENT

Find and treat the cause. Give painkillers according to cause.

20.2 EPILEPSY

DEFINITION

An epileptic seizure is a sudden onset event where there is a disturbance of consciousness, posture, movement or behaviour due to increased electrical activity in the brain. **It is diagnosed ONLY after a person has had more than two epileptic seizures.** There are many different types of seizure.

Status Epilepticus = several separate seizures where the patient does not become completely conscious in between or an uninterrupted seizure lasting more than 10 minutes.

The most common types of epileptic seizures are:

GENERALISED (TONIC CLONIC) CONVULSIONS

- In this type of seizure there is a sudden loss of consciousness with or without cyanosis and strong jerking movements of the arms and legs (sometimes the patient also passes urine or bites their tongue). When the movements stop, the patient may be very sleepy.
- In small babies, obvious arm or leg movements might be absent but their eyes may blink, and they may smack their lips together or clench their hands.
- **Note: If the patient is still conscious during the episode, it is not a generalised convulsion but it could be a different type of convulsion**

CHILDHOOD ABSENCE ATTACKS

- In this type of seizure the child suddenly stops talking or playing for a few seconds and then starts again to do what he was doing. The child does not remember the attack.

If a patient presents with a history of strange sensations or movements of their limbs, or suddenly going floppy or stiff, epilepsy should be considered. Discuss with a doctor.

DIAGNOSIS

The most important step in diagnosing epilepsy is to take a good history of the episode from someone who has seen the seizure. Not all seizures are due to epilepsy: you must consider other diagnoses:

Seizures with fever:	e.g. malaria, meningitis, hyperthermia, encephalitis.
Seizures with or without fever:	e.g. hypoglycaemia, severe dehydration, head trauma, amphetamines, alcohol, renal failure (uraemia).
Seizures in pregnant women:	e.g. eclampsia.
Repeated seizures without fever:	e.g. brain tumour, cysticercosis.

- Every patient presenting with a seizure should have a full neurological examination performed.
- If possible do an ECG as some cardiac arrhythmias can present as an absence seizure (or sudden collapse).

TREATMENT

- For treatment of acute convulsion see 'Convulsions' section p.21.
- Not all medications are available at SMRU. Discuss with doctor before treatment. Consider referral if cannot treat at SMRU.

Figure 20.1 Treatment of different kinds of seizure

Seizure type	Medication to treat	Medication to avoid
Infant (<1year) Generalised tonic clonic seizures	1 st line: Phenytoin 2 nd line: Phenobarbitone	Sodium valproate
Child Generalised tonic clonic seizures	1 st line: Sodium valproate 2 nd line: Carbamazepine	
Child Absence seizures	Sodium valproate	Carbamazepine Phenytoin Phenobarbitone
Adult Generalised tonic clonic seizures	1 st line: Carbamazepine 2 nd line: Sodium valproate	

1. Consider starting patients on medication if the patient is having **more than two convulsions in one year**.
2. Explain to the patient that this therapy is long-term and stopping suddenly could cause severe convulsions.
3. Talk to the patient about epilepsy and explain to him/her that it is a disease that can be controlled.
4. If the patient agrees to treatment, treat with **one medication only**.
5. If the seizures are not controlled on one medication at the maximum dose, discuss the case with a doctor. It may be dangerous to stop one medication and switch to another one very quickly.
6. Start with a small dose and then increase the dose until convulsions are controlled or the patient has side-effects.
7. Encourage the patient to come back every month. If possible ask them to write a diary of when they are having seizures and what they were doing at the time.

Many epilepsy medications react with other medications so always check carefully when prescribing.
****Check baseline CBC and LFT's before starting epilepsy medication****

Figure 20.2 Adverse effects of epilepsy drugs^{*update}

	Starting dose	Increasing dose	Usual dose	Max dose per day	Contraindication	Most common side-effects	Toxic effects
Carbamazepine	100mg BID	Increase by 100-200mg every 2 wks	400-600mg BID	2g	Severe heart disease, bone marrow depression. Be careful if liver or kidney disease	Drowsiness, confusion, rash, dry mouth	Rash, nausea, double vision, dizziness, low sodium, low RBC/platelet/ WBC. Monitor CBC, LFT after start.
Phenobarbitone	60mg at night		60-180mg at night	180mg	Severe respiratory depression	Drowsiness, confusion, hypotension, rash	Blood disorders, respiratory depression and respiratory arrest, nystagmus, ataxia
Sodium Valproate	200mg TID	Increase by 200mg every 3 days	1-2g per day	2.5g	Active liver disease, pancreatitis	Nausea and vomiting, dyspepsia, weight gain, ankle swelling	Low platelet, sedation, confusion Rarely, liver failure; especially in children <3 years old. Monitor CBC, LFTs after start.
Phenytoin	200mg OD	Increase slowly (ideally measuring blood levels)	200-500mg OD	500mg	Bradycardia	Depression, insomnia, polyneuropathy, acne, swollen gums	Double vision, tremor, ataxia, difficulty speaking, confusion, changes in behaviour, anaemia

Adult drug doses for epilepsy medications:
 (For child drug doses see Pharmacy Handbook or other sources e.g. BNF)

STOPPING EPILEPSY MEDICATION

The majority of patients will have no more convulsions after a few years on medication.

Consider stopping medication if the patient has had no convulsions for more than 2 years
 AND has a normal neurological examination

Discuss the possibility with the patient and take the decision together. Some patients will be too afraid of having convulsions if medications are stopped, other patients will wish to stop as soon as possible.

- More than 60% will have no more convulsions if medication is stopped.
- Less than 40% will start having convulsions again after medication is stopped.

If you and the patient decide to stop the medication, you must gradually decrease the medication every 4 weeks.

Schedule for adult patients:

- Decrease carbamazepine by 100mg every 4 weeks.
- Decrease phenobarbitone by 30mg every 4 weeks.
- Decrease sodium valproate by 200mg every 4 weeks.

If switching anti-epileptic medication do not stop any of the medications suddenly.

PREVENTION

- Take long-term epilepsy treatment to prevent new seizures.
- Teach families about the coma position and how to prevent aspiration after a seizure. If seizure not stopping by itself after a few minutes must go to the clinic.

20.3 STROKE

DEFINITION

A stroke, also called a cerebro-vascular accident (CVA), is the sudden death of cells in a specific area of the brain due to a problem in the blood supply to a region of the brain. The brain tissue beyond that artery is damaged or dies. (Brain cells need blood to supply oxygen and nutrients and to remove waste products.)

The effects of a stroke depend on how much damage occurs, and which part of the brain is affected.

****STROKE IS A LIFE-THREATENING EMERGENCY****

Using **FAST technique** can be very helpful:

F - Facial weakness: Has their face fallen on one side? Can they smile?

A - Arm weakness: Can the person raise both arms and keep them there? Is there weakness on one side?

S - Speech and communication difficulties: Is their speech slurred?

T - Time: Time is important, needs URGENT to transfer to the hospital if you see **any single one** of these signs.

Note: hypoglycaemia can also cause these symptoms. Treat hypoglycaemia if the dextrose is low. If the patient does not recover when the dextrose is normal, then think of stroke.

CAUSES

1. **Ischemic stroke:** caused when a blood vessel supplying the brain becomes blocked. This can happen due to hardening of the arteries (arteriosclerosis), fatty plaques that build up in the arteries (atherosclerosis) or a clot that travels from another part of the body (embolism). Responsible for 80% of all strokes.
2. **Haemorrhagic stroke:** caused when an artery in the brain ruptures. Responsible for 20% of all strokes. Hypertension is the most common cause of brain haemorrhage. Other causes: aneurysms (weakness of the wall of blood vessels) and arteriovenous malformation (an abnormal connection between arteries and veins)
3. **Transient ischaemic attack (TIA):** also known as **temporary** or **mini stroke** causes symptoms similar to those of a complete stroke, however the symptoms disappear completely within 24 hours as the disruption of blood supply is only temporary (in a stroke, the symptoms are usually more permanent). It is a serious warning sign of worsening cerebrovascular disease. A complete stroke may follow a TIA in a matter of hours or weeks to months.

A stroke may also be caused by different infections: malaria, tuberculosis, cysticercosis and syphilis.

RISK FACTORS

Age	The risk of stroke increases with age, especially after age 55.
Sex	Men are at greater risk than women.
Family	People with a family history of stroke have an increased risk of stroke themselves.
Diseases	People with diabetes, heart disease especially atrial fibrillation (irregular heart beat), high BP, HIV or prior stroke are at greater risk of stroke.
Lifestyle	Stroke risk increases with obesity, cigarette smoking, alcohol consumption and use of IV drugs.

DIFFERENTIAL DIAGNOSIS

1. Hypoglycaemia
2. Cerebral malaria
1. Complex migraine
2. Meningitis/encephalitis
3. Brain abscess
4. Brain tumour
5. Head trauma

SIGNS AND SYMPTOMS

Depending on the region of the brain affected. Strokes on the left side of the brain primarily affect the right half of the body, and vice versa. In addition, in left brain-dominant people, left-brain strokes usually lead to speech and language deficits. A stroke can cause:

- **Limb weakness** – usually one sided
- **Facial weakness** – drop of one side of the face
- **Speech impairment**
- Loss of vision
- Reduction in sensation
- Acute severe headache
- Memory loss and reduced reasoning
- Initial low tone followed by high tone and increased reflexes and up going plantars on side affected
- Haemorrhagic stroke: more likely to get loss of consciousness, seizure, vomiting, very high BP
- Coma
- Death

DIAGNOSIS

1. Stroke is a clinical diagnosis
2. **If acute symptoms:** refer to hospital immediately
3. **If chronic symptoms:** careful medical history, especially about when the symptoms started and what parts of the body are affected, and the presence of risk factors. Ask about any previous similar symptoms to see if the patient has had TIAs before.
4. Perform a neurological examination. It is best if a CT scan or MRI scan should be done to confirm stroke and rule out other causes e.g. tumour
5. ECG is important to look for abnormal heart rhythms or heart abnormalities which can make people more at risk of stroke.
6. Check dextrose to rule out diabetes
7. If available: ultrasound scan of the carotid arteries to see if there is any blockage.

TREATMENT

Treatment of Acute stroke:

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment (see p.13) should be done. You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step.**

Figure 20.3 DRS ABCDE for stroke

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR STROKE
DRS	Danger Response Send for help	Gloves Safe place Call for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Simple airway manoeuvres +/- airway if needed Suction if needed (and available) Oxygen
B	RR, SpO2, cyanosis Chest indrawing/ tracheal tug Listen to chest	
C	HR, BP, Cap refill Urine output, Temp Listen to HS	Put in IV cannula – take bloods e.g. Hct, CBC, MS, dextrose etc. Note: Do not give BP medication to reduce the BP as the high BP may be needed to supply the brain with more oxygen
D	Check dextrose Any drugs needed e.g. antibiotics, paracetamol	Give dextrose if low
E	AVPU/GCS Expose and examine all over body	If abnormal neurology exam e.g. facial droop, one sided weakness, high tone, increased reflexes → suggests diagnosis of stroke Review notes and charts History, further investigations, treatment plan
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

Note: If the stroke is very severe it may be more appropriate not to refer or give treatment and follow palliative care (see p.220). Discuss with doctor.

Long-term treatment:

- For comatose patients (see p.19)
- Fever: sometimes a stroke can cause a mild fever but need to rule out other causes as a stroke makes people more at risk of infection.
- Fluids: in an acute stroke do not give D5W as this can worsen the blood flow to the brain.
- Medication to lower the BP should be used very cautiously as it can cause more damage – discuss with a doctor.
- Check dextrose BID and correct if low
- Start feeding as soon as possible. Strokes can affect the nerves that make the muscles of swallowing work. This means that there is a risk of food and liquid ending up in the lungs which can cause an aspiration pneumonia. When patients feed, they should be sitting up right, try to have thickened fluid, and they may need a soft diet. If the patient starts to cough when eating, stop and re-start again when stop coughing. Explain this to the family.
- Encourage the patient to move their limbs especially the weak side to try to re-gain the strength. Encourage the family to help massage and move the limbs.
- Long term **aspirin** (75-100mg/day) may prevent another stroke but increases bleeding risk – discuss with a doctor.
- If available patients may benefit from a rehabilitation programmes for strokes which include physical, speech, language and mental therapy.

PREVENTION

- Treat diseases that put patients at risk e.g. medications for high BP (see p.39), diabetes (see p.69)
- Give prophylactic aspirin treatment for conditions e.g. angina (see p.41).
- Advise your patients about lifestyle advice - to stop smoking, do regular exercise, eat healthy diet and avoid excessive alcohol consumption.

Education of the community about early recognition of stroke symptoms is important: early treatment depends on the victim, family members or other bystander.

20.4 BELL'S PALSY^{*new}

DEFINITION

Acute peripheral facial nerve palsy (weakness of face muscles) of unknown cause. The risk is higher during pregnancy especially the third trimester and in the first postpartum week.

CAUSES

- Herpes zoster
- Otitis media
- Guillain-Barré syndrome
- HIV infection
- Autoimmune disease (sarcoidosis, Sjögren syndrome)
- Tumour
- Stroke

DIAGNOSIS

The diagnosis is made clinically.

SIGNS AND SYMPTOMS

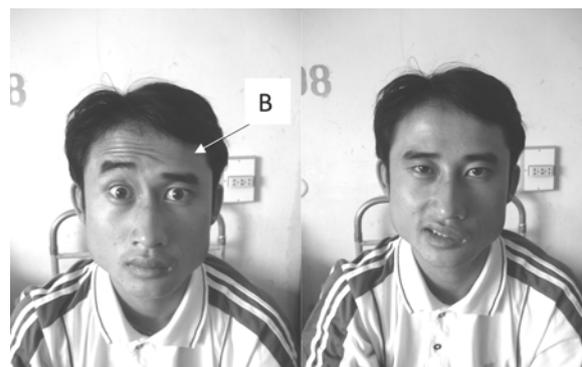
- Sudden onset, may get worse until 3 weeks
- Unilateral facial paralysis
- Cannot close the eye on the affected side
- HIV infection
- Drooping mouth on the affected side
- Decreased tears on affected side
- Possible loss of taste of the anterior 2/3 of tongue

On examination you need to confirm this is a peripheral (not central – in the brain) facial nerve palsy. If the patient cannot wrinkle the forehead then it is a peripheral problem.

Figure 20.4 Signs of Bell's palsy



A. Cannot close eye completely



B. Cannot wrinkle the forehead

TREATMENT

- If you think the examination shows a central lesion (CAN wrinkle the forehead), the patient should be referred for head imaging to rule out a more serious problem.
- For a peripheral facial palsy (most common cause is Bell's palsy), counsel the patient that they may improve after 6 months – 1 year but need to have follow up. Older patients may not have much improvement.
- If ≤ 3 days since onset of symptoms, start **prednisolone** 60 mg daily for 1 week only.
- Use artificial tears (eye drops or ointment) to protect the cornea because the eye cannot close normally.
- Treat the underlying problem if found on examination (e.g. otitis media).
- Consider referral or other investigation (head CT) if the patient becomes worse.

CHAPTER 21: NUTRITION

21.1 MALNUTRITION*UPDATE

DEFINITION

Malnutrition refers to both UNDERNUTRITION and OVERNUTRITION. Previously undernutrition was the major problem on the border but now overnutrition is a rising problem. In this guideline the word malnutrition is used to describe undernutrition, and overnutrition as the opposite.

21.1.1. UNDERNUTRITION

DEFINITION

Undernutrition results from not eating enough food or not enough of the right kinds of food, or from infections that cause a loss of appetite, or changes in how the body uses nutrients.

.....
If a child does not eat the right kind of food in the right amounts, growth slows or stops. Malnourished children are more likely to become ill and to die from illness than other children.
.....

Children under the age of 5 can easily become malnourished if not given small, frequent meals with a variety of nutritious foods, especially when they start eating solid foods and stop breastfeeding. This age-group is most vulnerable to malnutrition and most at risk from illness and death resulting from illness. It is important to find and treat children who are malnourished.

There are different types of malnutrition:

Acute Malnutrition: wasting

Chronic Malnutrition: stunting, underweight

Micronutrient deficiency: Iron, vitamin A, vitamin B1, zinc, etc.

INDICATORS	WHAT TO MEASURE?
Wasting (acute malnutrition)	Weight-for-Height z-score
Underweight (acute & chronic malnutrition)	Weight-for-Age z-score
Stunting (chronic malnutrition)	Height-for-Age z-score

Note: if you are concerned about malnutrition, the most important step is to measure the child's weight and height and compare it to the WHO standards (see Appendix 18).

ACUTE MALNUTRITION IN CHILDREN

Acute malnutrition is an emergency, especially if severe. **ALL** children <5 years coming to IPD or OPD should have their weight and height routinely checked to compare their **Weight-for-Height z-score**.

Take the child's weight using a baby scale (Salter Scale) and measure their height.

It is good practice to compare with a previous measurement in the child's chart or lemma.

Calculate the Weight-for-Height z-score (W/H z-score) using the Weight-for-Height z-score table (see Appendix 18).

DIAGNOSIS

The diagnosis of severe or moderate acute malnutrition is made clinically.

1. Severe Acute Malnutrition (there are two types)

(a) Severe wasting (marasmus)

- MUAC < 115mm or Weight-for-Height less than -3 z-score
- Looks very thin, little fat or muscle
- Lethargy, apathetic

(b) Nutritional oedema (kwashiorkor)

- MUAC < 115mm or Weight-for-Height less than -3 z-score
- Oedema of the legs, may have pitting
- Skin is dry and scaly, skin disease
- Child has a round 'moon' face
- Lethargy, apathetic

Severe acute malnutrition can be complicated or uncomplicated

Complicated severe acute malnutrition: children diagnosed with severe acute malnutrition AND have other clinical features: infection, signs of metabolic disturbance, oedema, hypothermia, vomiting, severe dehydration, severe anaemia or no appetite (e.g. do not want to eat).

Uncomplicated severe acute malnutrition: children diagnosed with severe acute malnutrition but do NOT have signs of infection AND have a little appetite (e.g. they are able to eat).

2. Moderate Acute Malnutrition

Weight-for-Height is between -2 and -3 z-scores.

TREATMENT

Management of acute malnutrition depends on the clinical condition:

- 1. Severe malnutrition:** check for any medical complications and if they have some appetite or not.
 - a. If have an appetite and are clinically well give OPD treatment (discuss with the doctor).
 - b. If have medical complications, pitting oedema or poor appetite need to be admitted to IPD on a Therapeutic Feeding Programme (TFP).
- 2. Moderate malnutrition:** children need to be followed in OPD on a Supplementary Feeding Programme (SFP).

Be sure to follow the treatment protocol exactly.

The outcome depends mostly on the motivation and effort of the person feeding the child.

On Admission/When to discharge:

Record the child's weight, height and the Weight-for-Height z-score

Write on the chart the target weight for when you want to discharge the child home:

- 1. Moderate malnutrition:**
 - Discharge when Weight-for-Height is ≥ -2 z-scores for 2 weeks in a row.
 - The average stay in an SFP is 60 days, so be patient!
- 2. Severe malnutrition:**
 - Discharge when Weight-for-Height is ≥ -2 z-scores Weight-for-Height and no oedema for 2 weeks in a row.
 - **Note:** be sure to re-measure the child's height every month and recalculate the child's target weight.

MODERATE ACUTE MALNUTRITION IN CHILDREN

DIAGNOSIS

Weight-for-Height is -3 TO < -2 z-score

When you see the child for the first time in OPD, take the following steps:

- 1. Evaluate the child**
 - Conduct a medical evaluation to look for illness, oedema, acute conditions, and vaccination status.
 - Try to **find out from the parent(s) why the child is not growing**. Reasons may include:
 - Not giving the right food or right amount of food after stopping breast-feeding (poor weaning practices).
 - Not having enough food for the family.
 - Not dividing the food into frequently enough small meals for the child to eat enough each day.
 - Illness.
 - The mother having to work or having another baby and so has no time to look after the first one.
 - A home visitor can help by visiting the household and talking with the family.
- 2. Start systematic treatment and treat any other diseases –diarrhoea, anaemia, other chronic infections**

Figure 21.1 Treatment for malnutrition

Deworming	1-2 years > 2 years	Albendazole 200mg OD x 3 days mebendazole 100mg BID x 3 days
Vitamin A*	< 6 months 6 to 11 months (< 8 kg) 1 year and over (> 8 kg)	50,000 IU on D1, D2 and D8. 100,000 IU on D1, D2 and D8. 200,000 IU on D1, D2 and D8.
Vitamin B1		10mg OD for 6 weeks
Folic Acid		5mg on day 1, then 5mg/week for 3 months

Ferrous Sulphate	< 5 kg 5-9 kg ≥ 10 kg	50mg OD for 3 months 100mg OD for 3 months 200mg OD for 3 months
Zinc supplements	< 6 months 6 months – 5 years	10mg (1/2 tablet of 20mg) per day for 14 days 1 tablet of 20mg per day for 14 days
Other minerals (magnesium, copper) if available.		
*Note: there should be 1 month between a preventive vitamin A dose and a treatment dose – check the child's vaccination card. If they have been referred from TFP, do not re-treat for vitamin A or deworm. Continue with other treatment.		

3. **Check child's vaccination card:**

Give all vaccines according to up to date protocol, if not already given.

4. **Encourage a normal diet**

Counsel to the caregiver that the child should eat normal foods as often as they want but do not force to eat. Eat different kinds of food. A combination of animal-source foods and plant-source foods is better than the rice-only diet. Frequency of meals depends on the child's age:

- **Birth-6m:** exclusive breast-feeding is preferred and increase the frequency
- **6-9m:** breast-feeding and 3 additional meals of different types of food, first 2-3 spoons each then progressively increase the amount as tolerated (i.e. mashed banana, rice, cooked egg, Asia Remix, etc.)
- **9-12m:** breast-feeding and 4 additional meals up to ½ cup (125ml) each, can start to eat sliced foods
- **12-24m:** breast-feeding and 5 additional meals ¾ cup to 1 cup (250ml) each, increase food diversity
- **Over 24m:** transition to 'family' food with as much diversity as possible

Important: If any SFP food is given (i.e. in the camps), this should be given in-between meals.

5. **Ask the mother to return every week to the clinic**

6. **Weigh the child weekly and mark it on the growth chart**

Expected average weight gain for a child 6-59m following an SFP should be **≥ 3g/kg/day**

If the child does not gain weight after 2 weeks in the program, reassess for underlying causes.

If the child does not gain weight regularly within 6 weeks, admit to IPD for supervised feeding.

If the child is in a camp, try to find out if every member of the family is registered for, and receiving, adequate rations before discharging the child.

7. **Explain to the mother**

When the mother stops breastfeeding, her children need to eat a variety of foods to stay healthy and grow properly, including rice, beans, fruits, vegetables, meat, eggs, and fish.

8. **Ensure follow-up health and nutrition education in the household by home visitors**

Give booster vaccines using up to date protocols.

SEVERE ACUTE MALNUTRITION IN CHILDREN

DEFINITION

Weight-for-Height < -3 z-score OR bilateral pitting oedema OR MUAC < 115 mm

Severe acute malnutrition is a **MEDICAL EMERGENCY** and most children will be hospitalized and need constant monitoring. However new guidelines (2013 WHO guideline) say that children who have an appetite and are clinically alert and well might be treated as outpatients, while any children with medical complications, severe oedema or poor appetite should be hospitalized.

TREATMENT^{UPDATE}

The management of a very severely malnourished child contains 3 phases:

- Phase 1** is mostly medical initial treatment.
The patient is started on special feeding but is not expected to gain weight.
- Phase 2** is the nutritional part of the treatment of the patient (rehabilitation).
- Phase 3** is the follow-up once discharged from the treatment program in order to avoid a relapse

Figure 21.2 Time schedule for severe malnutrition management (Management of severe malnutrition: a manual for physicians and other senior health workers, WHO 1999)

Activity	Initial treatment:		Rehabilitation:	Follow-up:
	days 1-2	days 3-7	weeks 2-6	weeks 7-26
Treat or prevent: hypoglycaemia hypothermia dehydration	----->	----->		
Correct electrolyte imbalance	----->			
Treat infection	----->			
Correct micronutrient deficiencies	←----- without iron ----->		←----- with iron ----->	
Begin feeding	----->			
Increase feeding to recover lost weight ("catch-up growth")				----->
Stimulate emotional and sensorial development	----->			
Prepare for discharge			----->	

PHASE 1

In general: It takes a lot of time to feed these children, because they are very weak (lethargic) and have a poor appetite. Be sure to explain this to the family, because they will have to invest a lot of time feeding the child regularly under the supervision of a medic or nurse.

High Energy Milk (HEM)

To avoid overloading the intestine, liver and kidneys, it is very important that the food is given frequently and in small quantities at the beginning of the treatment, follow the instructions below. Use only a naso-gastric tube (NG) when the child cannot drink.

Figure 21.3 How to make Phase 1 high energy milk (HEM)^{*new}

HOW TO MAKE PHASE 1 - HIGH ENERGY MILK (H.E.M.)

Ingredients and Amounts:		Instructions:
Dried skimmed milk	25 g	Mix milk powder and sugar in a large pot or jug
Sugar	100 g	Add oil and stir to make a paste
Vegetable Oil	27 g	Add the cooled boiled water SLOWLY, stirring all the time. Add enough water to reach the 1000ml (1 litre) line. Stir completely until liquid is smooth
Cooled Boiled water	1 L	Add mineral mix if available (from UNICEF).
Number of Meals		8-12 meals per 24 hours
Time of meals		8 meals = every 3 hours 12 meals = every 2 hours
Volume per meal (6m – 5yrs)		135ml/kg per 24 hours

****DO NOT STORE AND RE-USE HEM THAT HAS NOT BEEN EATEN – IT CAN CAUSE DIARRHOEA****

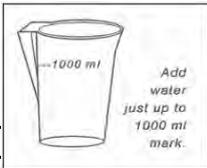


Figure 21.4 How to record the amount of food eaten in a child with malnutrition

For example, if the child is given 8 meals in 24 hours, draw 8 circles and fill in how much the child ate. All, half, most, etc....as below

Date: - / - / -							
Meal 1	Meal 2	Meal 3	Meal 4	Meal 5	Meal 6	Meal 7	Meal 8
None	All	Half	Slightly more than half	Most	Small amount	Less than half	

1. Weigh the child daily and record on the weight chart

2. Prevent hypoglycaemia:

An important cause of death in the first 48 hours of IPD. Do not stop breast-feeding. Give frequent, small quantities of food during day **and** night. Some very weak children will need feeding every hour.

3. Prevent the child from becoming cold (hypothermia):

Encourage the mother to hold the child close to her at all times. Do not wash the child during the first days.

4. Manage dehydration

Assessment of dehydration is difficult: the skin is already loose and eyes sunken in these children: look in the mouth and at the eyes to see if they are moist. Ask if the child is passing urine normally.

- o **Avoid IV** rehydration if possible.
- o Use **diluted** ORS solution (if you give normal ORS you will give too much salt and not enough potassium) or **Rehydration Solution for Malnutrition (ReSoMal)**.
- o Continue breast-feeding.
- o Treat the mother for any illness and worms, make sure she can eat well and drink lots of fluids. Give her Vitamin A, ferrous sulphate, folic acid, vitamin B1 so that she can produce enough milk containing vitamins and iron for her baby. Provide the mother with clean drinking water.
- o Monitor the child's vital signs and urine output.
- o By continuing breast-feeding, preventing hypoglycaemia and managing dehydration, electrolytes unbalance will most likely be corrected

HOW TO MAKE DILUTE ORS (see ORS preparation, Appendix 8)

1 packet (size for 750ml water) of ORS powder + **1500ml** clean water + 30g sugar + 1.5g potassium

OR

1 packet (size for 1L water) of ORS powder + **2000ml** clean water + 40g sugar + 2.5g potassium

5. Treat infections:

A severely malnourished child can have severe infections without fever. Septic shock is a serious complication of severe malnutrition and respiratory infections are very common.

Give all severely malnourished children a broad-spectrum antibiotic:

Does not look unwell/ no signs of infection:
AND
No complications

Amoxicillin 15mg/kg TID for 5 days

Severely ill (apathetic, lethargic)
OR
Complications e.g. hypoglycaemia, hypothermia, broken skin, respiratory tract infection

Ceftriaxone 50mg/kg OD
OR
If pneumonia: **ampicillin** 50mg/kg IM/IV QID **AND** **gentamicin** 7.5mg/kg IM/IV OD for 5 days

If specific infections are detected for which additional treatment is needed e.g. skin infection then treat accordingly.

DO NOT FORGET TO DO A MALARIA SMEAR!

6. Correct micronutrient deficiencies:

Vitamin A*:	< 6 months 6 to 11 months (< 8 Kg) 1 year and over (> 8 Kg)	50,000 IU on D1, D2 and D8 100,000 IU on D1, D2 and D8 200,000 IU on D1, D2 and D8
Vitamin B1:	10mg daily for 6 weeks	
Folic acid:	5mg on day 1 and then 5mg/week for 3 months	
Zinc supplements:	< 6 months 6 months – 5 years	10mg (1/2 tablet of 20mg) per day for 14 days 1 tablet of 20mg per day for 14 days.
Other minerals (magnesium, copper) if available.		
Note: DO NOT GIVE IRON OR ANTIWORM MEDICATION UNTIL PHASE 2		
*Note: there should be 1 month between a preventive vitamin A dose and a treatment dose – check the child’s vaccination card. If they have been referred from TFP, do not re-treat for vitamin A or deworm. Continue with other treatment.		

7. Check vaccination card:

Give **measles vaccine** if child is > 6m and not immunized. Do not give if the child is in shock. Give other vaccinations in phase 2.

PHASE 2

A child enters this rehabilitation phase when a good appetite returns.
A child with a naso-gastric tube cannot enter phase 2. The child must be able to eat.

1. Switch to Phase 2 HEM

- Start with the same quantity (ml) of HEM as in Phase 1, but use Phase 2 – HEM. (this solution contains more calories than the Phase 1 HEM)

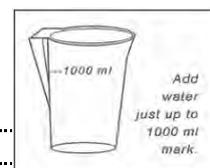


Figure 21. 5 How to make Phase 2 high energy milk (HEM)*update

HOW TO MAKE PHASE 2 - HIGH ENERGY MILK (H.E.M.)	
Ingredients and Amounts:	Instructions:
Dried skimmed milk 80 g Sugar 50 g Vegetable Oil 60 g Cooled Boiled water 1 L	Mix milk powder and sugar in a large pot or jug Add oil and stir to make a paste Add the cooled boiled water SLOWLY, stirring all the time. Add enough water to reach the 1000ml (1 litre) line. Stir completely until liquid is smooth Add vitamin and mineral mix if available (from UNICEF).
Number of Meals	6 meals per 24 hours
Time of meals	6 meals = every 4 hours
Volume per meal (6m – 5yrs)	200ml/kg per 24 hours
DO NOT STORE AND RE-USE HEM THAT HAS NOT BEEN EATEN – IT CAN CAUSE DIARRHOEA	

Increase meal size

If the child finishes the meal, **increase the size of the next meal by 10ml**. Slowly add other foods. The amount of HEM and other foods can be increased according to the appetite of the child.

The child should still be fed day and night. Follow this schedule of meals spread over 24 hours:

TIME	EXAMPLES OF MEAL
6 am	PHASE 2 HEM
8 am	LOCAL MEAL – AsiaMIX porridge + banana + egg
10 am	PHASE 2 HEM
12 pm	LOCAL MEAL – rice + beans + tinned fish
2 pm	PHASE 2 HEM
4 pm	LOCAL MEAL – AsiaMIX pancake with sugar and milk or rice, oil and egg
6 pm	PHASE 2 HEM
10 pm	PHASE 2 HEM
2 am	PHASE 2 HEM

2. The child should gain 10-20g body weight / day.

If the child has already improved from phase 1 to phase 2 and then does not gain more weight over a period of 3 days (secondary failure) and feeding is supervised consider infection and chronic illness:

- Check for chronic diseases, such as TB, HIV, thalassaemia, cardiac disease, hepatitis B.
- Check for infections, such as diarrhoea, pneumonia, UTI, parasitic infection.

3. Continue medicine treatment started in Phase 1, start iron and de-worm.

1. Continue with Folic Acid, vitamin B1 and Zinc supplements.
2. Add **mebendazole** or **albendazole**
3. Add **ferrous sulphate** after 2 weeks of admission or when the child moves into Phase 2.
 - <5 kg: 50mg OD for 3 months
 - 5-9 kg: 100mg OD for 3 months
 - >10 kg: 200mg OD for 3 months.

5. Check child's vaccination card:

Give all vaccines according to up to date protocol if not already given.

6. Consider switch to OPD treatment

When the child reaches -2 z-scores W/H and stays at least -2 z-scores for 2 weeks in a row, no longer has oedema, and is free from infection: refer to OPD for the Supplementary Feeding Programme (SFP).

Emotional and physical stimulation

They are an important part of the treatment as severely malnourished children often present some degree of mental and behavioural delay. Mother and other family members need a lot of support and encouragement in order to prevent malnutrition from returning.

PHASE 3

Post discharge:

- The risk of relapse is greatest just after discharge.
- Plan to follow-up the child regularly, first weekly, then monthly and finally 3-monthly.
- Continue to monitor weight and height and report the results to the mother.
- Continue advice on feeding practices, provide all micronutrients or vitamins necessary
- Ensure that any booster vaccines are given according to up to date protocols.

A special consideration: dermatosis of kwashiorkor

This is characterized by shedding of the skin, ulcerations, weeping skin lesions which easily become infected. It can improve spontaneously as nutrition improves, but it also can lead to severe diaper rash especially if the child has diarrhoea. The area should be left uncovered; apply nystatin cream/ointment, or zinc to relieve pain and prevent infection. Bathing the affected area with 1% potassium permanganate solution for 10-15 minutes daily can also help to dry the lesions.

21.1.2. ACUTE MALNUTRITION IN ADOLESCENTS AND ADULTS

MODERATE ACUTE MALNUTRITION

Moderately malnourished adolescents and adults are not normally admitted to feeding programs unless they are severely malnourished and in poor clinical condition.

DIAGNOSIS

Adolescents:	3 to <-2 Z-score BMI-for-age (see Appendix 18)
Adults:	BMI 16-16.9 (calculate: weight (kg) / height ² (m), see Appendix 18) The person is thin and has bi-lateral pitting oedema
Pregnant and Lactating Women:	MUAC < 230mm (use if do not have weight/height, see <i>obstetric guidelines</i>)

TREATMENT

- Moderately thin adolescents and adults require an additional 20-30% caloric intake and should be treated in outpatient care.
- If available, depending on underlying condition(s), 1-4kg of Asia REMIX and 1.5L of vegetable oil is provided to take home each month with nutrition education and promotion provided on using the foods provided at every distribution. (Refer to the Guidelines for Supplementary Feeding and Medical Faculty Food Provision, TBC, 2012)
- Link or refer to community or home-based nutritional interventions or food security initiatives, if possible
- Ensure follow-up home visits and assessment.

SEVERE ACUTE MALNUTRITION

Adolescents and adults may present with severe malnutrition, indicated by low weight for height (see Appendix 18):

DIAGNOSIS

Adolescents:	Severe Malnutrition: less than -3 z scores BMI-for-age or are in a poor clinical condition (for example): <ul style="list-style-type: none">• Bi-lateral oedema not attributable to other causes.• Clinical marasmus – extreme thinness.• Night blindness.• Extreme pallor (paleness) – severe anaemia.• Vitamin and mineral deficiencies.
Adults:	BMI is less than 16 (calculate: weight (kg) / height ² (m)). The person is thin and has bi-lateral pitting oedema.
Pregnant and Lactating Women:	MUAC < 207 mm (or a BMI < 16 kg/m²) (use if do not have weight/height – see <i>obstetric guidelines</i>)

These people are severely acutely **malnourished** and need therapeutic feeding.

MANAGEMENT

- Investigate all possible sources of acute malnutrition including diabetes mellitus, TB, HIV and treat underlying cause.
- First phase of treatment is similar to that of children including prevention of hypoglycaemia, hypothermia, control of infections and giving vitamins.
- Feeding often requires naso-gastric tube as most of acutely malnourished adults are anorexic. The amount of feed given per kg of body weight is lower than for children and decreases with age.

Note: vitamin A 200 000 IU as single dose should not be given to pregnant women

PHASE 1

Feeding should be frequent (at least 6 meals per day).

PHASE 1 - HIGH ENERGY MILK	
Number of meals	6 to 8 meals per 24 hours
Time of meals	6 meals = every 4 hours 8 meals = every 3 hours
Volume per meal	depends on the age of the patient:
6-10 years	135 ml/kg per 24 hours
11-18 years	55 ml/kg per 24 hours
18-75 years	40-55 ml/kg per 24 hours
> 75 years	35-45 ml/kg per 24 hours

PHASE 2

As for children, improved appetite is the beginning of rehabilitation. It is usual that adolescents and adults become very hungry and refuse the formula feed. A diet should be then given based on traditional foods, but with added oil, mineral mix and vitamin mix if possible. Allow the patients to eat as much as they want and provide a wide variety of foods, but at least 6 times a day.

Be sure that they eat a variety of foods other than rice (rice fills the stomach quickly, but it is not very nutritious), and small amounts of rice or noodles.

Adults should continue to receive a supplemented diet as outpatients until their BMI is > 18.5 kg/m² and adolescents until their BMI-for-age is >5th centile of the median reference values. Pregnant and lactating women should receive supplemented diet all through their pregnancy and until the child is weaned.

21.2 OVERNUTRITION

DEFINITION

An obese person is too heavy for his/her height compared to standard weight tables. Obesity is a risk factor for many diseases and reduces life expectancy.

Overweight = having extra body weight from muscle, bone, fat, and/or water.

Obesity = having a high amount of extra body fat.

Central/abdominal obesity (or apple shape body): too much visceral fat (fat around organs), may have normal BMI but still at risk for heart disease and type 2 diabetes.

Obesity is a risk factor for:

- Heart disease
- High blood pressure
- Stroke
- Sleep apnea
- Type 2 diabetes
- Dyslipidaemia (cholesterol)
- Some cancers
- Gall bladder disease

CAUSES

1. Eating too much food (and therefore taking in too many calories), and/or doing little or no physical activity (most common causes)
2. Diseases such as endocrine diseases (rare)
3. Medications e.g. long term steroids

DIAGNOSIS

For adults, the international definition of obesity is the **Body Mass Index (BMI)**. BMI is used to diagnose underweight, overweight or obese. BMI can also help know risk of a chronic disease. **BMI can be used for non-pregnant adult only.**

Figure 21.6 How to calculate BMI:

Step 1: Check the weight on the scale in kilograms.
Step 2: Measure height in meters
Step 3: Square the answer from STEP 2 (multiply the number of meters by the same number of meters).
Step 4: Calculate BMI by dividing the answer from STEP 1 by the answer from STEP 3.

$$\text{BMI} = \frac{\text{weight (kg)}}{\text{height (m)} \times \text{height (m)}}$$

Figure 21.7 How to use BMI:

These are the cut off values for BMI for >19 yrs according to WHO standards for Asian populations:

CLASSIFICATION	BMI (kg/m ²)
Underweight	≤ 18.5
Healthy	18.5 to 22.9
Overweight (increased risk)	23 to 27.4
Obese (high risk)	≥ 27.5

Note: the cut off values for BMI are not the same for all people due to the difference in body shape and risk of disease in different populations (e.g. Asian's have a higher risk of developing cardiovascular disease at a younger age).

For example: a 70kg man who is 1.6 metres tall

$$\text{BMI} = \frac{70}{1.6 \times 1.6} = \frac{70}{2.56} = \text{BMI of } 27 = \text{overweight}$$

Note: BMI may **overestimate** body fat in people who have a muscular build e.g. athletes.
underestimate body fat in older persons or others with muscle loss.

WAIST CIRCUMFERENCE

Sometimes, **even if BMI is within normal range**, having too much visceral fat (fat that accumulates around organs) called **central/abdominal obesity** (or **apple shape body**) still put a person at risk for **heart disease and type 2 diabetes**. To measure central obesity use the waist circumference.

How to measure the waist circumference:

Use a tape measure and measure around the abdomen just above the belly button (naval).

How to use the waist circumference:

Normal figures are:

Men ≤ 90cm

Women ≤ 80cm

Figure 21.8 Using waist circumference and BMI to measure the risk of co-morbidities

CLASSIFICATION	BMI (kg/m ²)	RISK OF CO-MORBIDITIES	
		waist circumference	
		< 90 cm (men) < 80 cm (women)	≥ 90 cm (men) ≥ 80 cm (women)
UNDERWEIGHT	≤ 18.5	Low, but risk of other health problems	Ok
HEALTHY	18.5 – 22.9	Ok	Increased
OVERWEIGHT	23 - 27.4	Increased	High
OBESE	≥ 27.5	Very high	Very high

MANAGEMENT

Screening for high blood pressure: If the patient is over 40 yrs of age OR overweight or obese OR has had a blood pressure reading of >130/90 in the past, check for high blood pressure every year.

If overweight/obese adults have a sustained blood pressure of > 135/80, consider screening for type 2 diabetes through fasting blood glucose or OGTT or HbA1c.

You need to advise your patients to:

EXERCISE

- **Exercise:** Advise the patient to do some exercise – try to do at least 30 minutes every day: e.g. walking, playing football, gardening.

SMOKING

- Try to stop, if unable to stop advise to reduce.
- Passive smoking (inhaling smoke from someone else who smoking) is also bad for you

ALCOHOL

- Advise to reduce alcohol
- **Women:** no more than 2 drinks/day (on average) **Men:** no more than 3 drinks/day (on average)

DIET

General advice:

- Few smaller meals during the day, rather than eat one or two very heavy meals
- Avoid heavy meals or snacks just before sleeping
- Avoid food that result in a sudden rise in sugar levels (e.g. sugary drinks), better to eat foods that cause a slow release of sugar into the blood (e.g. health carbohydrates)

Specific Advice:

1. Eat high **fibre** food
 - Rice and oats, whole grain breads and cereals, beans, peas, fresh fruits and vegetables
 - Fibre is not broken down (digested) by the body, and it does not raise calories or glucose levels so makes you feel full without the bad effects.
2. Try to eat **healthy carbohydrates**
 - Healthy carbohydrates are the least processed (brown and wild rice, whole wheat, corn, peas, boiled dry beans). White flour and white rice may taste better, but they are less filling and make blood sugar higher.
3. Eat plenty of **vegetables and fruits** regularly
 - They are a good source of fibre
 - Take a piece of fruit for a snack at work.
4. Eat moderate amounts of **fat**
 - Replace butter and coconut oil with grape seed oil, olive and peanut oil.
 - Add only ½ to 1 teaspoon of oil per person
 - Do not batter and deep fry, but poach, grill or boil in soup
 - Eat fish and shellfish which are naturally low-fat
 - Remove excess fat from meat, remove skin from poultry
 - Replace fried snack foods with roasted or baked ones, e.g. baked or boiled potatoes vs. potato chips
5. Limit **salt** intake
 - Most salt comes from pre-packaged food e.g. potato chips so try to avoid these
 - Try to replace with herbs, spices, lemon juice when cooking
 - In patients with high blood pressure reducing salt is very important
6. Reduce **sugar**
 - Sugar is present naturally in some foods (e.g. fruits) or is added (e.g. sweet drinks)
 - Too much sugar also causes dental caries
 - Main source of sugars: bread, breakfast cereals, rice, noodles, corn, potato, fruit, milk, yoghurt, sugar, biscuits, cakes, candies, sodas
 - Try to cut down on these

Note: When educating about diet it is also important to discuss **hygiene and eating clean and safe food** to prevent infection:

- Wash hands with soap
 - after using the toilet
 - after cleaning children who have used the toilet
 - before preparing meals
 - before eating
 - after stroking animals
- Make sure that raw vegetables have been washed and rinsed before cutting or skinning them.
- Boil the water if it comes from the community tap, well, rainwater or a stream.
- Prevent your food and cooking oils from smoking or burning. Burnt food contains **acrolein** which is bad for you.
Oil used for deep frying should not be reused!

Be careful when prescribing drugs to obese people. For certain medication you may need to change the dose.

21.3 VITAMIN DEFICIENCIES

21.3.1. VITAMIN A DEFICIENCY

DEFINITION

Vitamin A deficiency is a major cause of blindness, and is a significant factor in many childhood illnesses, especially diarrhoea and pneumonia. Vitamin A deficiency mostly affects small children but can also affect adults, especially women of reproductive age. See p.85, for more detailed information on vitamin A deficiency.

SIGNS AND SYMPTOMS

The signs and symptoms of vitamin A deficiency are found in the eyes. These include night blindness ('chicken blindness'), conjunctival dryness, Bitot's spots (grey-white spots on conjunctiva), dry cornea and some types of cornea damage.

DIAGNOSIS

Early clinical recognition and treatment are important to avoid severe complications and permanent blindness.

TREATMENT

Children less than 6 months

Day of diagnosis	(D 1)	50,000 IU
Next day	(D 2)	50,000 IU
One week later	(D 8)	50,000 IU

Children between 6 and 11 months (<8 kg)

Day of diagnosis	(D 1)	100,000 IU
Next day	(D 2)	100,000 IU
One week later	(D 8)	100,000 IU

Children age 1 year and older (or >8 kg)

Day of diagnosis	(D 1)	200,000 IU
Next day	(D 2)	200,000 IU
One week later	(D 8)	200,000 IU

Women of reproductive age

25,000 IU once a week **for 8 weeks**

Vitamin A capsules come in two sizes 200,000 IU (International Units) and 25,000 IU capsules. Read the bottle for the strength of the capsules. Write down carefully on the health record the date and dose of treatment. Do not give treatment more often than every 4-6 months because too much Vitamin A can cause hypervitaminosis (this can occur with vitamins A, D, E, and K).

Treatment for pregnant woman:

In case of **night blindness and Bitot's spot:**

Vitamin A 10,000 IU PO daily OR 25,000 IU PO/ week for at least 4 weeks

In case of **corneal dryness and corneal ulcer/ keratomalacia:**

Day of diagnosis (day 1) 100,000 IU
Next day (day 2) 100,000 IU
1 Week later (day 8) 100,000 IU

(Must discuss with doctor BEFORE using this dose)

Give a treatment dose of vitamin A even if they have received a recent prevention dose to:

- All patients with confirmed signs or symptoms of vitamin A deficiency
- All cases of moderate and severe malnutrition
- All children with measles
- All children with severe respiratory infections and severe diarrhoea requiring admission to IPD

PREVENTION

The cause of vitamin A deficiency is a lack of food containing vitamin A. This is found in leafy green vegetables, eggs, many kinds of meat, mango, papaya, pumpkin and many fruits. The mother's breast milk is a very important source of Vitamin A. Rice, bananas and oranges contain little or no vitamin A.

As many people cannot afford meat, eggs and other foods with vitamin A, capsules need to be distributed to children to prevent deficiency. **A single dose of 200,000 IU will provide one child with enough vitamin A to last for four to six months.**

Newborn	50,000 IU	at birth
Less than 6 months (if not given at birth)	50,000 IU	
Children 6 months to one year	100,000 IU	every 4-6 months
Children one year and older	200,000 IU	every 4-6 months
Mothers (within 1 month of delivery)	200,000 IU	at delivery of baby and 200,000 the next day

Before giving a preventive dose of vitamin A check if one has been given in the last 4 months.

Note: If you need to give doses smaller than 200,000 IU:

Most capsules are 200,000 IU (International Units) in strength. If you need to give a smaller dose, such as 100,000 IU cut the capsule with scissors and give 3 drops to the child.

Do NOT give a high dose to a woman who is pregnant or could be pregnant (age 15 – 50 years).

If a treatment dose has been given in the past 1 month, do not treat again. Wait for one month to pass between treatments and re-evaluate.

21.3.2. VITAMIN B1 DEFICIENCY

DEFINITION

Vitamin B1 deficiency occurs when there is not enough vitamin B1 in the body due to an insufficient diet. This was common at SMRU, especially in pregnant and breastfeeding women and their babies. The disease may present in different ways, known as 'Dry Beriberi,' and 'Wet Beriberi,' or in combination. In alcoholics or very severe malnutrition, low vitamin B1 levels can cause Wernicke's Encephalopathy or Korsakoff's syndrome. Most vitamin B1 deficiency seen on the border is mild. The clinical presentation and management is different in adults and infants.

BERI BERI

DIAGNOSIS OF BERIBERI IN ADULTS AND OLDER CHILDREN

This is a clinical diagnosis.

SIGNS AND SYMPTOMS IN ADULTS AND OLDER CHILDREN

A. Dry Beriberi

Mild

Numbness
Burning sensation or tingling in lower legs or hands

Severe

Weakness: the person cannot walk alone or stand up from squatting position
Reduced tendon reflexes

B. Wet Beriberi

Oedema (legs, trunk, face), hepatomegaly
Difficulty breathing
A rapid pulse that can lead to heart failure

TREATMENT IN ADULTS AND OLDER CHILDREN

Note: take vitamin B1 tablets 1 hour before meals.

- **For mild deficiency** (Mild dry Beriberi)
 - **Vitamin B1** PO 100mg OD x 7 days then 10mg OD x 6 weeks.
- **For severe deficiency**
 - (Wet Beriberi and Dry Beriberi with severe signs)
 - Admit to IPD
 - **Vitamin B1** IM 100mg TID for 1 day, then
 - **Vitamin B1** PO 100mg OD x 7 days then PO 10mg OD x 6 weeks.

Consider giving **B-Complex** or **multivitamins**, as other B vitamins may be deficient in the patient as well.

**Advise patients not to chew betel-nut or eat lepetho when taking vitamin B supplements:
betel-nut destroys the vitamin B1**

PREVENTION IN ADULTS AND OLDER CHILDREN

- Patients should be advised to do the following to prevent vitamin B1 deficiency:
- Eat a variety of foods (for example yellow beans, meat, fruits and vegetables).
- Do not chew betel-nut or lepetho (fermented tea-leaf salad) just before or after eating – wait several hours.
- Wash rice only once before cooking and use the cooking water to make other food
- Advise to eat unpolished rice and to cut down fish paste if possible.

**To prevent vitamin B1 deficiency in pregnant women and their babies:
Give vitamin B1 PO 100mg daily to all pregnant and breastfeeding women up to 6 months of
breastfeeding**

DIAGNOSIS OF BERI BERI IN INFANTS

Beriberi is common in babies <1 year who are breast-fed and whose mothers have Vitamin B1 deficiency or low intake of Vitamin B1.

Note: this is a very dangerous condition in infants and can lead to death within only a few days.

SIGNS AND SYMPTOMS IN INFANTS

Think of Beriberi in previously healthy babies when they present with one or more of the following signs:

- Difficulty breathing, or very fast breathing with RR >50/min
- Clear lungs on auscultation
- Generalised oedema
- Voice change or loss of voice
- Cyanosis
- Fast pulse
- Low urine output
- Not sucking well
- Enlarged palpable liver
- Vomiting
- Convulsions

This is an **emergency**. Without treatment the child will die quickly.

TREATMENT IN INFANTS

1. Admit to IPD
2. **Vitamin B1** IM: 50mg (0.5ml) TID for 1 day, THEN (Vitamin B1: 1 vial = 1ml = 100mg)
3. **Vitamin B1** PO: 10mg OD x 6 weeks
4. Treat the mother: Vitamin B1 PO 100mg OD x 7 days, then 10mg OD x 6 weeks
5. Tell the mother to stop eating betel nut and snack food (e.g. lepetho) for 6 weeks as these make the symptoms worse. Take vitamin B1 tablets 1 hour before meals.

WERNICKE'S ENCEPHALOPATHY

DEFINITION

Neurological symptoms develop from low B1 levels on the central nervous system. Most common in people who have a long history of alcohol excess. Symptoms are often reversible with treatment. *See p.183, Alcohol substance abuse.*

SIGNS AND SYMPTOMS

- **Ophthalmoplegia** (abnormal eye movements)
- **Ataxia** (poor balance, unable to walk normally)
- **Confusion**
- **History of alcohol excess/very poor diet**
- Seizures
- Memory problems

TREATMENT

- Higher doses of **Vitamin B1**: 250mg IV/IM TID.
- IM is painful – best to dilute B1 in 100ml NSS and give IV.
- Continue high dose until patient symptoms stop improving.
- Consider replacing other vitamins which are likely to be deficient and long term B1.
- Encourage stopping alcohol
- Encourage good diet and prevention advise above

KORSAKOFF'S SYNDROME

DEFINITION

Neurological condition caused by low thiamine. More common in chronic alcohol abuse and severe malnutrition. Some of the symptoms are not reversible with treatment. (*See p.183, Alcohol substance abuse.*)

SIGNS AND SYMPTOMS

- Memory loss
- Confabulation – makes up gaps in memory
- Minimal conversation
- Lack of insight (is not aware that has any problems)
- Loss of interest

TREATMENT

- As for Wernicke's encephalopathy

Wernicke-Korsakoff Syndrome is when the two conditions occur together.

CHAPTER 22: ONCOLOGY AND PALLIATIVE CARE

DEFINITION

Cancer is a tumour caused by abnormal very fast growth of cells in the body. The cells can spread to other parts of the body. Sometimes cancers can have non-specific symptoms e.g. weight loss and lethargy, but other times there can be more specific signs and symptoms for each cancer (see Figure 21.1).

Oncology is the treatment of cancer. Treatment is sometimes surgery (to remove a very large mass), chemotherapy (drugs to kill the cancer cells) and radiotherapy (radiation beams to kill the cancer cells). Treatment will not work for all cancers, especially more advanced cancers. Treatment is expensive and not available at SMRU and specialist review (if possible) is needed.

Palliative care is the management of a patient who is near to the end of their life and there is no treatment available to cure them e.g. advanced cancer, very severe COPD, rabies with symptoms. It is necessary to make sure patients have control of their symptoms and have a peaceful end to their life.

22.1 ONCOLOGY

SIGNS AND SYMPTOMS

All cancers can cause weight loss. In addition, there are specific symptoms that you should be aware of that may make you think of cancer as a diagnosis:

Figure 22.1 Specific cancers: Signs and symptoms and investigations that may be available at border clinics

	Signs and Symptoms	Investigations available at SMRU
Oesophageal/Mouth Cancer	Difficulty swallowing, initially to solids but then to liquids, may see mass in mouth, history of betel nut chewing	None
Lung Cancer	Prolonged cough, haemoptysis, clubbing, history of smoking	Chest X-ray
Stomach Cancer	Epigastric pain, vomit with blood, melaena, large lymph node above the left clavicle	Ultrasound may or may not identify a mass
Bowel Cancer	Change in bowel habit especially in elderly, blood in stool	None
Bone Cancer	Feel mass on bone, chronic bone pain, unable to straighten joint, limp	Bone X-ray
Blood Cancer	Large lymph nodes, frequent infections, night sweats	CBC, thin film
Brain Tumour	Headache, signs of raised intracranial pressure, change in personality/function	
Pancreatic/Gallbladder Cancer	Jaundice with no abdominal pain, may have epigastric mass	Ultrasound may or may not identify a mass
Liver Cancer	Jaundice, history of hepatitis B/C or cirrhosis	Ultrasound may or may not identify a mass

DIAGNOSIS AND TREATMENT

There are limited resources available to investigate cancer, and the diagnosis at SMRU clinics is often clinical. Actually, diagnosis needs biopsy and intensive investigation. Ultrasound may be helpful to look for a mass e.g. in the abdomen (but can be difficult), and an X-ray may help to find some cancers.

If you suspect cancer then you must refer for further investigation and treatment or send home with palliative treatment and follow up.

If you suspect cancer then you must refer for further investigation and treatment or send home with palliative treatment and follow up.

22.2 PALLIATIVE CARE

TREATMENT

Care can be divided into palliative medical care, psychological support for the patient, and psychological support for the family/care givers.

1. Palliative medical care

- Teach the family when and how to give pain relief/other medications
- Drugs and materials are needed e.g. provide gloves or materials for dressings.

General Care:

1. **Oral care** use soft toothbrush, or rinse mouth with diluted salt water after eating.
2. **Prevent bedsores** by moving patient every 1-2 hours, use cushions to keep position.
3. **Prevent pain, stiffness and contractures** in muscles and joints by gently moving and massaging limbs.

Symptom Treatment:

Educate the family to look out for symptoms e.g. pain, constipation, vomiting etc. and when to ask for help. This is how to treat some of the common symptoms:

Figure 22.2 Palliative treatment for specific symptoms

Anorexia:	Prednisolone 5-15mg OD in the morning to increase appetite, stop if no help after 2 wk
Anxiety:	Diazepam 2.5-5mg at night or BID (not more than 2 weeks)
Chronic Diarrhoea:	Loperamide 4mg once then 2mg per loose stool (max 16mg/d) or opioids (like codeine) (if available)10mg TID (max 60mg every 4hrs)
Constipation:	Increase oral fluids , eat high fibre foods e.g. fruit and vegetables, use laxatives if available
Emotional support:	Physical methods e.g. touching (stroking, massage), ice/heat, deep breathing Cognitive methods e.g. distraction with radio, music, imagining pleasant scene, prayer
Dehydration:	Dehydration may decrease drug excretion from the body and so increase drug side effects, like hallucinations or myoclonic jerks. This is particularly true for morphine. Try to stop unnecessary medication or decrease the dose while maintaining symptom control. Can give extra fluids for a short period of time for strong adverse effects.
Delirium/ confusion:	Mild agitation: Diazepam 5-10mg OD to TID Severe delirium: Haloperidol 1.5-5mg up to TID until improved or Chlorpromazine 25-50mg PO/PR TID (if available). Add Diazepam as above, but do not use Diazepam alone for severe delirium because it might make confusion worse
Insomnia:	Diazepam 5-10 mg HS, use only prn and do not use for chronic insomnia.
Itching:	Chlorpheniramine 4mg QID (max 24mg/day). Assess for cause.
Mouth ulcers:	Prednisolone crush a 5mg tablet and apply a few grains on to ulcer
Muscle Spasm:	Buscopan 10mg TID (max 20mg QID)
Nausea/Vomiting:	Metoclopramide 10 mg TID
Oral/Oesophageal Thrush:	Nystatin 1 tablet to be sucked QID for 7 days or 1ml of oral suspension (100,000 IU) QID for 7 days (total 400,000 IU per day) to swish and swallow.
Pain:	Make a plan for adequate pain relief (see p.31). If not better, try different pain medications to see what helps the patient. Encourage other methods for pain control.
Urinary incontinence:	Male: use plastic drinks bottle over penis Females: cotton cloth pads or plastic pants, wash and dry between use

2. Psychological support for the patient

- Be honest about the outcome of the illness and treatment.
- Respect the patient, even if there is social stigma surrounding their illness.
- Be aware of the psychological and spiritual aspects of patient care e.g. allowing relatives and close personal friends access to the patient.
- Feelings of sadness, anger, fear, anxiety, regret, psychological stress are common. Medication does not make these feelings go away, be open and listen in a non-judgmental way to the patient's concerns
- Confidentiality is the key to setting up a good relationship with the patient and family.

3. Psychological support for the care givers/family

- Support the family during the patient's illness, e.g. provide gloves or materials for dressings. Ask a home visitor to support the patient and/or the family at home.
- Explain to the family how to give the medical and psychological support to the patient
- Encourage help from community members, particularly neighbours, to give the main caregiver some help and give them some time to relax, even if it is only for a few hours. This allows the caregiver to enjoy some of the things they like doing such as attending a prayer service or sports that is helpful for them during this difficult time.

Note: Palliative care can also be a very difficult subject for staff members, if you are upset then remember you can talk to your colleagues who have been through similar experiences. *Refer to the WHO palliative care booklet.*

CHAPTER 23: REPRODUCTIVE TRACT DISEASES

23.1 REPRODUCTIVE TRACT INFECTIONS

DEFINITION

Diseases of the genital tract of men and women. Many are Sexually Transmitted Infections (STIs).

SIGNS AND SYMPTOMS

If you suspect a genital tract infection, you should:

- Do the genital examination in a **private room** and look for the following signs and symptoms: discharge, ulcers, warts, inflamed cervix and pain on palpation of cervix.
- Examine and treat the **patient's sexual partner for STI**

STI control is important to prevent sexual transmission of HIV. If you suspect STI, think about possible HIV co-infection and offer referral Voluntary Counselling and Testing (VCT). For non-pregnant patients, you may need to refer for VCT. If SMRU has an HIV program available, you may be able to test at the SMRU clinic if the patient is eligible.

23.1.1. VAGINAL DISCHARGE SYNDROME

DEFINITION

If a patient complains of vaginal discharge, it is important to identify between:

1. **Vaginitis:** an infection of the vagina.
 - Most commonly caused by *Gardnerella vaginalis* (**bacterial vaginosis**), *Trichomonas vaginalis* (**trichomoniasis**) and *Candida albicans* (**candidiasis**)
2. **Cervicitis:** an infection of the cervix.
 - Most commonly caused by *Neisseria gonorrhoea* (**gonorrhoea**) and *Chlamydia trachomatis* (**chlamydia**)

SIGNS AND SYMPTOMS

- Abnormal vaginal discharge
- Vulva itching/burning
- Painful intercourse
- Dysuria (pain when urinating)
- In candida vaginitis there can be vulva oedema, curd like discharge, erythema and scratch scars
- **Vaginitis:** usually no pain and no cervical discharge
- **Cervicitis:** red and swollen cervix with purulent discharge. More severe than vaginitis.

DIAGNOSIS

The tests for the vaginitis and cervicitis are expensive, so SMRU uses a clinical diagnosis.

RISK FACTORS for **cervicitis** are:

- Sexual partner has urethral discharge
- Sexual violence or prostitution
- New partner or the patient has more than one sexual partner in the last three months

****It the patient has at least one risk factor, you must treat as cervicitis****

TREATMENT OF VAGINITIS

Type of vaginal discharge	Responsible Micro-organism	Treatment
White, frothy discharge	Usually <i>Trichomonas</i> (protozoal infection)	Metronidazole (PO) 2g stat
Grey-green discharge and fishy smell	Usually <i>Gardnerella</i> (bacterial vaginosis = superficial bacterial infection)	Metronidazole (PO) 2g stat
White, itchy discharge	<i>Candida</i> (fungal infection)	Nystatin 100,000 units OD inserted high in vagina x 14 days at bedtime.

1. Mixed infections (e.g. *Trichomonas/ Gardnerella* and *Candida*) can occur together. Treat both.
2. Advise the patient to return after 7 days for review.
3. If after 7 days she still has symptoms: Treat for cervicitis.

TREATMENT OF CERVICITIS

Treat the patient for cervicitis if:

- Any risk factors are present
OR
- If the cervix is red and swollen with a lot of purulent discharge

Cervicitis treatment regime (treat both Gonorrhoea and Chlamydia at the same time)	For <i>Gonorrhoea</i>	Ceftriaxone IM 500mg STAT (higher dose for resistance). If concerned about resistant gonorrhoea give ceftriaxone with Azithromycin 1g po STAT.
	AND For <i>Chlamydia</i>	PLUS Non-pregnant: Doxycycline PO 100mg BID x 7 days (Alternative treatment or if pregnant woman: Azithromycin PO 1g po STAT, <i>see obstetric guidelines</i>)

Note: In this region (South-East Asia), resistance against ceftriaxone has been reported. If a patient on ceftriaxone does not respond to treatment, discuss with the doctor.

PREVENTION OF SEXUALLY TRANSMITTED INFECTIONS

Educate patients about sexually transmitted infections, promote/provide condom use, promote single sexual partnerships.

23.1.2. PELVIC INFLAMMATORY DISEASE (PID)

DEFINITION

Infections above the cervix (endometritis, salpingitis, tubo-ovarian abscess, pelvic peritonitis) which are mainly caused by *Gonorrhoea*, *Chlamydia* and anaerobic bacteria. PID is more severe than vaginitis/ cervicitis.

SIGNS AND SYMPTOMS

- Lower abdominal pain
- Sometimes fever
- Painful cervix/ adnexa on vaginal examination (sometimes painful mass palpable)
- Abnormally painful menstruation
- Pain during sexual intercourse (dyspareunia)
- Abnormal vaginal discharge
- Pain when passing urine (dysuria)

DIAGNOSIS

Clinical: **PID is highly likely if there is one of the above signs and symptoms and painful cervix or adnexa during vaginal examination or tender pelvic mass.**

If available, microscopy of vaginal/cervical discharge may show gram-negative intracellular diplococci of gonorrhoea infection. Chlamydia cannot be identified by field microscopy and should always be treated if you treat for gonorrhoea.

TREATMENT

Gonorrhoea, chlamydia and anaerobic bacteria are the most common causes of PID. In the OPD management of PID you must treat all three at the same time.

PID combined treatment regime (OPD Management):	For <i>Gonorrhoea</i>	Ceftriaxone IM 500mg STAT
	AND For <i>Chlamydia</i>	PLUS Non-pregnant: Doxycycline PO 100mg BID x 14 days. Note: Azithromycin 1g po STAT is not effective against PID (if pregnant see obstetric guidelines)
	AND For Anaerobic bacteria	PLUS Metronidazole PO 500mg TID x 14 days

Criteria for hospitalisation in IPD:

- Patient is pregnant
- Recent delivery / abortion
- Pelvic abscess is suspected
- Severe illness
- Patient can not follow complete OPD treatment
- Patient not better after 3 days of OPD treatment.

IPD Treatment:

Ceftriaxone IM 500mg OD **AND**
Doxycycline PO 100mg BID x 14 days **AND**
Metronidazole PO/IV 500mg TID

Give this regime until patient's conditions improved, then continue only with:

Doxycycline PO 100mg BID and
Metronidazole PO 500mg TID for total 14 days

For postpartum sepsis: Consider retained placenta and discuss with obstetrician about referral for manual placenta removal. (see *obstetric guidelines*)

Change antibiotics: **Ampicillin AND gentamicin AND metronidazole**

Note: Refer if there is acute abdominal pain or not better in 3 days of treatment. Give IVF and antibiotics if needed.

PREVENTION

Educate patients about sexually transmitted diseases, promote/provide condom use, promote single sexual partnerships.

23.1.3 GENITAL ULCERS AND WARTS IN WOMEN

DEFINITION

Genital ulcer : is a lesion on the surface of the mucosa or skin in the genital area.

Genital wart: is a raised portion of skin which can be flat on the top or elongated.

Both ulcers and warts are caused by sexually transmitted infections (STIs).

SIGNS AND SYMPTOMS

- Anal/ genital sores or ulcers
- For herpes primary infection: fever, painful vesicles on the genitals
- Swelling of inguinal lymph nodes
- Single or multiple warts in anal/genital area.

DIAGNOSIS & TREATMENT

Diagnosis and treatment depend on the type of lesion (sore, ulcer, wart):

Figure 23.1 Diagnosis and treatment of genital lesions in women

Type of lesion	Treat for	First choice regime	Second choice regime
Genital ulcers (open sore or lesion)	Syphilis	Benzathine penicillin IM 2.4 MIU STAT ¹ Note: If the duration of infection is unknown, take it is as late syphilis (>2 years) and give one injection per week for 3 weeks <u>PLUS</u>	Procaine penicillin IM 1.2 MIU OD x 10 days OR *Doxycycline PO 100mg BID x 14 days If pregnant: erythromycin
	AND Chancroid	Ciprofloxacin PO 500mg BID x 3 days (OR Erythromycin PO 500mg QID x 7 days OR Azithromycin PO 1g STAT)	<u>PLUS</u> Ceftriaxone IM 500mg stat
Genital ulcers ² (small, painful blisters)	Herpes	Wash with soap and water Apply gentian violet x 5 days Paracetamol 1g QID x 5 days Acyclovir 200mg 5 times/day x 7 days (give within 5 days of first attack, but within 24hrs of symptoms if recurrent attack)	
Genital papule (separate, with dimple in centre)	Molluscum Contagiosum	Wash with soap and water Will disappear in about 8 weeks	
Genital warts (in groups, like cauliflower)	Condyloma Acuminata	Wash with soap and water Paracetamol PO 1g QID x 3 days <u>External warts <3 cm:</u> Podophyllotoxin ³ 0.5% solution – apply with cotton bud twice daily for 3 consecutive days/week up to 4 weeks <u>Vaginal warts:</u> Same as external wart <3cm but solution must be applied by medical person only <u>External warts >3 cm and cervical, intraurethral, rectal or oral warts:</u> May need surgical removal or cryotherapy	

* **Note:** Not in pregnancy: In pregnancy change doxycycline for erythromycin 500mg QID for 14 days.

¹ Because of the volume, this dose of benzathine penicillin is usually given as two injections at separate sites.

² Vaginal herpes may need oral acyclovir to prevent infection of child at birth. Active genital herpes at delivery or first episode of genital herpes in pregnancy should have a caesarean section. Refer to doctor.

³ Podophyllotoxin is contraindicated in pregnant and breastfeeding women. Improper use may result in painful ulceration.

PREVENTION

Educate patients about sexually transmitted diseases, promote/provide condom use, promote single sexual partnerships. Treat the patient and the partner.

23.1.3. SEXUALLY TRANSMITTED INFECTIONS IN MEN

DEFINITION

Sexually transmitted infections (STI) are diseases transmitted by sexual behaviour.

SIGNS AND SYMPTOMS

- Genital/ anal sore or ulcer
- For Herpes primary infection: fever, painful vesicles on the genitals
- Swollen inguinal lymph nodes
- Urethral discharge, dysuria are common in gonorrhoea
- Single or multiple warts in genital/anal area

DIAGNOSIS & TREATMENT

- Microscopy of urethral discharge may show gram-negative diplococci gonorrhoea infection. Chlamydia cannot be identified by field microscopy and should be treated presumptively.
- Treatment depends on the type of lesion (sore, ulcer, wart, lymph node swelling) and discharge:

Figure 23.2 Diagnosis and treatment of genital lesions in men

Type of lesion	Treat for	First choice regime	Second choice regime
Genital ulcers (open sores) on glans penis	Syphilis	Benzathine penicillin IM 2.4 MIU stat ¹ Note: If the duration of infection is unknown, take it as late syphilis (>2 years) and give one injection per week for 3 weeks	Procaine penicillin IM 1.2 MIU OD x10 days (OR doxycycline PO 100mg BID x 14 days)
	AND Chancroid	PLUS Ciprofloxacin PO 500mg BID x 3 days (OR erythromycin PO 500mg QID x 7 days OR azithromycin PO 1g stat)	PLUS Ceftriaxone IM 500mg stat
Penile or urethral discharge, pus, urethral irritation burning in passing urine	Gonorrhoea	Ceftriaxone IM 500mg stat (OR azithromycin PO 1g stat)	Erythromycin PO 500mg QID x 7 days
	AND Chlamydia	PLUS Doxycycline PO 100mg BID x 7 days (OR azithromycin PO 1g stat)	
Inguinal swelling (Lymphogranuloma Venereum) painful bubo	Chlamydia	Doxycycline PO 100mg BID/ 200mg OD x 7days (OR azithromycin PO 1g stat)	
Genital ulcers (small, painful blisters)	Herpes	Wash with soap and water Apply gentian violet x 5 days Paracetamol 1g QID x 5 days Acyclovir 200mg 5 times/day x 7 days (give within 5 days of first attack, but within 24hrs of symptoms if recurrent attack)	
Genital papule (separate, with dimple in centre)	Molluscum Contagiosum	Wash with soap and water Will disappear in about 8 weeks	
Genital warts (in groups, like cauliflower)	Condyloma Acuminata	Wash with soap and water Paracetamol PO 1g QID x 3 days External warts <3 cm: Podophyllotoxin 0.5% solution – apply with cotton bud BID for 3 consecutive days/week up to 4 weeks External warts >3 cm and intraurethral, rectal or oral warts: May need surgical removal or cryotherapy	

¹ Because of the volume, this dose of benzathine penicillin is usually given as two injections at separate sites.

PREVENTION

Educate patients about sexually transmitted diseases, promote/provide condom use, encourage less sexual partnerships. Treat the patient and the partner.

23.1.4. REPRODUCTIVE TRACT PROBLEMS IN PAEDIATRICS*^{NEW}

A **genital examination** is important when the patient or family complains of a problem in the genital area.

- If you are not comfortable doing the examination, ask another medic or doctor for help.
- Before any genital examination, counsel the patient that they are IN CONTROL and WILL NOT BE HURT. The CAREGIVER MUST BE PRESENT during the examination.
- If the child is afraid, they can be examined on the caregiver's lap.
- Explain to the child to tell you if there is pain, so you can be gentler during the examination. Look for rash and signs of infection, discharge, trauma, or scar tissue.
- Look at the rectal area for lesions, lacerations, and scarring. You should also notice if there are both new and old lesions or scars.

Vaginal bleeding

- May occur in female newborns because of decreased hormones from the mother. This is normal (like a menstruation) and you can reassure the mother that the female infant has a normal reproductive system. If bleeding is more than 2-3 days, consider another diagnosis.
- Vaginal bleeding in a prepubertal child is NOT normal. Ask about trauma (e.g. haematoma from straddle injury) and sexual abuse.

If sexual abuse is suspected, immediately refer to the *Gender Based Violence (GBV) guideline p.93*, BEFORE continuing with the patient/family interview or examination.

- In prepubertal children, the unestrogenised labia are small so the vagina and the vaginal opening are easily contaminated with stool and other materials. This can cause **vulvovaginitis**. There may be pain, redness, itching, or dysuria). The most common cause of vulvovaginitis are poor hygiene, irritation from soaps, and bacterial infection. Counsel the patient and family about proper hygiene. Wash the genital area daily, use only water to wash the genitalia, and avoid tight synthetic clothing (should wear plain cotton underclothes). If you see **vaginitis with discharge** on examination, think about STI.

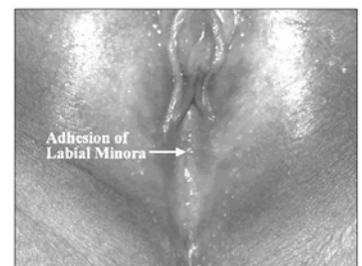
Vaginal tags

- Usually noticed during infancy
- They look the same as skin tags except they are located on the mucosal surface of the vagina
- On physical examination, this can be seen easily with only a visual exam. A vaginal skin tag is normal

Labial adhesions

- When the labia minora are fused together and you cannot see the urethra and vaginal opening
- This is normal
- If you are able to see the urethra, there might be a different diagnosis (discuss with the doctor)
- Do not make incisions or insert anything inside to make an opening. This could cause trauma and scar tissue
- Observe until puberty. The labia may open spontaneously as the child becomes more active. Increased female hormones during puberty will make the labia open naturally.
- Can be treated with oestrogen cream applied to the fused line BD, but the adhesions may come back.

Figure 23.3 Labial adhesion



Hydrocele or inguinal hernia

- Common problem in male children
- A **hydrocele** is when fluid collects inside the scrotum around the testis.
 - Occurs because of an opening between the scrotum and abdominal wall (so the intra-abdominal fluid enters the scrotum).
- **Inguinal hernias** occur when there is an opening in the muscle and tissue of the abdominal wall. The intestines push out of the opening when crying or lifting heavy things. For both hydrocele and inguinal hernia observe the

patient until 2 years old. Over 60% will improve without treatment. Prematurity is a risk factor for hernias. If the hydrocele or hernia is very large, refer for surgery.

Phimosis

- In young males who are not circumcised, the foreskin of the penis may remain slightly closed. This means that the foreskin cannot be pulled back easily over the head of the penis.
- This is normal
- Do not insert a foreign body to make the opening bigger. This can cause trauma and tissue contractures which will result in permanent phimosis.
- Observe until puberty
- The increased male hormones during puberty will make the foreskin open naturally. Treatment for phimosis is circumcision.

Figure 23.4 Phimosis



Balanitis

- Swelling of the foreskin
- Caused by:
 - Chemical irritation
 - Fungal infection (e.g. candida)
 - Tinea infection
 - Bacterial infection
 - STI
 - Poor hygiene
- Treatment:
 - Hygiene is the most important treatment.
 - Clean or soak the penis in a weak salt solution BID to TID.
 - Use a cotton swab to clean inside (between the foreskin and penis glans).
 - Treat the underlying cause.
 - If there is urinary obstruction from the inflammation or pain, consider urinary catheterisation. Discuss with the doctor first. Patients with severe balanitis and urinary obstruction may need referral for surgery.

CHAPTER 24: RESPIRATORY DISEASE

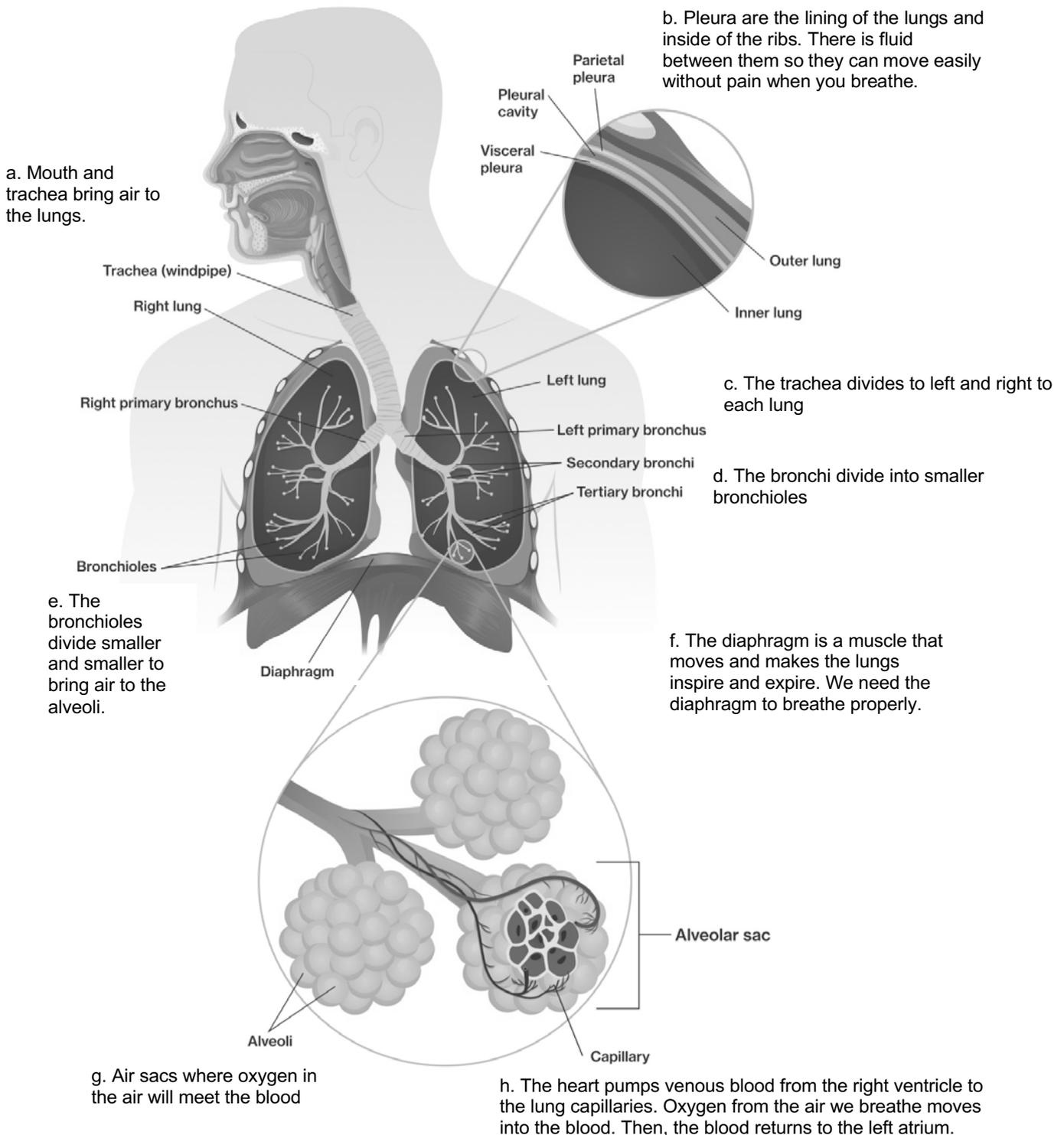
24.1 CHEST EXAMINATION

On listening (auscultation) to the chest, you may hear some examples of **abnormal breath sounds**. **Breath sounds must** be compared between the left and right lung, and the different lobes of each lung.

Quantity: Breath sounds may be reduced or absent over areas of the lung where less air is entering because of disease.

Quality: Normal breath sounds are 'vesicular' in the lungs and 'bronchial' over the trachea (b) and main bronchi (c). Bronchial breath sounds heard in the lungs are a sign of pneumonia. See *Figure 24.1*

Figure 24.1 Lung anatomy



The most common abnormal sounds heard are:

1. **Crepitation:** are crackles made when air enters the alveoli [g] and small bronchi [d] and makes them open. Crepitation are also the sound of air bubbling through mucus or fluid in the alveoli [g]. If crepitation disappear after coughing, they are probably not significant.
2. **Wheeze:** is a whistling sound caused by air passing through narrowed airways [d and e]. Wheeze can be caused by asthma, chronic obstructive pulmonary disease (COPD) and sometimes pulmonary oedema. It can be associated with infection, especially in children <2yrs (bronchiolitis [e]). If wheezing is heard only in one small area of the lung, and it does not disappear after coughing, it may be caused by a tumour or foreign body causing partial obstruction of a bronchus [c]. **Stridor** is a sound that comes from the vocal cord area (glottis and epiglottis).
3. **Pleural Rub:** is a rough creaking sound usually heard in only one area during inspiration and expiration. It is caused by movement of the two pleural surfaces [b] over each other when the surfaces are rough because of inflammation (e.g. pleurisy caused by pneumonia, TB).

24.2 ACUTE RESPIRATORY INFECTIONS

Acute respiratory infections (ARI) can be divided into:

1. Upper Respiratory Tract Infections (URTIs): ear, nose, throat, tonsils, sinuses
2. Lower Respiratory Tract Infections (LRTIs): lungs

24.2.1. UPPER RESPIRATORY TRACT INFECTIONS

(For Ear Diseases see p.57)

DEFINITION

Upper Respiratory Tract Infections (URTIs): infections of the upper airways which include the ear, nose, throat, tonsils or sinuses. Most of these infections are caused by viruses (so do not need antibiotics) and last for a short time only. The lungs are not affected. If the symptoms are severe and/or last for more than a week, this may be a sign of a more severe bacterial infection or influenza.

COMMON COLD

DEFINITION

Common cold is a mild URTI caused by a virus. It is very common and not dangerous. It can be an early sign of another infection (e.g. measles or influenza) or complicated by a bacterial infection (e.g. otitis media or sinusitis). In any community, a lot of people will have a cold at the same time.

SYMPTOMS

Nasal discharge or block, sore throat, cough, mild or no fever, lacrimation (more tears in the eyes).

In children under 5 years, routinely check the tympanic membranes to look for an associated otitis media.

TREATMENT

Paracetamol 3 days and advise when to come back to clinic.

Symptomatic treatment with cough and cold medications. Patients can find these in any pharmacy. These drugs should be avoided in children <2 years old because of drug side effects.

No antibiotics needed.

SINUSITIS

DEFINITION

Acute sinusitis is an infection of the sinuses with pus discharge from nose or around teeth. This may develop into chronic sinusitis. Most acute sinus infections are viral and resolve spontaneously within 10 days. Acute bacterial sinusitis may be a primary infection, a complication of viral sinusitis or of dental origin. Especially in children, bacterial sinusitis can spread to the bone, eye or meninges (causing meningitis) so it is important to treat.

SYMPTOMS

- Unilateral or bilateral discharge, nasal obstruction AND
- Facial unilateral or bilateral pain that increases when bending over, painful pressure either side of nose or behind forehead.
- Usually no fever or mild fever
- **Sinusitis likely if symptoms:**
 - Continue for more than 10-14 days AND/OR
 - Worsen after 5-7 days AND/OR
 - Are severe (severe pain, high fever, deterioration of general condition)

TREATMENT

- **Paracetamol** and NSS drop
- **Amoxicillin** Adult: 500mg TID, for severe infection use up to 1 g TID. Child: 15 mg/kg TID, can increase up to 30 mg/kg TID (if needed) for 7-10 days.
- If no response within 48 hours consider switching to **co-amoxiclav** PO for 7 to 10 days. To calculate dose, use the amoxicillin (not the clavulanate):
 - Children < 40 kg: 25 mg/kg 2 times daily
 - Children ≥ 40 kg and adults:
 - Ratio 8:1: 2000 mg daily (2 tablets of 500/62.5 mg 2 times daily)
 - Ratio 7:1: 1750 mg daily (1 tablet of 875/125 mg 2 times daily)

PHARYNGITIS

DEFINITION

Inflammation of the pharynx (throat), it is very common.

*For photo, see
Appendix 1*

SYMPTOMS

- Sometimes a sore throat is the only symptom. It may also be painful to swallow.
- The throat may be red with or without whitish exudate. Fever may or may not be present.
- In patients over 14 years, the probability of bacterial pharyngitis is low.
- Symptoms typically get worse over 2 to 3 days and then gradually go, usually within a week.

Note: if there is a grey membrane on the back of the throat suspect diphtheria

TREATMENT

Analgesia (pain treatment) e.g. **paracetamol**

No antibiotics

Infectious mononucleosis caused by Epstein Barr Virus (EBV) is found in adolescence and young adults. Symptoms are fever, extreme fatigue, pharyngitis, cervical lymphadenopathy, and often splenomegaly. Atypical lymphocytes in the blood are increased on the peripheral smear.

TONSILLITIS

DEFINITION

Tonsillitis is an infection of the tonsils at the back of the mouth, which is most commonly due to a bacterial or viral infection.

*For photo, see
Appendix 1*

SYMPTOMS

- Similar to pharyngitis but more severe, in particular, fever and generally feeling unwell tend to be worse than pharyngitis symptoms.
- Sore throat is worse on swallowing or turning the head.
- Swollen neck glands are common.
- Pus may appear as white spots on the tonsils.
- Most cases of viral tonsillitis improve after 3 to 4 days.

The following symptoms make bacterial tonsillitis more common:

1. Absence of cough
2. Fever >38°C
3. At least one enlarged and painful anterior cervical lymph node
4. Presence of pus on tonsils.

*For photo, see
Appendix 1*

COMPLICATIONS

Peritonsillar abscess

- SYMPTOMS: fever, intense pain, hoarse voice, trismus (cannot open mouth fully), tonsillar swelling on one side which moves uvula to one side
- TREATMENT: need surgical drainage as well as antibiotics for tonsillitis

Rheumatic fever

Acute glomerulonephritis

TREATMENT

Treatment with antibiotics if suspect bacterial cause, can help prevent complications. Treat the fever and advise the patient to drink plenty of fluids.

If the patient can take PO tablets and can eat and drink:

Adult: Penicillin V PO 500mg QID x 10 days
OR Benzathine penicillin IM 1.2 million IU STAT

Child: Penicillin V PO 15mg/kg QID x 10 days
OR Benzathine penicillin IM 25,000-50,000 IU/kg (max 1.2 million IU) STAT

Note: shorter courses of penicillin V do not prevent Rheumatic Fever, must finish 10 days treatment

If allergic to penicillin:

Adult:	Erythromycin PO x 5 days 500mg QID	<u>OR</u>	Azithromycin PO x 3 days 500mg OD
Child:	8 - 18 yrs 250 - 500mg QID 2 - 8 yrs 250mg QID 1m - 2 yrs 125mg QID		20mg/kg (max 500mg) OD 20mg/kg (max 500mg) OD 20mg/kg (max 500mg) OD

****Double dose in severe infection****

If the patient cannot take tablets and cannot eat or drink, admit to IPD and give IV fluids and treat with antibiotics as follows:

Adult: Benzathine penicillin IM 1.2 million IU STAT
OR Benzyl penicillin IV 1.2g QID
OR Ampicillin IV 1g QID

Child: Benzathine penicillin IM 50,000 IU/kg STAT (max 1.2 million IU)
OR Benzyl penicillin IV 25mg/kg QID
OR Ampicillin*IV

Change to **penicillin V PO** when the patient can swallow. Treat for a total of 10 days.

Note: Monitor for rash: if gets rash may be because diagnosis is Epstein Barr Virus (EBV) as the virus reacts with ampicillin causing a rash.

DIPHTHERIA^{new}

DEFINITION

Diphtheria is an infectious disease caused by the bacteria *Corynebacterium diphtheriae*. It spreads from person to person by respiratory droplets from the throat through coughing and sneezing. The diphtheria bacteria produce toxins throughout the body.

SYMPTOMS

- Tonsillitis with grey sticky membranes in the throat
- High fever >39°C
- Oliguria, cervical oedema, enlarged cervical lymph nodes
- Signs of haemorrhage e.g. purpuric rash, epistaxis, bleeding gums

URGENT REPORT
See Appendix 7

COMPLICATIONS

1. Myocarditis
2. Neuropathies
3. Renal failure
4. Pneumonia

For photo, see
Appendix 1

TREATMENT

- **Immediate strict isolation. Refer quickly if possible, especially for laryngeal obstruction (needs urgent intubation), cardiac or neurologic complications.**
- Nose and throat samples for culture if available.
- If strong suspicion start antibiotic treatment

Adult: Benzathine penicillin IM 1.2 million IU STAT
OR Benzyl penicillin IV 2.4g QID x 7 days

Child: Benzathine penicillin IM 50,000 IU/kg (max 1.2 million IU) STAT
OR Benzyl penicillin IV 50mg/kg QID x 7 days

If allergic to penicillin: **Erythromycin** PO Adult: 500mg QID; Child: dose as for tonsillitis x 7days, see p.229.

- Give antitoxin serum (*see below*)
- **Antitoxin serum** should be given with caution, because of common allergic reactions:
- Give 0.1ml SC. Wait 15 min. If no allergic reaction or erythema around the injection site give 0.25ml SC.
- Observe for further 15 min before injecting the rest IM or IV
- Same dose for adults and children
- Give IV if more than 20,000 units in 200ml NSS over 4 hours.

Laryngitis or pharyngitis	20,000 - 40,000 units
Rhinopharyngitis (inflammation nasal and pharyngeal mucosa)	40,000 - 60,000 units
Serious form or >48hours after onset of symptoms	80,000 - 100,000 units

Having the disease does not give you immunity, you need to update the vaccination after patient has recovered

PREVENTION

Routine vaccination and mass vaccination in an epidemic

Close contacts (e.g. family members, children in the same class at school, medical personnel)

- Treat with **benzathine penicillin** (single dose IM) or **erythromycin** (7 days orally) (as per treatment dose).
- If possible, quarantine and do daily monitoring (throat exam and temperature) for 7 days and no school or work until 48 hours after finishing antibiotics.
- Check vaccination status:
 - If less than 3 vaccines: **complete course**
 - If received 3 injections and had last injection more than one year before: give a **booster dose**.
 - Medical personnel in direct contact with patients: give a **booster dose**.

CROUP^{update}

DEFINITION

Viral infection causing swelling around the vocal cords in children.

SIGNS AND SYMPTOMS

- Acute onset of barking cough, hoarseness of voice.
- Stridor (**inspiratory** wheeze or noise)
 - Croup is considered mild or moderate if the stridor only occurs with agitation;
 - Croup is considered severe if there is stridor at rest, especially when it is accompanied by respiratory distress (intercostal, subcostal or sternal recession, decreased air entry and altered level of consciousness).
- Wheezing may be present
- Has recent mild upper respiratory tract infection.

DIAGNOSIS AND TREATMENT

Clinical

See Figure 24.2

Figure 24.2 Tripod position

ACUTE EPIGLOTTITIS^{update}

DEFINITION

A severe bacterial infection of the epiglottis seen in children.

SIGNS AND SYMPTOMS

- Sudden onset of symptoms
 - Sore throat
 - High fever
 - Stridor
 - Lack of immunization
- **DANGER SIGNS are rapidly becoming severe, drooling, 'tripod' position (patient keeps his airway open)****



This is an emergency. Do not examine the child unless you are able to intubate. If the child cries, then airway can become obstructed.

DIAGNOSIS AND TREATMENT

Clinical

See Figure 24.2

Figure 24.3 Approach to common differential diagnosis of acute stridor in children^{*new}

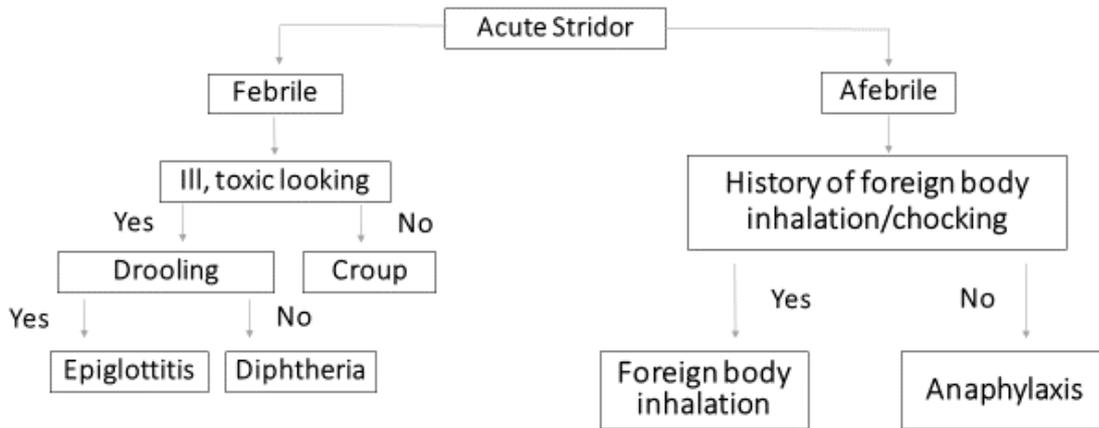


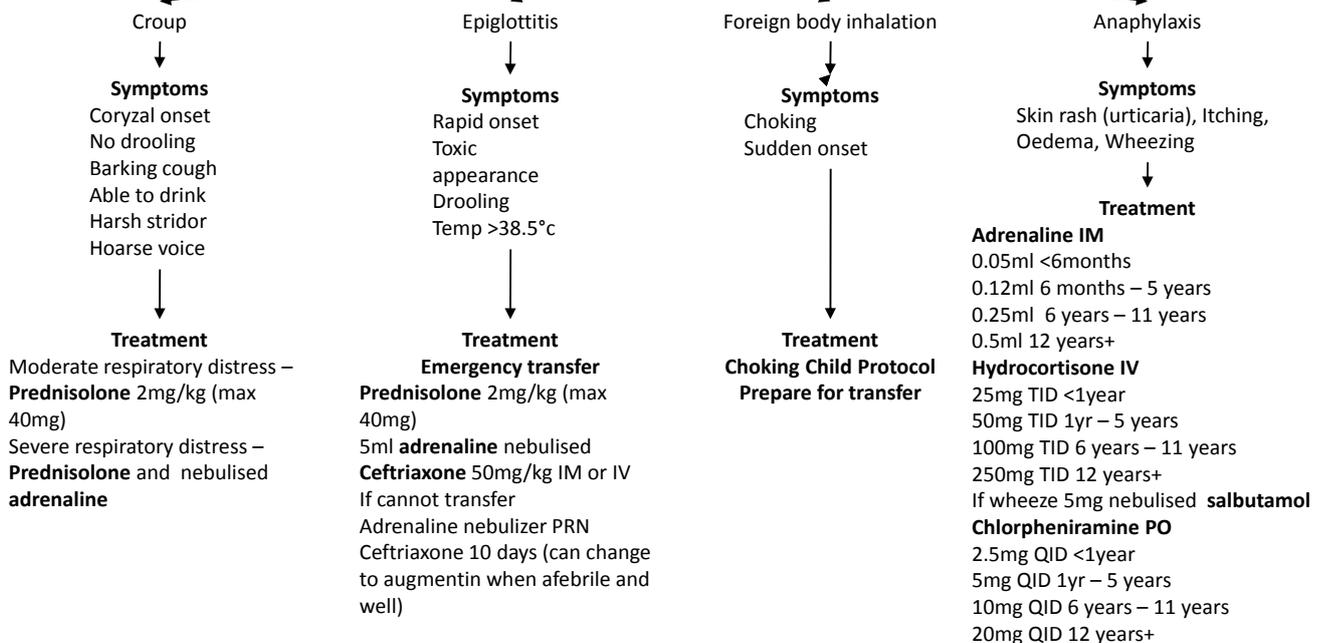
Figure 24.4 Management and treatment of stridor in children^{*new}

Stridor Treatment Protocol

Stridor

Definition: harsh breathing noise produced by obstruction to breathing in the larynx or trachea, mainly on breathing in (inspiration). It is one of the features of upper airway obstruction with hoarseness and barking cough

**Leave the child in a comfortable position
DO NOT distress the child**



PERTUSSIS

DEFINITION

Pertussis is also known as whooping cough, is a highly contagious disease that is caused by the bacterium *Bordetella pertussis*. It is transmitted through inhalation of droplets spread by infected individuals e.g. coughing, sneezing. Pneumonia can be a complication.

SYMPTOMS

- Most cases are in non-vaccinated or incompletely vaccinated individuals.
- Initially mild ARI symptoms.
- After one to two weeks coughing is followed by an inspiratory 'whooping' sound mostly at night, and vomiting.
- Fever is often absent or not too high, and the clinical exam may be normal between episodes of coughing.
- After weeks or months the symptoms gradually resolve.

TREATMENT

- Admit infants less than 3 months (observe 24 hours because risk of apnoea)
- Admit severe cases
- Try to isolate patients (airborne isolation) until the patient has received 5 days of antibiotic treatment.
- Hydration and nutrition: Ensure children are well hydrated, breastfeeding should continue, feed the child frequently in small quantities after coughing episode, monitor the weight and consider food supplements.
- Antibiotics: give in first 3 weeks after onset of cough

First line:	Azithromycin PO	Adult: D1 500mg STAT, D2-D5 250mg OD Child: 10mg/kg OD (max 500mg) x 5 days
Second line:	Erythromycin PO	Adult: 500mg QID x 7 days Child: dose as for tonsillitis x 7days, see p.229.

PREVENTION

- Isolate patients in IPD and OPD so they cannot spread the infection to others.
- Pertussis vaccine can prevent severe disease in young children.
- Antibiotic prophylaxis (**azithromycin** same dose as treatment for 5 days) for unvaccinated/ incompletely vaccinated infants <6m who have had contact with suspected case. **Isolation of contacts is not necessary.**

INFLUENZA

DEFINITION

Influenza is a viral infection that can be very contagious. Often there is close contact with someone who has similar symptoms. Different strains of influenza occur such as the avian influenza (H5N1). Common influenza is self-resolving, but some dangerous strains can become pandemics (epidemic that spreads across countries) and have high morbidity and mortality.

SIGNS AND SYMPTOMS

Fever, muscle pain, headache.	Diarrhoea.
Respiratory symptoms (cough, sore throat and runny nose).	Shortness of breath (dyspnoea). Clinical pneumonia.

DIAGNOSIS

Clinical diagnosis initially, NPA result can help confirm.

TREATMENT

- **Paracetamol** for fever and pain
- Antibiotics not required
- Encourage sufficient oral hydration

PREVENTION

- **Infection prevention:** the patient should wear a mask and should cover his/her mouth with a cloth while coughing or sneezing and wash their hands afterwards.
- Hand hygiene
- Isolate patients in IPD and OPD so they cannot spread the infection to others.

24.2.2. LOWER RESPIRATORY TRACT INFECTIONS*UPDATE

BRONCHIOLITIS*update

DEFINITION

A viral infection of the tiny airways, called the bronchioles, especially in children less than 2 years of age.

SIGNS AND SYMPTOMS

- Fever (usually low grade)
- Increased RR or difficult breathing
- Cough and coryza
- Prolonged expiration phase, wheeze and/or crepitation throughout the lungs (not focal)

DIAGNOSIS

Diagnosis is usually clinical.

Chest X-ray: peri bronchial thickening, hyperinflation or flat diaphragms.

WBC and CRP will usually be normal (can help differentiate bronchiolitis from bronchopneumonia).

TREATMENT

1. Salbutamol or adrenaline inhalation or nebulizer. Use the treatment that the patient responds better to.
2. No antibiotics unless the clinical condition becomes worse or investigations are abnormal.
3. If the patient is on oxygen and difficult to wean or if there have been many episodes of bronchiolitis, you can try using prednisolone 1 mg/kg/day for 3-5 days.
4. See Figure 24.3

PREVENTION

Counsel the family to keep the child away from smoke (e.g. cigarettes, cheroot, cooking fire or when burning the fields for farming)

Figure 24.5 Management of bronchiolitis in children < 1 year*new

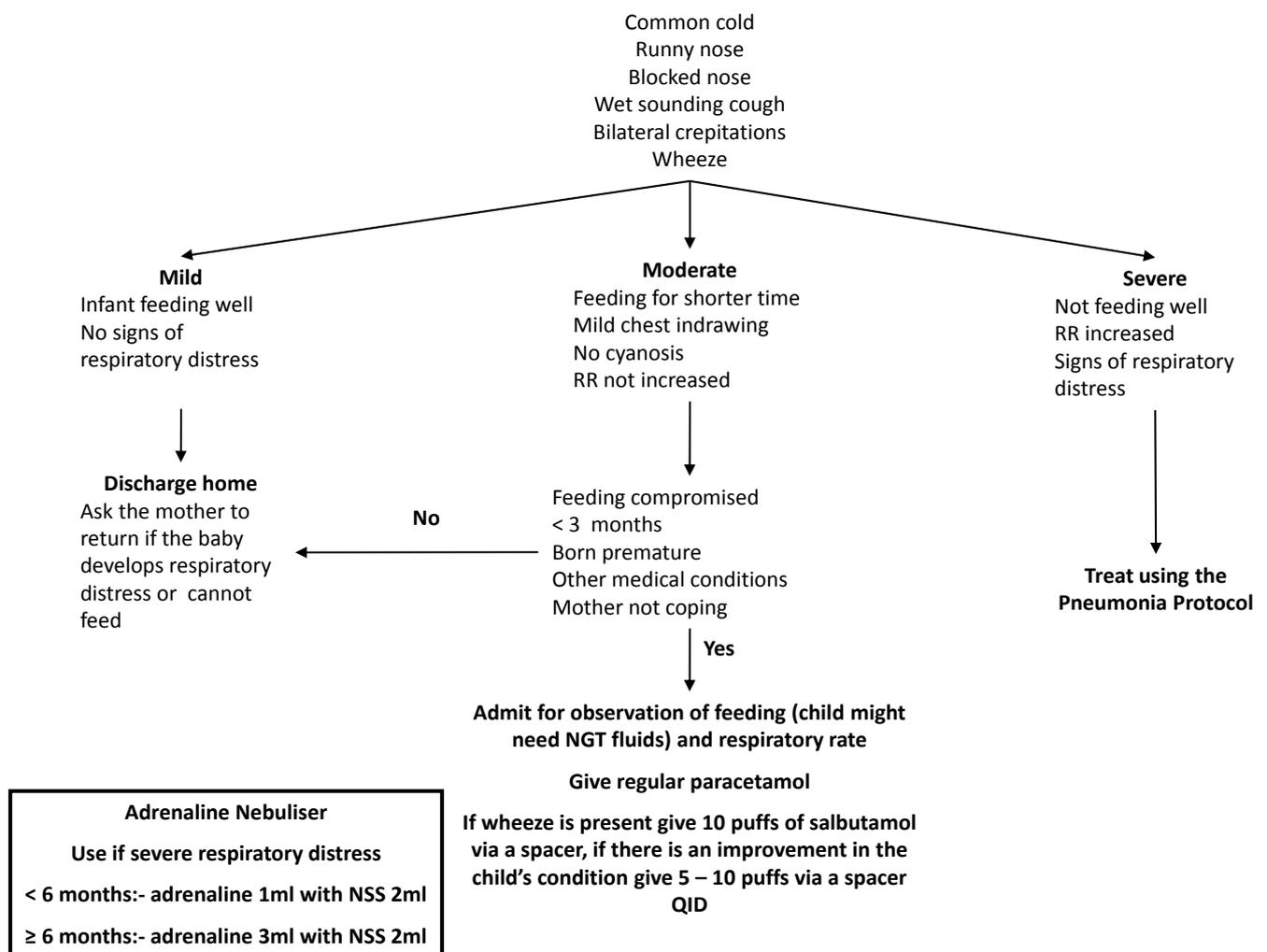
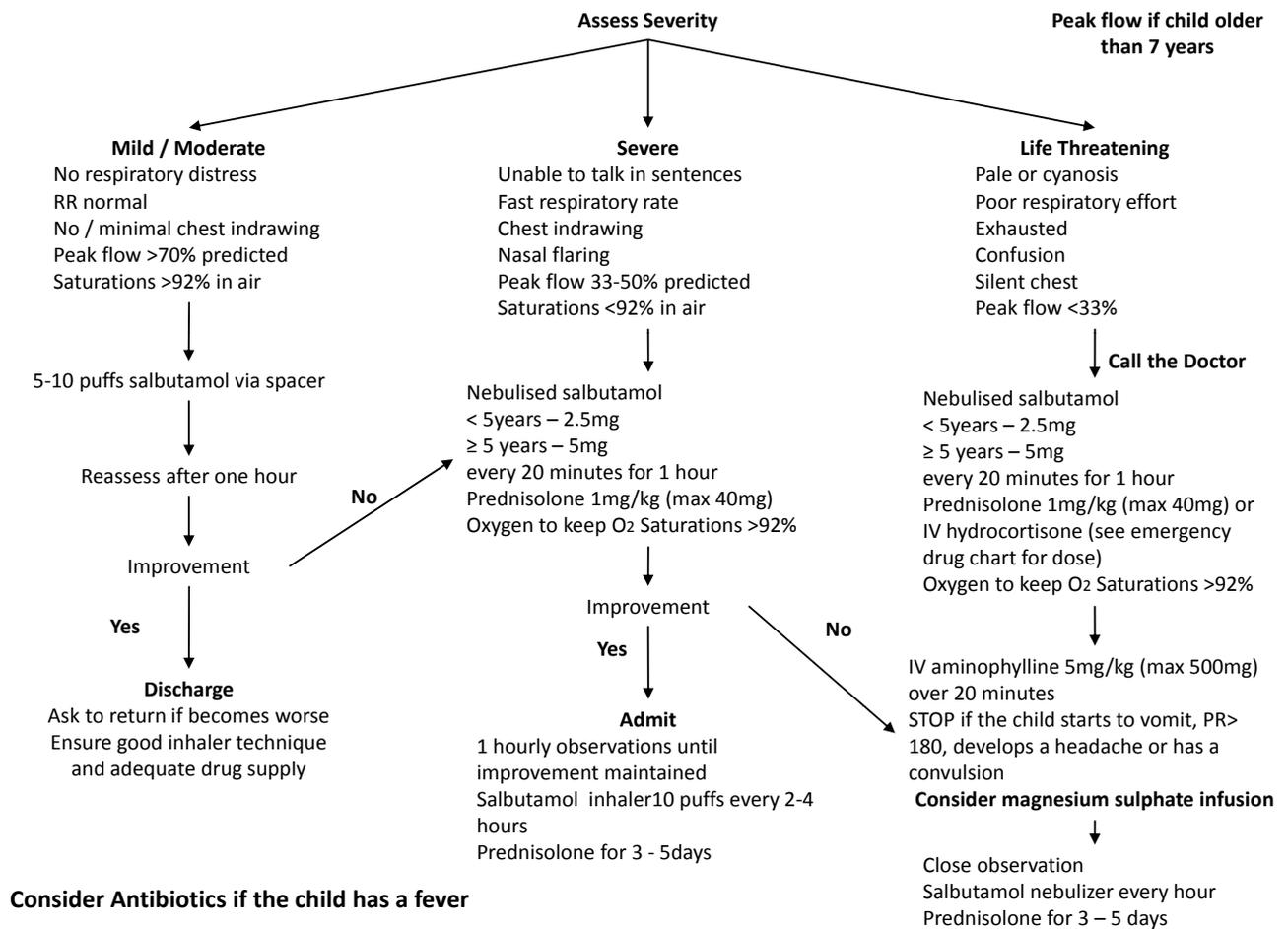


Figure 24.6 Management of wheeze in children ≥ 1 year^{*new}



PNEUMONIA^{*update}

DEFINITION

Pneumonia is an infection affecting the lungs and smaller airways. These can be viral, bacterial, parasitic or fungal infections. For children, see *Paediatric pneumonia protocol*, Figure 24.7 below.

SIGNS AND SYMPTOMS

SYMPTOMS:

- Cough, sputum: yellow or green (may have blood)
- Dyspnoea, fast breathing
- Chest pain (with cough and deep breaths)

SIGNS:

- Inspection: cyanosis, nasal flaring, chest indrawing, superficial or asymmetric breathing
- Percussion: dullness
- Auscultation: abnormal breath sounds

In addition, patients with pneumonia may have general signs and symptoms of infection:

- Fever, rigors
- Generally unwell, tired
- Tachycardia
- Dehydration, low blood pressure

Signs of severity in adults	
Rapid breathing	(RR >30/min)
Cyanosis	(blue colour of lips or nails, CRT > 2 seconds)
Reduced consciousness or confusion	Especially in elderly
Low blood pressure	(SBP <90mmHg or DBP <60mmHg)
High pulse rate	(>120 beats/minute)
Low SpO ₂	(<94%)
Chest indrawing or nasal flaring	

DIAGNOSIS

To diagnose an adult with pneumonia they must have:

1. Fever **AND**
2. Cough **AND**
3. Abnormal chest sounds

Chest X-ray can confirm a pneumonia if diagnosis is not clear e.g. not responded to antibiotics

Note: Think about Beriberi if there is sudden fast breathing **and no or low-grade fever**. After birth, beri beri most commonly presents at 4 months old.

RISK FACTORS FOR ADULTS

Aged 65 years or more.

Patient with malnutrition or severe anaemia.

Patient with heart failure.

Patient with measles.

Patient with splenectomy or sickle cell disease

Immunocompromised e.g. HIV with CD4 <200

If a young adult patient has **one or more signs OF SEVERITY** treat as **SEVERE** pneumonia.
If from the '**patient at risk group**' treat case by case – likely need to treat as severe pneumonia

TREATMENT

Treatment is different depending on:

1. The presence of signs of severe illness (see above)
2. If the patient is from the 'at risk group'

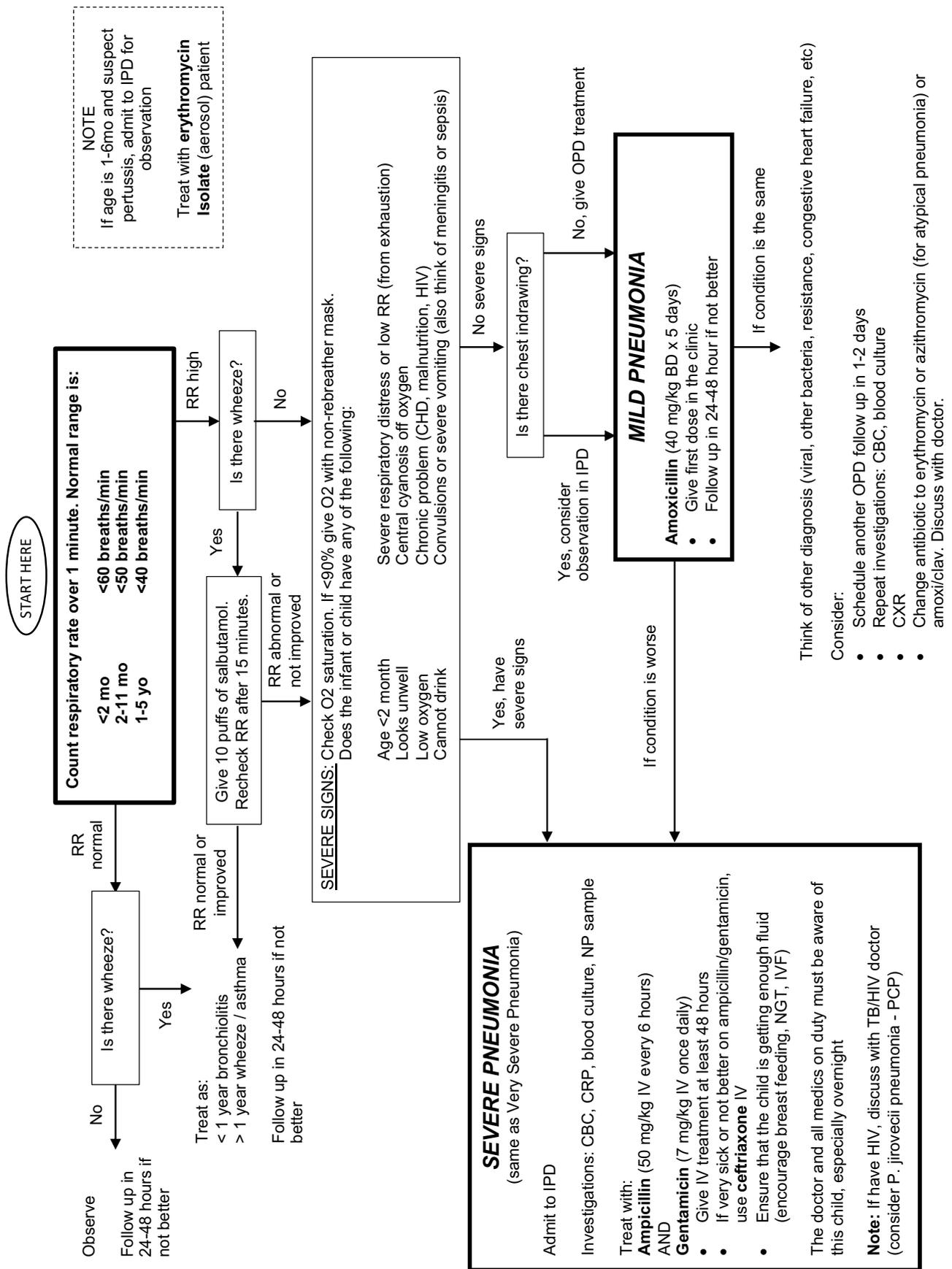
MILD PNEUMONIA = no signs of severe pneumonia

- Adults: **Amoxicillin** PO Adult: 500mg TID x 5-7 days
- Child: **Amoxicillin** 40mg/kg BID x 5 days (*see Paediatric pneumonia protocol, Figure 24.7 below*)
- **Paracetamol** for fever, increase oral fluid intake
- **Follow-up** in 24 to 48 hours or sooner if the child's condition deteriorates:
 - If the condition is improving continue with the same antibiotic to complete treatment.
 - If there is no improvement after 3 days of correct administration: change antibiotic to erythromycin or azithromycin (for atypical pneumonia) or co-amoxicillin/clavulanate.
 - If the condition is worse: hospitalise and treat as severe pneumonia.

SEVERE PNEUMONIA = signs of severe pneumonia

- Adults: continue to the POST EMERGENCY TREATMENT section below for IV antibiotics
 - If have risk factors, discuss with doctor.
 - You can try oral antibiotics first but observe closely.
- Children: **Ampicillin** IV 50mg/kg QID and **Gentamicin** IV 7mg/kg daily until no fever x 48 hours; change to **Amoxicillin** 40mg/kg BID to total 7 days of antibiotics (*see Paediatric pneumonia protocol, Figure 24.7 below*)

Figure 24.7 Management of pneumonia in infants and children >2mo - <5yr^{*new}



EMERGENCY TREATMENT

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment should be done. You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step**

Figure 24.8 DRS ABCDE for pneumonia

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR SEVERE PNEUMONIA
DRS	Danger Response Send for help	Gloves Safe place Dall for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Oxygen (maintain SpO ₂ >94%)
B	RR, SpO ₂ , cyanosis Chest indrawing/ tracheal tug Listen to chest	Nebulisers if have wheeze If dyspnoea sit up right
C	HR, BP, Cap refill Urine output, Temp Listen to HS	Put in IV cannula – take bloods e.g. Hct, CBC, MS, BC, dextrose etc. If signs of shock give fluid bolus NSS 500ml
D	Check dextrose Any drugs needed e.g. antibiotics, paracetamol	Ampicillin IV Adult: 1g; Child 50mg/kg +/- additional antibiotic (see below) Consider ceftriaxone IV if condition is severe. Paracetamol 1g Give dextrose if low
E	AVPU/GCS Expose and examine all over body	Review notes and charts History, further investigations, treatment plan
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

POST-EMERGENCY TREATMENT

Admit to IPD, treat the fever, keep the patient in a sitting position.

Give maintenance IV fluids if patient cannot eat or drink

Give oxygen if required – keep O₂ saturations above 94%, wean oxygen when improved, see Appendix 19

Give vitamin A treatment dose to all children < 12 years.

Antibiotics for adults: (If pregnant refer to Obstetric Guideline)

- **Ampicillin** IV 1g TID
- You may need to give **Additional Antibiotic Treatment** (see below)
- If have risk factors, consider using **Ceftriaxone** IV 1g OD
- Switch to PO **amoxicillin** Adult 500mg TID when condition improves (total 7 days of antibiotics)

Antibiotics for children (see Paediatric pneumonia protocol Figure 24.7 above):

Ampicillin IV 15mg/kg QID

AND

- **Gentamicin** IV 7mg/kg OD
- Use IV treatment at least 48 hours. When no fever for 48 hours change to **amoxicillin** 15mg/kg TID to finish total 7 days of antibiotics.
- Check temperature, pulse rate and respiratory rate regularly to see if the patient is getting better or worse.

Antibiotics for immunocompromised patients: (If pregnant see PMTCT guidelines, Appendix 20)

Additional Antibiotic/Treatment:

This may be required if:

- a) **The patient is very unwell**
- b) **There is a poor response to ampicillin/ amoxicillin**
- c) **There are recurrent episodes of pneumonia**

Discuss with the doctor to see if any additional antibiotics/treatments are required:

1. **Atypical Pneumonia:** pneumonia caused by bacteria e.g. *Legionella*, *Mycoplasma*, will not respond to routine antibiotics. Patients should be treated with **doxycycline, erythromycin, or azithromycin**. Consider adding ciprofloxacin also.
2. **Staph Aureus Pneumonia:** particularly if skin infection, patient looks very unwell, CXR shows necrotizing lesions. Treat with IV **cloxacillin**.

3. **Tuberculosis:** If there has been good compliance of amoxicillin and an antibiotic to cover an atypical pneumonia, suspect TB (symptoms include coughing for more than 2-3 weeks, weight loss, coughing with blood and/or night sweats) **Do NOT use ciprofloxacin if suspect TB.**
4. **Aspiration pneumonia:** Patients with decreased consciousness, or those that have problems swallowing e.g. after a stroke, have high risk of aspiration pneumonia (inhaling acid or vomit from the stomach). To prevent keep comatose patients in the coma position (see p. 19). If suspect an aspiration pneumonia e.g. a comatose patient develops signs of ARI **treat as per pneumonia + metronidazole.**
5. **Fungal pneumonia:** is uncommon, but it may occur in patients with immune system problems due to AIDS, immunosuppressive drugs, or other medical problems. See HIV chapter.
6. **Eosinophilic pneumonia:** is invasion of the lung by eosinophils, a particular kind of white blood cell. Eosinophilic pneumonia often occurs in response to infection with a parasite (e.g. paragonimus, intestinal worms, lymphatic filariasis or as inflammatory or allergic reactions (including asthma). Treat the underlying cause.

PREVENTION AND VACCINATION

For patients without a spleen, **amoxicillin** should be given at the first sign of ARI. These patients should also receive pneumococcal vaccination. **Co-trimoxazole** should be given to individuals with HIV with low CD4 count.

PARAGONIMUS

DEFINITION

Paragonimus is a 'flake' (short flat worm) that mainly affects the lungs. It is caused by eating infected, undercooked, fresh water crabs and crayfish.

SYMPTOMS

2 most common symptoms are:

Productive cough >2 weeks
Intermittent haemoptysis (rusty-brown colour)

Signs and symptoms are very like pulmonary TB and include:

- Cough with sputum
- Fever
- Blood (rust coloured) in sputum
- Haemoptysis
- Chest pain
- Pleural effusion

DIAGNOSIS

Definitive diagnosis is by finding eggs on microscopy of unstained sputum (you can also find eggs in the stools, if the patient coughs up and swallows the eggs).

TREATMENT

Treat children >2yrs and adults with: **praziquantel PO 25mg/kg TID for 3 days.** Praziquantel can be given in 2nd and 3rd trimester of pregnancy.

24.3 CHRONIC RESPIRATORY DISEASES

There are many chronic diseases affecting the lungs. It is important to try and diagnose which one the patient has as the treatment is different. An x-ray (if available) may be helpful.

24.3.1. GENERAL MANAGEMENT AND TREATMENT

TREATMENT

Aims of Treatment of Chronic Lung Disease:

- | | |
|--|---|
| Slow the progress of the disease | Prevent complications |
| Relieve symptoms | Educate the patient to understand the disease |
| Improve capacity for exercise | Psychosocial support |
| Give patient the best quality of life that is possible | Reduce number of clinic attendances |
| Prevent exacerbations | |

Some treatment is the same for all chronic lung disease:

Educate the patient on the disease:

- Unfortunately (except for asthma) these are diseases that are not reversible, so it is likely that their symptoms will become worse
- 1. **STOP SMOKING**, if family smoke advise them to smoke away from the patient e.g. outside
- 2. **Treat bacterial infections** quickly – educate the patient on the signs of pneumonia and when to go to clinic. Advise them that if they have a change in the amount of dyspnoea, colour of sputum they must come to OPD.
- 3. Consider **prophylactic antibiotics** for those with repeated infections
- 4. **Pulmonary rehabilitation:**
 - Breathing exercises to increase respiratory muscle strength.
 - Gentle exercise to stay healthy.

Monitor the patient's response to treatment:

- | | |
|--|--|
| • Breathing is better or worse | Can do the same things now but faster |
| • Any other signs and symptoms are better or worse | Can do the same things but are not so breathless |
| • Can do more things than before the treatment | Can sleep better |

COMPLICATIONS of Chronic Lung disease:

- | | |
|----------------------------------|--|
| • Recurrent chest infection | • Secondary polycythaemia (raised haematocrit) |
| • Poor nutrition and weight loss | • Oedema due to heart failure and hypoxia of the kidney. |
| • Heart failure | |

MANAGEMENT - INHALER TECHNIQUE

- When using inhalers it is very important to do it properly to make sure that the medication gets down to the lungs. Always use a spacer device to help as using an inhaler alone is very difficult.
- To make a spacer device: use a 500ml plastic bottle (Fanta, Coca Cola, Sprite etc.) Make a hole in the bottom of the bottle to fit the mouth piece of the inhaler (the seal should be as tight as possible).

How to use an inhaler with a spacer:

1. Remove cap and **shake inhaler**.
2. Place mouthpiece of inhaler into hole in the bottom of the spacer – try to get as tight a seal as possible.
3. **Breathe out** completely.
4. **Put mouthpiece of spacer/bottle in mouth** and make a tight seal using the lips
5. As you begin to breathe in slowly and deeply, **press canister down and continue to inhale steadily and deeply**.
6. Continue **5-10 breaths**
7. **Remove** device from mouth
8. If giving 2 puffs wait about 30 seconds before **repeating process again**.
9. **Wash** the spacer with soap and water, leave to dry naturally, do not use a towel.

Figure 24.9 Spacer device



It is important to rinse mouth out with water (spit water out, do not swallow) after using inhaled steroids to prevent oral candida

MANAGEMENT - PEAK FLOW METERS

A **peak flow meter** is a cheap and simple device and should be available in all clinics.

It can be used for asthma and COPD to:

1. Assess how bad the lung damage is – compare to the patient's peak flow result to the normal expected values for height and age
2. Assess if there is any reversibility in the lung diseases e.g. in asthma (check peak flow before and after giving salbutamol treatment – if the peak flow improves diagnosis of asthma is likely)
3. Response to treatment (check peak flow before starting treatment and at follow up. Use this to help you decide on changing treatment)

Record peak flow measurements at each consultation.

Note: do not expect a child of less than 5-7 years to be able to perform a peak flow.

How to use a peak flow meter:

1. Move the marker to the bottom of the numbered scale.
2. Stand up straight.
3. Take a deep breath in.
4. Hold your breath while you place the mouthpiece in your mouth, between your teeth and make a tight seal.
5. Keep the peak flow horizontal.
6. Blow out as hard and fast as you can in a single blow.
7. Repeat three times and write down the highest number the patient reaches.

Figure 24.10 Peak flow meter



A Peak Flow Chart (see *Appendix 19*) gives normal measurements for patients according to their height and age.

24.3.2. CHRONIC OBSTRUCTIVE PULMONARY DISEASE

DEFINITION

Chronic Obstructive Pulmonary Disease (chronic obstructive pulmonary disease (COPD) is a form of chronic lung disease that causes the narrowing of the airways so ventilation is poor. Smoking is the primary cause of COPD. This term covers many respiratory conditions:

- Chronic bronchitis: inflammation of the bronchi.
- Emphysema: damage to the smaller airways and alveoli.
- Chronic obstructive airways disease: sometimes caused by allergy and environmental factors.

COPD patients often have lower oxygen saturations.

Patients with COPD have lower oxygen levels than normal people. If you give them too much oxygen (e.g. when they are acutely unwell) the brain tells their body to breathe less which makes them worse. Keep O₂ saturations 88-92% and not to give more than 5L.

SIGNS AND SYMPTOMS

The signs and symptoms of COPD are similar to asthma, but in **COPD the damage is permanent, and the symptoms are persistent.**

SYMPTOMS

- Cough with sputum gradually getting worse. (**Remember:** TB is also a cause for chronic cough)
- Breathlessness and wheezing on exertion, gradually getting worse. These symptoms will eventually occur even when the patient is at rest.
- Sputum, because the damaged airways create a lot of mucus.

SIGNS:

- Fast RR
- Accessory muscle working on expiration
- Hyperventilation
- Reduced chest expansion
- Resonant or hyper resonant percussion note
- Quiet breath sounds
- Wheeze
- Cyanosis
- Signs of heart failure (because of the back pressure on the heart from the lung disease)
- Low SpO₂

The patient may always have a fast RR/ wheeze/ cyanosis/ low SpO₂ but it is important to know when the patient comes in to the clinic if the symptoms are **worse or different to normal** e.g. sputum colour normally white but now green, or normally dyspnoea when walking but now dyspnoea at rest. If the patient is having an **acute attack** they need **emergency ABCDE treatment**

DIAGNOSIS

Clinical, a chest X-ray may show hyper-expansion of the lungs +/- bullae. Do not forget to **rule out TB.**

EMERGENCY (ACUTE) TREATMENT

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment should be done (see p.13). You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step**

Figure 24.11 DRS ABCDE for acute COPD attack

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR COPD ATTACK
DRS	Danger Response Send for help	Gloves Safe place Call for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Oxygen maintain saturations 88-92% Note: too much oxygen can be dangerous in these patients. Give no more than 5L.
B	RR, SpO ₂ , cyanosis Chest indrawing/ tracheal tug Listen to chest	Salbutamol Inhaler 10 puffs <u>OR</u> If low SpO₂/cyanosis/cannot speak: Salbutamol Nebuliser 5mg STAT Sit upright, observe HR for tachycardia
C	HR, BP, Cap refill Urine output, Temp Listen to HS	Put in IV cannula – take bloods e.g. Hct, CBC, MS, BC, dextrose etc. If signs of shock give fluid bolus NSS 500ml
D	Check dextrose Any drugs needed e.g. antibiotics, paracetamol	Antibiotic: * Ampicillin IV 1g <u>OR</u> Amoxicillin PO 500mg (see below) (give IM ampicillin if cannot put in cannula) Steroid: * Prednisolone PO 40mg for 5 days (may need longer course) <u>OR</u> Hydrocortisone IV 100mg if unable to take PO Note: IV aminophylline is not recommended for COPD attack Give dextrose if low
E	AVPU/GCS Expose and examine all over body	Review notes and charts History, further investigations, treatment plan
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

*Antibiotics for COPD Acute Attack:

Most acute attacks of COPD should be given antibiotics. (Only mild acute exacerbations may improve with inhaled salbutamol and not require antibiotics). **Note:** This is different to asthma when antibiotics should only be given if there is evidence of infection e.g. temperature, productive cough etc.

POST EMERGENCY (CHRONIC) TREATMENT

In COPD the changes to the lung are permanent (lung tissue will not get better), and there is little treatment available for chronic COPD at SMRU. Decide with the doctor the goal SpO₂ and wean oxygen as soon as possible, see *Appendix 19*.

1. Assess for discharge

- a) Before discharge from the hospital, check the patient on the following criteria:
 - Inhaled Salbutamol < 4 hourly
 - Can walk across the room without difficulty breathing
 - Can eat and sleep without frequent stopping from to breathing difficulty
 - Clinically stable for 12-24 hr
 - Patient and caregiver can understand correct medication use

2. Post discharge

- a. Complete 7 days of antibiotics.
- b. Complete 5 days of 40mg prednisolone.

3. Lifestyle and general advice

- Stop smoking and advise family members to not smoke around the patient.
- Exercise as much as possible, as much as their breathing allows.
- Breathing exercises.
- Advise the patient if their breathing or cough changes to seek medical attention quickly.

4. Medication

- Inhaled **salbutamol** 2 puffs PRN (max QID) when having dyspnoea
- **Note:** unlike asthma, oral or inhaled steroids are not recommended for chronic treatment of COPD.
- Only slow-release low dose **theophylline** is recommended (dose depends on the brand of tablet (see specific manufacturer instructions).
- Mucolytic, e.g. **bromhexine** can be considered but may not be available. These help break down the mucous to make it easier to cough it up.

COMPLICATIONS

- Recurrent chest infection
- Reduced exercise tolerance
- Poor nutrition and weight loss
- Heart failure
- Raised haematocrit (polycythaemia)
- Respiratory failure
- Pneumothorax
- Lung cancer (secondary to smoking)

24.3.3. BRONCHIECTASIS

DEFINITION

Bronchiectasis is a chronic disease of the bronchial tubes. The bronchial tubes become widened so mucous stays in the bronchial tubes, resulting in recurrent infections. These infections lead to blockage of the tubes. The blockage causes the alveoli to collapse.

SIGNS AND SYMPTOMS

- Cough with a lot of sputum every day
- Haemoptysis
- Wheezing
- Chronic sinusitis
- Many loud crepitation in inspiration and expiration.

DIAGNOSIS

Clinical, CXR may be helpful, but a CT scan is needed to confirm diagnosis which is not available in the clinics.

TREATMENT

There is no specific treatment for bronchiectasis. The patient may get recurrent infections so you need to educate them on the symptoms and when they should come in to the clinic to get antibiotics. Larger doses and longer courses are required. They may need prophylactic antibiotics to stop those getting recurrent infections.

Physiotherapy: Deep breathing followed by forced expiration (the 'active cycle of breathing' technique) helps to make secretions move from dilated bronchi to the trachea, then can cough secretions out.

24.3.4. INTERSTITIAL LUNG DISEASE

DEFINITION

Interstitial lung disease is a disease of the soft tissue of the lung that causes damage to the walls of the alveoli. The alveolar walls become thick, so gas exchange is poor. Small blood vessels in the lung can also be affected, so blood supply to the lungs is poor. In most cases the lungs will gradually get worse, and breathing will become more difficult for the patient.

CAUSES

- No cause (idiopathic fibrosis)
- Exposure to substances like silicon
- Some medications e.g. nitrofurantoin, methotrexate, amiodarone
- Chronic diseases e.g. rheumatoid arthritis

SIGNS AND SYMPTOMS

- In the early stages, no signs and symptoms
- Dry cough
- Difficulty breathing start slowly then later becomes more and more severe
- Cyanosis
- Fast respiratory rate at rest
- Raised jugular venous pressure
- Clubbing (enlarged fingertips and a loss of the normal angle at the nail bed)
- Reduced expansion of the lung
- Fine inspiratory crepitation on both lungs

DIAGNOSIS

This is a clinical diagnosis.

CXR can be very helpful if available, it may show reticulo-nodular shadowing in the parts of the lung affected.

TREATMENT

Some interstitial lung disease may respond to steroids. It is important to deworm before giving steroids, and to warn the patient that there are side effects of steroids. Try to manage the patient's symptoms with the lowest dose of steroids. Oxygen may help breathlessness.

24.3.5. ASTHMA*UPDATE

DEFINITION

Asthma is a chronic inflammation problem of the airways with acute reversible airflow obstruction. This means airflow on expiration is blocked but can open again if control triggers and give medications. Acute asthma attacks can be triggered by different things in different people (ie. allergies, viral infection, smoke). Asthma is most common in children and young adults.

Triggers: asthma attacks can be triggered by:

1. **Allergens** e.g. pollen, animal fur – often have a history of other allergies and eczema
2. **Infections**
3. **Air particles** (e.g. cigarette smoke, cooking fires, burning fields).
4. **Drugs** e.g. aspirin, NSAIDs, beta blockers, diazepam, codeine
5. Other: acid reflux, cold air, exercise, emotion, stress (e.g. maybe worse in holidays vs work/school)

.....
Asthma can kill people and cause failure to grow in children.
.....

SIGNS AND SYMPTOMS

- Coughing (either during day or at night, but often worse at night and with exercise and activity)
- Shortness of breath
- Wheezing when breathing out/expiration (**persistent or frequent episodes without no other causes**)
- Chest feels tight
- Symptoms occur or get worse if there are **triggers** (see above).
- **For chronic asthma, PEF <80% of personal best peak flow result**

DIAGNOSIS

1. **History** – What symptoms? Worse at any time of year/time of day e.g. cough at night? Any history of eczema/allergies? Previous wheezing episodes – hospital admissions, emergency visits, ICU admissions? Current medication? Any family members have eczema/allergies/asthma?
2. **Examination** - in patients with chronic asthma, the lungs may be normal between exacerbations
3. **Peak flow** – peak flow variability (See Figure 24.12 below) for diagnosis and OD/BID checks to monitor chronic asthma. The OD/BID result is compared to the patient's personal best value (highest result they ever had). Normal: 80-100%, moderate attack: 50-80%, and severe attack <50% of the personal best value.
4. **Improvement of symptoms/peak flow with treatment** e.g. salbutamol inhaler

Note: Children <5 years might have recurrent wheezing, but not asthma. In children ≥5 years old, asthma should be suspected if cough is >3weeks, occurs at night, comes during specific season, or triggered by specific exposure (cold air, exercise, laughing, crying, or allergies).

Note: If the patient has fever, haemoptysis (coughing up blood) or green sputum then asthma cannot be the ONLY diagnosis, consider infection/TB. Asthma is commonly mistaken for a cold or chest infection which is taking time to resolve (e.g. longer than 10 days).

Often it is difficult to diagnose if a patient has asthma. Use the following as a guide to help you make the correct diagnosis:

Diagnosis of asthma is MORE likely if:	Diagnosis of asthma is LESS likely if:
<ul style="list-style-type: none">• Above symptoms occur worse at night or in early morning, or after exercise or triggers (see above)• Symptoms worse after taking aspirin, NSAIDs or beta blockers• Personal history of other allergy or eczema• Family history of other allergy or eczema• Widespread wheeze on auscultation• Improvement in symptoms or peak flow with adequate treatment.• Eosinophilia with no other cause	<ul style="list-style-type: none">• Symptoms with colds only• Isolated cough with no wheeze or shortness of breath• History of wet/productive cough• Dizziness, light headedness, peripheral tingling (suggests hyperventilating from anxiety)• Repeatedly normal examination of chest when patient feels has symptoms• Normal PEF when has symptoms• No response to treatment• Clinical features of other diagnosis e.g. significant smoking, heart disease.

Peak flow meter can be used to help diagnosis and treatment response. In patients with asthma the PEF can change a lot because of airway inflammation. In addition to personal best PEF, you can check peak flow after waking up in the morning and before bed (do both at the same time every day). If the PEF from morning and night is more than 20% different, the diagnosis is asthma or worsening of chronic asthma.

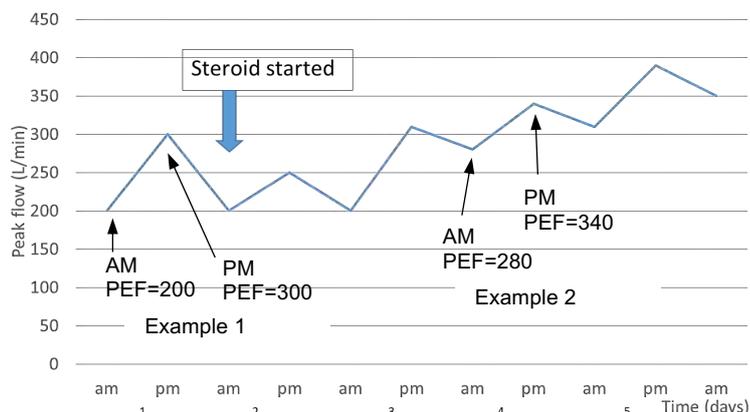


Figure 24.12 Peak expiratory flow (PEF) record in a patient with asthma ^{*new}

Normally, the morning PEF is lower than evening before bed. Example 1: morning PEF is 200 and evening PEF is 300.

$$\% \text{ change} = \frac{300-200}{300} = 33\%$$

33% different is not normal (because more than 20% different). Diagnosis is asthma or exacerbation asthma. After starting corticosteroids, the PEF improves. Example 2: morning PEF is 280 and evening PEF is 340.

$$\% \text{ change} = \frac{340-280}{340} = 18\%$$

18% different is normal. What is the % difference on day 5?

ACUTE ASTHMA ATTACK

DEFINITION

An acute asthma attack is a **sudden deterioration in the asthma symptoms**. Acute asthma attacks can cause death, so it is important to check these patients carefully and give quick treatment.

EMERGENCY ACUTE TREATMENT FOR ASTHMA ATTACK

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment (see p.13) should be done. You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step**

Figure 24.13 DR ABCDE for acute asthma attack

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR ASTHMA ATTACK
DRS	Danger Response Send for help	Gloves Safe place Call for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Give 10-15L oxygen if saturations low – aim SpO ₂ >94%. Note: if not able to measure saturations then just give oxygen
B	Assess severity of breathing problems Are they breathless at rest? What is the RR? What are the oxygen saturations? Able to speak – words? Full sentences? Listen to the chest – any wheeze? Silent chest? Any chest indrawing?	Salbutamol nebuliser Adult/>5yr: 5mg STAT; Child <5yr: 2.5mg STAT OR Salbutamol inhaler 10 puffs STAT (depends on severity – see below) Sit upright, observe HR for tachycardia
C	HR, BP, Cap refill Urine output, Temp Listen to HS	Put in IV cannula – take bloods e.g. Hct, CBC, dextrose etc. If signs of shock give fluid bolus NSS 500ml
D	Check dextrose Any drugs needed e.g. antibiotics, paracetamol	Steroid: Prednisolone PO (continue for 7 days) Adult: 40mg; Child: 1mg/kg (max 30mg) OR Hydrocortisone (if cannot to take PO) Adult: IV 100mg; Child: 4mg/kg Antibiotic: Ampicillin IV OR Amoxicillin PO ONLY IF SIGNS OF INFECTION e.g. fever, productive cough
E	AVPU/GCS Expose and examine all over body	If severe and not improving, discuss with doctor and consider, IV magnesium or IM adrenaline (see dose chart 24.15) Give dextrose if low Review notes and charts History, further investigations, treatment plan
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

TREATMENT

1. Use **DRS-ABCDE/S** to manage emergency cases.
2. Decide the **severity** of the attack (see *Figure 24.14 below*):
 - The treatment is different for the severity.
 - Vital signs and measure: PR, RR, O₂ saturation, Peak flow value
 - Degree of difficulty breathing
 - How many words the person can say in one breath
 - Presence or absence of wheeze
 - Presence or absence of chest indrawing

Remember that people with asthma can also have other illnesses such as bronchitis, TB, heart failure, worms. In a patient with asthma be careful: **look for and treat other illnesses at the same time** as the acute attack.

3. Treatment of ACUTE asthma has three parts (all are important):
 - Supportive: **Oxygen**
 - Short term: **Salbutamol**
 - Treatment of inflammation: Steroids (**prednisolone or hydrocortisone**)

Antibiotics for Asthma Acute Attack:

Most acute attacks of asthma should NOT be given antibiotics. Only give antibiotics if there is evidence of infection e.g. fever, productive cough etc.

Note: this is different to COPD where most cases should be given antibiotics

Decide the severity and treat acute asthma

All symptoms and signs may not be present. The presence of **ANY ONE** feature makes the higher severity likely e.g. if the patient is alert but they have a silent chest on auscultation then treat as a life-threatening attack.

- Review the patient's conditions every 15-20 minutes to adjust the treatment.
- See *Figure 24.14 next page*

Figure 24.14 Assessment for the severity of the asthma attack

	MODERATE ATTACK	SEVERE ATTACK	LIFE THREATENING ATTACK
Difficulty breathing	When walking	On lying down	Always
Speaking	Normal or saying a few words	Single words (child cannot feed)	Cannot speak (child cannot feed)
Consciousness	Alert but may be anxious	Agitated or very silent and not moving	Sleepy or confused
Wheezing	At the end of breathing out	Loud	Not heard, silent chest
Accessory muscles (in drawing)	No or minimal	Usually	Unusual movement
Respiratory rate / minute (see p.16)	Increased	Increased	Increased or decreased
Pulse rate / Minute (see p.16)	Increased	Increased	Increased or decreased
Peak flow (PEF) after treatment	Value is 50% - 80% of personal best	Value is <50% of personal best	Patient is very sick and PEF is not useful. Use clinical assessment until stable enough to do PEF
Oxygen Saturations (if available)	>94%	>94%	<94%
Central cyanosis	No	No	Yes



MODERATE ATTACK:

Depending on improvement likely no IPD admission needed

No oxygen needed

Salbutamol inhaler with spacer: 5-10 puffs each inhaled separately. Repeat every 10–20 minutes in the first hour (if necessary) then every 4-6 hours as needed until full response*

Consider **Prednisolone PO**
Adult: 40mg OD x 3 days
Child: 1mg/kg (max 30mg) x 3 days

Use if have other signs of moderate attack: moderate wheeze, difficulty breathing, etc

SEVERE ATTACK:

Admit to IPD

Oxygen: 5L, decrease according to saturations aim SpO₂ >94%

Salbutamol inhaler with spacer: 10-15 puffs each inhaled separately. Repeat every 10–20 minute in the first hour then every 4 hours
OR
Salbutamol nebuliser
Adult/>5yr: 5mg; Child <5yr 2.5mg 3 times per hour then every 4 hours as needed until full response*

Prednisolone PO
Adult: 40mg OD x 3-5 days
Child: 1mg/kg (max 30mg) x 3-5 days

If vomiting/cannot take PO consider IV **hydrocortisone**

LIFE THREATENING ATTACK:

Admit to IPD

Oxygen: 10-15L decrease according to saturations, aim SpO₂ >94%

Salbutamol nebuliser Adult/>5yr: 5mg; Child <5yr: 2.5mg 3 times per hour then every 4 hours as needed until full response*

Note: Give salbutamol inhaler with spacer 10-15 puffs only if do not have nebuliser, observe HR

Hydrocortisone IV
Adult: 200-250mg QID
Child: 4mg/kg (max 100mg) QID
Switch to PO prednisolone when can take PO

If no improvement, consider:
Adrenaline IM OR
Magnesium IV (see below for doses)

***FULL RESPONSE** = PEF >80% of personal best, RR and HR; speak and breathe normally; no agitation or confusion; chest auscultation with minimal wheeze or is clear; no more chest indrawing.

Considerations:

- If >2yrs old an inhaler with a spacer works as good as nebuliser (but not for life threatening asthma)
- If need to use second line therapy then discuss with doctor
- Always deworm patients if you give steroids
- Give hydrocortisone IV if the patient cannot take oral prednisolone.

Figure 24.15 Doses of drugs used to treat asthma*update

1. SALBUTAMOL		4. ADRENALINE IM (1:1000 = 1mg/ml):	
Inhaler:	One puff is 100 microgram salbutamol (you can use up to 10 puffs every 10 - 30 minutes)	Adult:	0.5 – 1ml
Nebuliser:	Adult/>5yr: 5mg; Child <5yr: 2.5mg Repeat every 20-30 min for 3 times then every 4 hours	Child:	>12yrs 0.5ml 6 – 12yrs 0.25ml 6mths – 6 yrs 0.12ml < 6mths 0.05ml
Oral:	(only use if inhaled/nebuliser is not available)	**Use the 0.5ml insulin syringe to give adrenaline in children**	
Adult:	2-4mg TID or QID		
Child <12yrs	1-2mg TID		
Note: Stop beta blockers, risk of miscarriage in first 6m of pregnancy, observe HR for tachycardia			
2. PREDNISOLONE PO		5. MAGNESIUM IV (Note: evidence is limited)	
Oral:		Adult:	1.2 - 2g IV over 20 minutes
Adult:	40mg OD in the morning x 3-5 days	Child:	40mg/kg (max 2g) over 20 minutes
Child:	1mg/kg OD in the morning (max 30mg) x 3-5 days		
3. HYDROCORTISONE IV		6. OXYGEN	
Adult:	100mg QID (up to 250mg if severe)	See Appendix 19 for weaning guidelines	
Child:	4mg/kg (max 100mg) QID		
Change to PO prednisolone as soon as possible (can also use IV dexamethasone)			

DRUGS SIDE-EFFECTS

- Salbutamol tablets may only be used when inhalers and nebulisers are not available because they have greater side effects and are slower to act.
- Salbutamol often causes tachycardia. Observe HR carefully especially if the patient has risk for heart disease
- Potassium levels are decreased by salbutamol and steroids. This may lead to levels that can be life threatening. If possible check potassium levels or give high potassium foods (banana, potato, beans).
- For pregnant women and persons with cardiovascular disease (coronary artery disease, congenital heart disease, high BP, high cholesterol) avoid aminophylline.
- Long term steroids can make many infections worse. Remember worms (including strongyloides), amoeba, TB, and other bacterial infections can get worse when using steroids. Take a good history for TB, amoeba, other infections. Give albendazole to prevent spread of worms.

TREATMENT AFTER DISCHARGE

Moderate Attack:

- Complete course of **prednisolone PO** for total 3 days.
- If possible should discharge with **salbutamol inhaler** with spacer (2-10 puffs every 4-6 hours) for 3 days, then PRN.
- Consider preventative medication e.g. **budesonide**, oral **aminophylline** (discuss with doctor).
- Return to clinic if not better/worse or no more inhaler.
- Follow up 4 weeks or before if inhaler finished.

Severe Attack:

- Complete course of **prednisolone PO** (total 3-5 days)
- If possible should discharge with **salbutamol inhaler** with spacer (2-10 puffs every 4-6 hours) for 3-7 days, then PRN
- Consider preventative medication e.g. **budesonide**, oral **aminophylline** (discuss with doctor).
- Return to clinic if not better/worse or no more inhaler
- Follow up 2-4 weeks or before if inhaler finished.

Life-threatening attack:

- Complete course of **prednisolone PO** for total 5-10 days
- If possible should discharge with **salbutamol inhaler** with spacer (2-10 puffs every 4-6 hours) for 3-7 days, then PRN
- Consider preventative medication e.g. **budesonide**, oral **aminophylline** (discuss with doctor).
- Follow up after 1 week or before if inhaler finished.

CHRONIC ASTHMA

PREVENTION / LONG TERM TREATMENT

When discharging a patient make sure you give them: general advice, long term medical treatment, what to do if has asthma attack at home, and follow up instructions:

General Advice:

1. Health education – if possible, avoid precipitants e.g. stay away from animals, smoke from wood or farm fires
2. Do not smoke/ stop smoking, advise people should smoke away from patient e.g. smoke outside house.
3. Always carry a salbutamol inhaler in case of attack.
4. Seek medical attention early in case of symptoms not being relieved by inhaler >10 puff every 4 hours or PEF <80% of personal best or PEF variability >20%, even if the patient has no difficulty breathing.

Long Term Medical Treatment: (Discuss with doctor about which preventative medication to use)

INHALERS

- Types of inhalers:
 - Note: Salbutamol ALONE does not prevent asthma symptoms or attacks**
 - 1. **Preventer inhalers** STEROID INHALER e.g. **budesonide** these inhalers should be taken regularly to prevent the symptoms/attacks from happening. Rinse mouth out with water (spit water out, do not swallow) after use to prevent oral candida.
 - 2. **Reliever inhalers** SALBUTAMOL INHALER e.g. Ventolin these inhalers should only be used when the patient has symptoms (although sometimes taken regularly for a short time after an acute attack)
- If you do not have steroid inhalers, you can use a low dose of oral steroids for patients who have symptoms very often (discuss with doctor).
- It is important to educate the patients
 1. How to use inhalers +/- spacer
 2. How many puffs to take how many times a day
 3. When to take each inhalers e.g. budesonide every day vs salbutamol PRN
- The dose will depend on the response. Need to aim for the lowest dose of steroid inhaler that controls the symptoms.
 - **OPD patient (mild attack) with persistent symptoms:** Low dose steroid inhaler **budesonide** (e.g. 1 puff BID).
 - **Patient discharged from IPD after moderate attack:** Medium dose steroid inhaler **budesonide** (e.g. 2 puffs BID).
 - **Patient discharged from IPD after severe/life threatening attack:** High dose steroid inhaler **budesonide** (e.g. 4 puffs BID).
 - **CONTROLLED SYMPTOMS** is PEF is $\geq 80\%$ of personal best, needing salbutamol ≤ 2 times per week, or waking up with symptoms ≤ 2 nights per month. If more symptoms than this, increase the preventer inhaler dose.

THEOPHYLLINE/AMINOPHYLLINE

- Note: oral theophylline is safer than aminophylline. Only oral aminophylline is available at SMRU.
- Discuss with doctor about starting oral aminophylline/theophylline
- Dose depends on the brand of tablet (see specific manufacturer instructions).

Advice in case of asthma attack at home:

1. Do not lie down
2. If acute dyspnoea give salbutamol inhaler 10 puffs
 - If no improvement in 10 minutes: give a second salbutamol inhaler 10 puffs
 - If again no improvement to come to clinic.
3. If patient needs the salbutamol inhaler more than 10 puffs every 4 hours they must come to the clinic.

FOLLOW UP

1. Follow up in OPD (**check peak flow value and compare to patient's personal best value**). Decrease the inhaler/tablet step by step to the minimum dose that fully controls symptoms. If symptoms come back or PEF <80% personal best (or PEF variability >20%), increase the dose of steroid inhaler again. If the PEF is normal, continue or decrease the treatment.
2. Review the patient every month or when the steroid inhaler is nearly empty.
3. Review inhaler with spacer technique at each follow up appointment.
4. Keep the patient at this dose all the time to help control the symptoms.
5. If asthma attacks reduce to < 1 per month try to stop steroid inhaler/theophylline/aminophylline and give inhaled salbutamol when symptomatic.

Remember: drugs such as beta blockers or NSAIDs e.g. ibuprofen can cause an asthma attack/make asthma worse so do not prescribe these drugs.

24.3.6. TUBERCULOSIS

DEFINITION

Tuberculosis is a contagious disease caused by *Mycobacterium tuberculosis* (and occasionally by *Mycobacterium bovis* and *Mycobacterium africanum*), which are also known as TB bacilli.

TB commonly attacks the lungs (**pulmonary TB**) but can cause disease in any part of the body such as the lymph nodes, pleural cavity, bones and spine, brain, abdomen, eyes, genito-urinary tract and the skin (**extra-pulmonary TB**).

TB Transmission:

TB infection is transmitted by air. A major source of infection is a patient with pulmonary TB who is coughing and whose sputum smear is positive (i.e. TB bacilli can be seen in sputum microscopy). If an infectious person coughs or sneezes, tiny infectious particles of respiratory secretion, which contain TB bacilli, are produced. These infectious particles can remain in the air for a long period. Therefore, people in close contact with an infectious person breathe in air containing infectious particles of TB bacilli.

TB Disease:

A person infected with TB does not necessarily feel unwell and such cases are known as silent or 'latent' infections. When the lung disease becomes 'active' and symptoms develop, such cases are diagnosed with '**TB Disease**'.

- In HIV uninfected populations, only 1 person out of 10 TB-infected people develop TB disease.
- In HIV infected populations, the proportion of developing TB disease is much higher. A HIV infected person has a 21-34 times higher risk of developing TB disease than a HIV uninfected individual.

CLASSIFICATION

1. Pulmonary TB (lungs) - most common site

2. Extrapulmonary TB (outside lungs)

<u>Common</u>	<u>Less common</u>
Pleural	Genital tract
Lymph nodes (commonly in neck)	Kidney
Brain	Adrenal gland
Abdomen	Skin
Pericardium (heart)	
Spine, other bones and joints.	

SIGNS AND SYMPTOMS

1. Pulmonary TB

- **The most common symptoms of Pulmonary TB are:**
 - Cough of any duration^{*update} (with or without sputum production)
 - Fever of unknown cause > 2 weeks
 - Weight loss in the past three months
 - Drenching night sweat
- Other symptoms:
 - Respiratory: coughing up blood, chest pain, breathlessness
 - General symptoms: tiredness, loss of appetite and secondary amenorrhoea (see Figure 24.16)

If the patient has one or more of the above signs and symptoms, the case should be suspicious of TB and investigation for TB diagnosis is to be carried out.

- Physical Signs
 - non-specific and similar to other lung diseases
 - General signs: fever, tachycardia, finger clubbing
 - Respiratory signs: often no abnormal signs in the chest, may be crepitations, wheeze or bronchial breath sounds.
- 2. Extrapulmonary TB
 - TB outside the lungs may present with the following:
 - **TB pleural effusion:** chest pain, dullness on percussion, reduced or no air entry on the affected side.
 - **TB lymphadenopathy:** enlargement of lymph nodes, usually in the neck and bilaterally.
 - **TB spine or bone:** deformity, chronic bone infection.
 - **TB brain:** signs and symptoms of meningitis (headache, neurological deficit, loss of consciousness).
 - **TB abdomen:** ascites, abdominal mass.

DIAGNOSIS

If you suspect a patient has TB you should:

1. **Assess for danger signs**
 - RR > 30/min
 - PR > 120/min
 - Temp > 39°C
 - Unable to walk
2. **Follow the algorithms** below depending on if the patient has danger signs or not:

TESTS USED IN THE DIAGNOSIS OF TB:

For Pulmonary TB:

1. **Sputum** for microscopic examination of Acid Fast Bacilli (AFB):
 - Called AFB as the bacilli are resistance to losing their colour by acid
 - Need to collect sputum 2 days in a row
 - It is a simple, rapid and reliable test for sputum smear positive cases.
2. **Molecular technique** (MTB/Rif Assay called **GeneXpert test**):
 - Rapid result within a few hours if machine is where sample is collected
 - Can be used to see if the Mycobacteria is resistant to rifampicin – if it is resistant it is a sign that it could be a multi-drug resistant TB (MDR TB)
3. **Culture** (growing bacilli in special media) (if available):
 - More specific test but results take longer (4-6wks), needs good technology, skills and is expensive
 - Used if:
 - Clinically suspect cases of smear positive and GeneXpert negative.
 - Confirmation of treatment failure.
 - Diagnosis of drug resistant TB (including MDR TB) together with drug susceptibility testing
4. **Chest X-Ray**: useful for smear negative pulmonary TB like pleural effusion, miliary TB, and TB in children
5. **Tuberculin skin test**: if positive is a sign of exposure to TB, it does not mean the patient has TB disease

For Extra-pulmonary TB:

1. FNAC (fine needle aspiration cytology) for lymphadenopathy.	4. Thoracocentesis (pleural tap) and examination of pleural fluid: TB pleural effusion.
2. Chest X-Ray: TB Pleural effusion, TB Pericarditis.	5. Lumbar puncture and examination of CSF: TB meningitis.
3. Spine and Bone X-Ray: bone and spine TB.	6. Abdominal paracentesis and examination of peritoneal fluid: TB abdomen.

Note: Multi-drug resistant TB (MDR TB) is already a problem in the border area. Diagnosis and treatment of MDR TB should be integrated within a TB program.

Figure 24.16 Managing a TB suspect WITHOUT Danger signs*

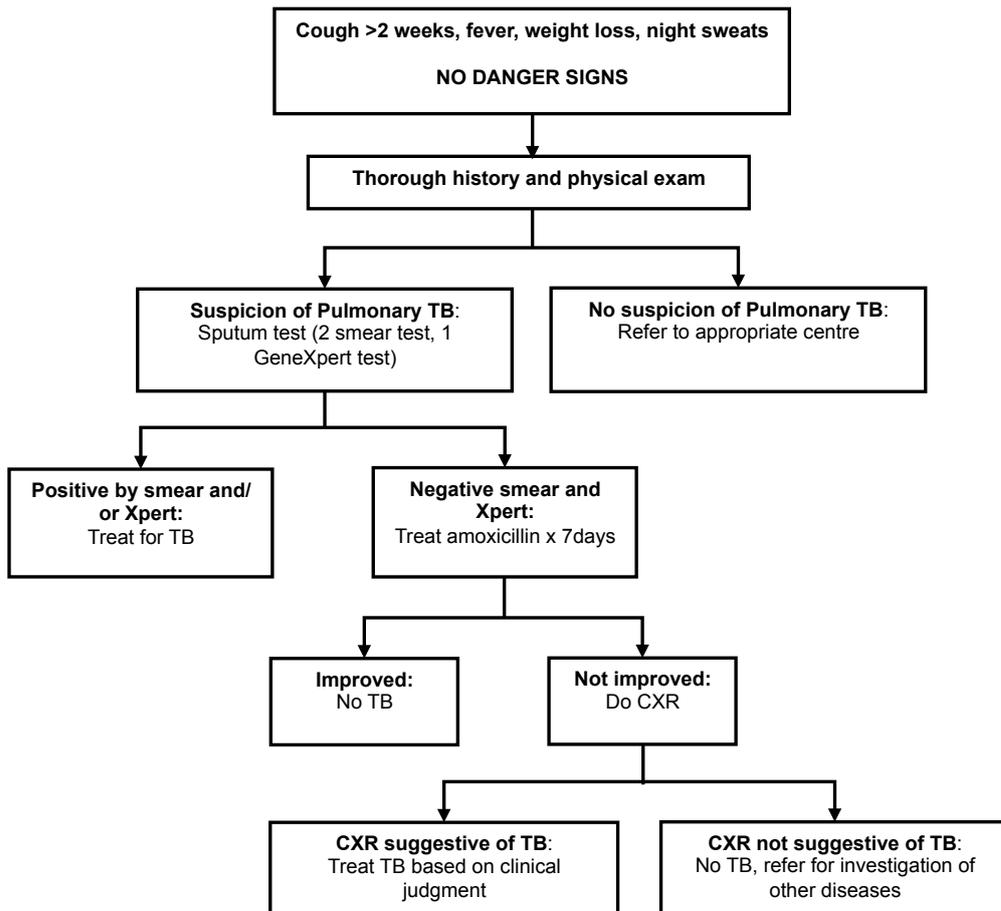
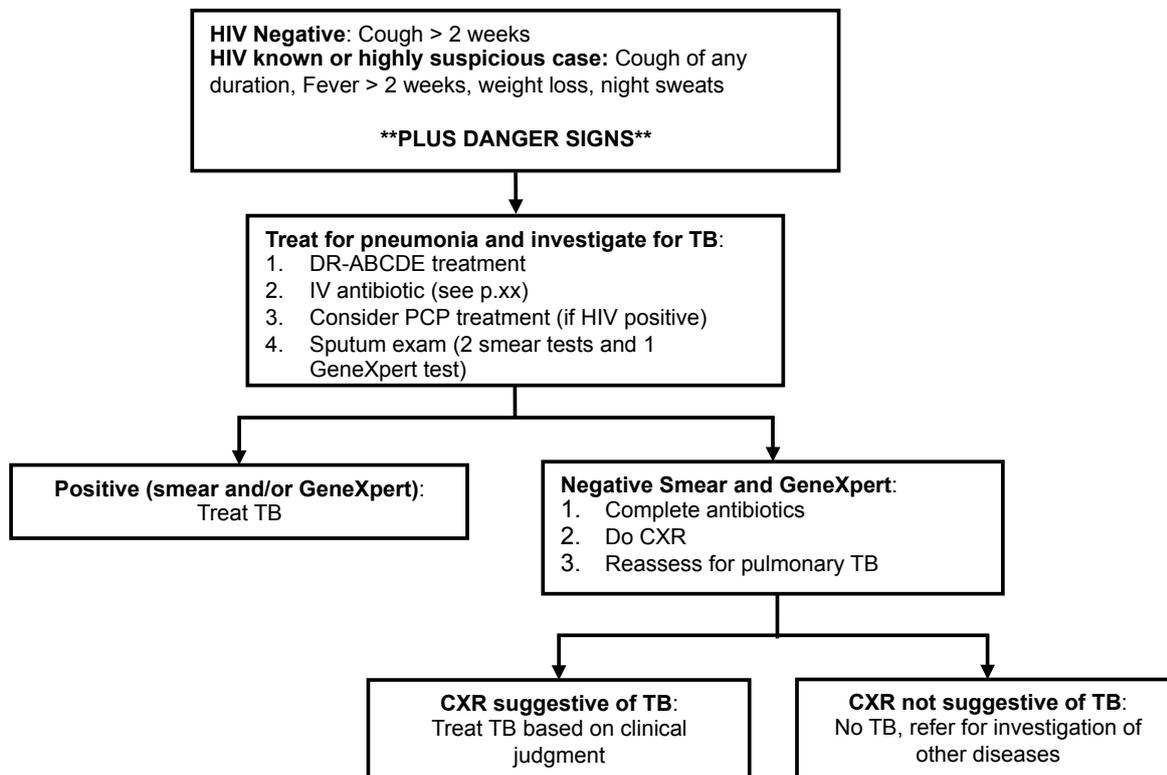


Figure 24.17 Managing a TB suspect WITH ****DANGER SIGNS****



*Danger signs are RR>30, PR>120, T>39°C, cannot walk.

TREATMENT

TB can be cured by using effective treatment regimens:

1. Daily ingestion of anti-TB drugs without interruption.
2. Multi drug therapy (4-5 drugs).
3. At least 6-8 months duration of drug therapy.
4. Use of quality drugs.

FIRST LINE ANTI-TB DRUGS AND RECOMMENDED DOSAGES:

(see tables below for weight-based dosage as an example)

Anti TB drugs	Daily treatment (mg/kg)	
	Children (<30 kg)	Adult
Isoniazid (H)	10 (10-15)	5 (4-10)
Rifampicin (R)	15 (10-20)	10 (8-20)
Pyrazinamide (Z)	35 (30-40)	25 (20-30)
Streptomycin (S)	15	15
Ethambutol (E)	20 (15-25)	15

Note: Consider age, body weight, existing liver or renal diseases, pregnancy and previous history of TB treatment before choosing a treatment regimen and the dosage

Early screening and taking effective treatment can break the chain of transmission.

It is strongly advised that those patients who are coughing for more than 2 weeks or have other signs and symptoms suspected of TB should undertake TB screening as early as possible.

TREATMENT REGIMENS WITH TB DRUGS:

The preferred standard short course regimen according to WHO guidelines:

New Treatment Case – Category I

	Initial Phase (2 months)	Continuation Phase (4+ months)
Sputum positive Sputum negative Extra pulmonary	HRZE x 2 months	HR x 4 months
TB Bone/joint	HRZE x 2 months	HR x 7 months
TB Meningitis	HRZE x 2 months	HR x 10 months

H = isoniazid, R = rifampicin, Z = pyrazinamide, E = ethambutol

Note: May need to extend Initial phase 1 extra month with HRZE if sputum smear examination after 2 months of treatment is still positive.

Re-treatment Case – Category II

Sputum positive, Sputum negative, or Extra pulmonary		
	Initial Phase (3 months)	Continuation Phase (5 months)
If less than 5 months of E in the previous treatment	SHRZE x 2 months Then HRZE x 1 month	HRE x 5 months
If more than 5 months of E in the previous treatment	SHRZE x 2 months Then HRZE x 1 month	5 HRZE x 5 months

S = streptomycin, H = isoniazid, R = rifampicin, Z = pyrazinamide, E = ethambutol

Note: May need to extend Initial phase 1 extra month with HRZE if sputum smear examination after 3 months of treatment is still positive.

IMPORTANT

Drug adherence and completion of treatment is essential in order to prevent treatment failure and developing Drug Resistant TB (DRTB).

Special considerations in treatment:

Pregnancy

- Patients should avoid getting pregnant during treatment (*see family planning p.87*).
- Rifampicin makes oral contraceptive pills less effective. Use other form of contraceptives e.g. injection Depo-Provera.
- If pregnant: streptomycin is contra-indicated as it can cause deafness to the baby. Use ethambutol instead.

EXAMPLES OF NUMBER OF TABLETS OF ANTI-TB DRUGS ACCORDING TO WEIGHT

Sample regimens (Category I) with separate anti-tuberculosis drugs in Adults

	Weight in Kg			
	30-39	40-54	55-70	>70
Initial Phase – Daily				
H 100mg	1.5	2.5	3	3.5
R 150mg	2	3	4	5
Z 400mg	2	3	4	5
E 400mg	1.5	2	3	3.5
S 1g (in TB meningitis)	0.5	0.75	1	1
Continuation Phase – Daily				
H 100mg	1.5	2.5	3	3.5
R 150mg	2	3	4	5

Sample regimens with fixed-dose combination of anti-TB drugs in Adults 2HRZE+4HR or 2HRZE+10 HR

Intensive phase									
Regimen	Drugs	Weight							
		21 – 29	30 – 34	35 – 39	40 – 49	50 – 54	55 – 64	65 – 70	> 70
2RHZE	RHZE 150 - 75 - 400 - 275	2	2	2½	3	3	4	4	5
Continuation phase									
4RH (10 HR for TB meningitis)	RH 300 – 150 RH 150-100	1	1	1 1	1 1	1 1	2	2	2 1

Dosage of anti-TB drugs (number of tablets) in children according to weight bands

Body weight bands (kg)	Isoniazid (100mg tablet)	Rifampicin (300mg tablet)	Pyrazinamide (500mg tablet)	Ethambutol (400mg tablet)
<5	0.5	0.33	0.33	0.33
5 to 10	1	0.33	0.5	0.33
11 to 15	1.5	0.66	1	0.5
16 to 20	2	1	1.33	1
21 to 25	2.5	1.33	1.5	1
26 to 30	3	1.5	2	1.5

PREVENTION & VACCINE

BCG Vaccination for children

- Routine vaccination to all infants in an area with high TB prevalence is recommended:
- It protects against severe forms of TB such as meningitis, miliary TB in infants.
- Vaccination lasts for 15 years in well-nourished children.
- It is safe to give in HIV infected children **but** is contraindicated in active AIDS

Maintaining Good Hygienic Practices

- Always cover mouth and nose with a tissue or handkerchief when coughing or sneezing.
- Keep doors and windows open during the day to provide ventilation and sunlight exposure.
- Spit only into a container.
- Proper disposal of excreta (sputum, saliva) from TB patients (burning, dumping in a pit).
- Keep good personal hygiene – regularly wash hands, take showers, wash hair, wear clean clothing, cut nails.

Improve Fitness

- Enough sleep, healthy diet, physical exercise. Do not smoke.

DRUG SIDE EFFECTS

Approach to drug side effects:

1. Identify responsible drugs.
2. Rule out other possible cause e.g. scabies for itchiness, viral hepatitis for jaundice.
3. Evaluate risk of side effects versus the consequences of treatment interruption.
4. Minor: encourage the patient to continue anti-TB and symptomatic treatment e.g. chlorpheniramine for itchiness, paracetamol for joint pain, advise the patient to take their medication at bed-time.
5. Most minor side effects are resolved within 2-3 weeks.

Figure 24.18 Side effects of TB drugs

SIDE EFFECTS	RESPONSIBLE AGENT	INTERVENTION
Orange-red urine	Rifampicin	Explanation and encouragement, no harm, normal staining from drug
Peripheral neuropathy (early symptoms: paraesthesia, then prickling and burning in feet, later in hands)	Isoniazid	Prevention by taking vitamin B6 (pyridoxine) 10mg OD prophylaxis. Treatment – 100-200mg of vitamin B6 daily (high dose may reduce the effectiveness of isoniazid)
Hepatitis (Jaundice)	In descending order: 1. Pyrazinamide 2. Rifampicin 3. Isoniazid	Stop treatment. Start re-introductory schedule when signs and symptoms of hepatitis are resolved. In case of recurrent hepatitis or severe hepatitis – use alternative treatment regimen SHE x 2 months + HE x 10 months
Impaired vision (Eye) (Early signs: blurred vision, decreased visual acuity, red-green blindness)	Ethambutol	These symptoms are reversible a few weeks after stopping. A dosage of 15mg/kg is generally safe to use. However, if optic neuropathy is established, it is not reversible.
Vestibulo-ototoxicity (Ear) (At early stage: dizziness, vertigo, ear ringing) and renal toxicity	Streptomycin	Reduce dose according to weight of the patient. If it does not work, may use alternate day injection of 3 times per week. If persistent or side effects getting worse– may stop streptomycin. In elderly patients and patients less than 35kg – 500mg dosage is safe and effective. If deafness is established, it is not reversible.
Skin manifestation or generalised hypersensitivity	All agents in descending order: 1. Streptomycin 2. Ethambutol 3. Pyrazinamide 4. Rifampicin 5. Isoniazid	<u>Minor</u> (itchiness and rash): symptomatic treatment with chlorpheniramine and Calamine lotion <u>Severe Steven Johnson Syndrome</u> (fever rash, mucocutaneous eruptions): stop treatment. Start re-introductory schedule when the symptoms are resolved.
Joint pain	Pyrazinamide	Symptomatic treatment with paracetamol (or ibuprofen if not better with paracetamol alone), usually resolves after 2 weeks
Gastrointestinal upset (nausea, vomiting and abdominal pain)	Rifampicin	Give after small meal Symptomatic treatment: omeprazole or metoclopramide . Administer 2 hours before or 3 hours after TB medication
Shock, purpura, acute renal failure	Rifampicin	Stop rifampicin. Never reintroduce rifampicin again.

CHAPTER 25: SKIN DISEASES

Skin diseases are very common. Many skin diseases are related to poor hygiene.

Take a good history:

- When did the lesions start?
- Where did they start?
- Did they spread?
- Are they itchy?
- Are there risk factors for skin disease?
- Take note of patient's job and allergy history
- Are there any other symptoms: fever? Joint pain? Headache? Fatigue?

Examine the entire body and describe the lesions:

- Where?
- How many?
- What colour
- What shape (flat or raised)?
- Hot or cold?

Before starting any treatment, clean the lesions with water and soap.

25.1 BACTERIAL SKIN INFECTIONS

Remember: any skin lesion can become infected

If skin lesions are wet with pus, red, warm/hot, or if the patient has fever suspect a bacterial infection and treat with the following antibiotics: (see below for specific diseases)

Cloxacillin:

	Mild Infections	Moderate Infections	Severe Infections
Adult:	500mg QID PO	1g QID PO	1g QID IV
Child:			
10 - 18yrs	250mg QID PO	500mg QID PO	50mg/kg QID IV (max 1g)
2 - 9yrs	125mg QID PO	250mg QID PO	50mg/kg QID IV (max 1g)
1m - 2yrs	62.5mg QID PO	125mg QID PO	50mg/kg QID IV (max 1g)

Erythromycin (if allergic to penicillin):

	Mild Infections	Moderate Infections	Severe Infections
Adult:	500mg QID PO	1g QID PO	12.5mg/kg QID IV
Child:			
10 - 18yrs	250-500mg QID PO	500mg-1g QID PO	12.5mg/kg QID IV (max 1g)
2 - 9yrs	250mg QID PO	500mg QID PO	12.5mg/kg QID IV (max 1g)
1m - 2yrs	125mg QID PO	250mg QID PO	12.5mg/kg QID IV (max 1g)

25.1.1. IMPETIGO

*For photo, see
Appendix 1*

DEFINITION

This is a bacterial infection of the skin caused by *Staphylococcus aureus*. It spreads easily amongst children. Transmission is by direct contact. Often starts after a bite or a scratch. Rash can increase over days to weeks. The lesions are red, round, flattish, with golden coloured crusts that are usually 0.5 to 3cm in size. They are sometimes wet. Treat also any other associated skin disease (scabies, ringworm, eczema etc.).

For all patients:

- Keep away from school until crusts are dry.
- Treat any other skin disease e.g. scabies, eczema,
- Ask siblings and other close contacts to come to the clinic if they have lesions
- Wash clothing and towels daily until infection is resolved.

LOCALISED IMPETIGO

Note: If the patient is a neonate go directly to Extensive Impetigo.

SIGNS AND SYMPTOMS

Less than 3 spots with pus and red skin on only **one** part of the body, often around the mouth, behind the ears, on the hands or feet. No fever.

TREATMENT

- Clean with water and soap or antiseptic (e.g. **gentian violet**, **povidone**, **chlorhexidine**, or **savlon**) 2 times per day and dry. Use **gentian violet** if impetigo is near mucous membranes (eyes, mouth).
- Keep dry (if on the buttocks of children, leave them uncovered).
- Cut the fingernails, cut hair short around lesion (shave head if a lot of lesions on scalp).

EXTENSIVE IMPETIGO

SIGNS AND SYMPTOMS

Neonates, or **more than 3 lesions** or impetigo on **more than one** part of the body.

TREATMENT

- Give the same local treatment as for mild infections.
- Give PO **cloxacillin**
(if allergic to penicillin: **erythromycin**)
 - Incise abscesses.

25.1.2. ABSCESS

*For photo, see
Appendix 1*

DEFINITION

This is a collection of pus in the soft tissues, most commonly due to *Staphylococcus aureus*. There is a red, painful, hot, localised swelling. There may be fever and enlarged lymph nodes. Antibiotics cannot reach the abscess cavity very well so the treatment is to cut open the abscess to allow the pus to drain out (incision and drainage).

**Some abscesses are not hot and not painful ('COLD' abscess).
If you find this, think of TB.**

TREATMENT

FIRST STAGE: the skin is hard.

- Apply warm compresses four times per day.
- Treat the pain with paracetamol or ibuprofen
- **No antibiotic** is needed for this stage
- Give **cloxacillin** for 7 days (or **erythromycin** if allergic to **penicillin**) if the patient also has:
 - Cellulitis
 - General symptoms (fever, chills)
 - Children < 1 year
 - Abscess on the head/neck or hand, multiple abscesses
 - Abscess on the breast and mastitis, give 10 days **Cloxacillin** (500mg QID)
- If the wound is very unclean or contaminated e.g. consider adding **metronidazole** and/or **ciprofloxacin** to cover bacteria from soil or water.

SECOND STAGE: very painful. One point on the skin (exactly above the pus collection) is soft and should be opened.

- Wash hands, use gloves and sterile materials.
- Use local lidocaine injection for pain relief.
- Cut with a sterile blade.
- Remove the pus. Clean inside the cavity. Break down all lobes of the abscess.
- Wash with normal saline.
- Insert a gauze dressing soaked with normal saline into the hole as a 'wick'.
- Change dressing daily until the hole begins to close. Do not clean with gauze and iodine: you will destroy all the new tissue. Flush gently with normal saline until clean water comes out.
- Be careful when using gauze packing. If small pieces are left inside the abscess (foreign body), the abscess cannot heal and will become chronic.
- Abscesses in the buttocks are at risk to develop fistula with the anus. Follow these cases carefully with daily normal saline flush.

Always think about what can be injured when doing an incision and drainage.
Is there a nerve nearby? A blood vessel? Be careful in the face, neck and other sensitive areas.

If an abscess or other bacterial skin infection does not improve on usual antibiotics think about drug resistant *Staph aureus*, especially if already on antibiotics (see *MRSA*, p. 163) or melioidosis especially in patients with risk factors (see p. 162)

25.1.3. CELLULITIS AND ERYSIPELAS

For photo, see
Appendix 1

DEFINITION

This is an acute bacterial infection spreading under the skin. *Streptococcus pyogenes* or group A streptococci and *Staphylococcus aureus* are the most common causes of cellulitis. Streptococci (beta haemolytic) are the most common cause of erysipelas. They enter the body through a previous wound, a scratch or when the skin is cut open for surgery. Look for the port of entry.

SIGNS AND SYMPTOMS

- Redness
- Swelling (not localized like an abscess)
- Borders not well defined, but for erysipelas there may be clear borders.
- Fever, chills or rigors (especially for erysipelas)
- Pain
- Local lymph node enlargement

Note: If the cellulitis causes deep ulcers very quickly (within a week), this could be “**necrotising fasciitis**”, caused by many organisms including *group A Streptococcus (group A strep)*, *Klebsiella*, *Clostridium*, *E. coli*, *Staphylococcus aureus*. Necrotising fasciitis can be life threatening and must be treated immediately.

There is a risk for sepsis during cellulitis because bacteria spread to the blood.
To prevent septicaemia, it is important to diagnose early and start correct antibiotic treatment.

TREATMENT

- Immobilisation and elevation of the limb (higher than the heart).
- Cool and wet dressing.
- **Do not cut open.**
- Give paracetamol or ibuprofen for pain and inflammation
- Give antibiotics:

1. Mild cases

- **Cloxacillin PO** x 7 days and follow up regularly
- If penicillin allergic use **erythromycin PO**
- If **no improvement** after 3 days, or the patient is getting worse: admit to IPD and change to severe case.

2. Severe cases: high fever, patient unwell.

- Admit to **IPD**, do blood culture
- Start intravenous antibiotics:
 - **Cloxacillin IV** Adult: 1g QID; Child >1mth: 50mg/kg QID (max 1g QID)
 - AND**
 - **Benzyl penicillin IV** Adult: 1.2g QID; Child >1mth: 25mg/kg QID
- If **no improvement** after 48 hours or patient's condition is getting worse, **add gentamicin OD** (4mg/kg neonates; 5-7mg/kg in children and adults) for 3-5 days.

3. Suspect necrotising fasciitis

- Consider referral – patient may need surgery for wound cleaning
- Remove all necrotic tissue and clean with normal saline 1-2 times daily.
- Cover with wet gauze (use normal saline) and then wrap around with dry gauze
- Treat with IV **cloxacillin** as per severe cellulitis. If available can use **clindamycin IV** Adult: 600mg - 2.7g daily in 2-4 divided doses; Child 10mg/kg (max 1.2g) QID or **clindamycin PO** Adult: 450mg QID; Child: 6mg/kg (max 450mg) QID. Clindamycin provides bacterial anti-toxin effect and will help the infection improve. Use antibiotics until the ulcers are improving and no more cleaning is needed.

25.2 FUNGAL SKIN INFECTIONS

25.2.1. CANDIDA

For photo, see
Appendix 1

DEFINITION

Fungal infection of the skin or mucous membranes, sometimes also called 'thrush'. Mostly seen in patients with previous use of antibiotics, diabetes mellitus, decreased immunity or pregnancy. Common types of infection are oral candidiasis and vaginal candidiasis. (Oral candidiasis is common in neonates or elderly but uncommon for other ages. If find oral candidiasis in other age groups then consider additional diagnosis of immunosuppression e.g. HIV, cancer.

SIGNS AND SYMPTOMS

- Oral Candidiasis: white spots in the mouth (cannot remove), painful and difficult swallowing.
- Vaginal Candidiasis: white discharge with itching

TREATMENT

Oral Thrush

- **Nystatin 400,000 IU/day** – give 1 lozenge to be sucked QID for 7 days or 1ml of oral suspension (100,000 IU) QID for 7 days. Oral suspension should be swished around oral cavity and swallowed. For treatment in HIV/AIDS patients, see p.150.

Vaginal Candidiasis

- See p.221

25.2.2. RINGWORM

DEFINITION

Fungal infection of the skin.

For photo, see
Appendix 1

SIGNS AND SYMPTOMS

- Round dry lesions that grow slowly (taking weeks to months).
- Dry white scales on the edges with a clearing in the centre, they are very itchy, not painful
- No fever.
- Sometimes there are pustules.
- On the scalp it may be associated with localised loss of hair.

TREATMENT

Local treatment on skin (tinea corporis):

- Clean with soap and water 2 times per day, ketoconazole 2% cream BID for 2 weeks or longer if necessary.
- Other topical antifungals can also be used, such as clotrimazole, miconazole, or Whitfield ointment.

Treatment for scalp (tinea capitis):

- If on head cut hair short around lesions (shave head if many lesions on the scalp, counsel family to use a new razor and not to share razors because the fungus can go to another person).
- Treat any bacterial super-infection first
- If scalp ringworm: need to also give oral antifungals
 - e.g. **griseofulvin** PO for 6 weeks (can give up to 12 weeks)
 - Child <12yrs: 10-20mg/kg per day (max 500mg per day)
 - Children >12yrs/Adults: 500mg OD (750mg OD if severe infection)
 - Contraindicated in pregnant women
- Can also use Whitfield cream on the scalp (if available)
 - Note:** men should not make their wives pregnant within 6 months of the griseofulvin treatment, women should wait until 1 month after treatment before getting pregnant.
 - Note:** For adults over 35 years, consider checking baseline liver function tests before treatment, and again at 4 weeks.

If there is no improvement, make sure it is not leprosy.

25.3 VIRAL SKIN INFECTIONS

For photo, see
Appendix 1

25.3.1. HERPES SIMPLEX

DEFINITION

Recurrent infection of skin and mucous membranes due to infection with *Herpes Simplex Virus* (HSV). After the first infection, the virus stays in the body and can recur if the person has another illness, is stressed or exposed to cold or sunlight. The infection always happens in the same place. Common places: lips, mouth, eyes and genital area. Herpes is spread by direct contact with lesions. Herpes lesions heal by themselves in approximately 10 days, but they will often recur.

SIGNS AND SYMPTOMS

- Group of small vesicles filled with clear fluid on the skin or the mucosa (mouth or genital area).
- Often the vesicles have broken and become crusted when the patient comes to the clinic.
- Very painful, may have tingling and itching before the lesions appear.
- In the mouth: Pain and difficulty eating. Ulcers in the mouth and on the lips. Often the gums are swollen.

COMPLICATIONS

Infections in the eyes can be severe and cause keratitis and blindness (*see eye infections, p.80*).

If a pregnant woman has a genital lesion, it can be very dangerous for the newborn baby because the baby can become infected during delivery.

TREATMENT

Mild or moderate infections:

- Supportive care. No antiviral medication needed.

Severe cases with necrotic lesions or extensive lesions or in the face spreading to the eye:

- Oral **acyclovir**, if available, 200mg 5 times per day for minimum 5 days, given **in the first 48 hours of symptoms starting**.
1. On the skin
 - Clean lesions with antiseptic solution (e.g. **gentian violet, povidone, chlorhexidine, or savlon**) and let dry.
 - Apply **GV** (can be used on mucous membranes).
 2. In the mouth:
 - Swish and spit with warm salty water.
 - **GV**, if secondary infection, treat with **amoxicillin**.
 3. In the eyes:
 - Wash the eyes with cool boiled water.
 - **Apply ointment to the eye e.g. TEO to keep moist.**
 - Refer to doctor for consultation.
 4. On the genitals:
 - Wash with soap and water. Give paracetamol for pain. Condoms help prevent the spread of herpes.
 - Check for other STIs.
 - Men or women who have difficulty passing urine need oral acyclovir.
 - Acyclovir is not known to be harmful in pregnancy. Active genital herpes at delivery should have caesarean section. Refer to doctor.

For eczema herpeticum, see p.265

25.3.2. VARICELLA ZOSTER

For photo, see
Appendix 1

CHICKENPOX

DEFINITION

This is a very common disease caused by the Varicella Zoster virus, and spreads easily. Other persons in the family or in the neighbourhood might have the same symptoms.

SIGNS AND SYMPTOMS

- Slight fever, headache, feeling unwell.
- Itchy, round spots of different sizes with clear liquid inside, some may be crusty. Some lesions are old and some are new.
- Whole body: more on the trunk and less on the arms and legs.

TREATMENT

- Clean with water and soap.
- Cut the fingernails, to reduce damage from scratching.
- Apply **GV** only on infected spots. Secondary infections: antibiotic treatment (see p.259).
- Treat the fever with paracetamol
- Only in cases of severe itching, give PO **chlorpheniramine** 1-3 days.
- If lesions in the eye treat with an ointment such as **Terramycin Eye Ointment**.

HERPES ZOSTER (SHINGLES)

DEFINITION

A rash caused by the reactivation of the chickenpox virus. It occurs to people that have previously had chickenpox. After you recover from chickenpox, some of the virus (varicella zoster) stays in the body in an inactivated form in the spinal cord. Sometimes the virus becomes active again and causes shingles. It may happen at any age, but frequently in patients with low immunity (see *HIV p.145*). More common in adults than children.

SIGNS AND SYMPTOMS

- Often fever and chills a few days before the rash develops. Feels unwell.
- Moderate to severe neurologic pain (needles feeling, sharp pain, numbness) on skin before rash develops.
- 4 or 5 days later the vesicles appear on a red base (similar to herpes simplex but over a larger area).
- The vesicles become pustules, then crusts.
- The rash is distinctive because it appears in the **area of the affected nerve (dermatome), therefore it is usually only on one side of the body**, very often on the chest but it can be found anywhere on the skin or mucosa (depending on the affected nerve).

TREATMENT

- Same treatment as for Herpes Simplex.
- Apply cold compresses.
- Follow pain protocol (see p.31).
- Consider **amitriptyline** if pain is not improved by painkillers as it is very effective against nerve pain.
- If eye is affected or severe disease discuss with the doctor and consider referral. Acyclovir can help if available, but only if given in the first 48 hours after eruption of lesions.

Mild or moderate infections:

- No antiviral treatment is needed and supportive care is enough

Severe cases with necrotic lesions or extensive lesions or in the face spreading to the eye:

- Oral **acyclovir**, if available, 200mg 5 times per day for minimum 5 days, given **in the first 48 hours** after eruption of lesions.

The patient with shingles is infectious to people who have not had chicken pox.

This is especially important for contact with pregnant women – **advise them to stay away from pregnant women who have never had chickenpox.**

25.4 PARASITIC SKIN INFECTIONS

*For photo, see
Appendix 1*

25.4.1. SCABIES

DEFINITION

Scabies is a parasitic infection of the skin. It is common in this region and spreads easily. Transmission is by close direct contact. The mite invades into the skin causing an inflammatory reaction.

SIGNS AND SYMPTOMS

- Itching (especially at night).
- Small sores, scratch marks and burrows (tunnels under the skin) can be found between the fingers and toes, around the wrists, axilla or groin and other places.
- The back and face are not affected.
- Other members in the family may have it too. If suspect in child examine the mother, especially her hands. Scabies lasts for weeks to months. The sores can become infected: If there are any sign of infection treat with antibiotics first and then the scabies.

25.4.3. LARVA CURRENS (STRONGYLOIDES)

DEFINITION

The disease is caused by migrating *Strongyloides stercoralis* larvae. The worm enters the body by making a hole in the skin and then moves around the body causing a rash.

For photo, see
Appendix 1

SIGNS AND SYMPTOMS

Acute strongyloides

- The area around where the worm entered the body may have redness and itching and last for up to a few weeks.
- May also get pulmonary symptoms (dry cough, dyspnoea, wheeze) if the worm travels to the lungs.
- Once larvae get to the intestine they can cause GI symptoms e.g. bloating, abdominal/epigastric pain, vomiting, diarrhoea.

Chronic strongyloides

- Intestinal larvae may re-infect their host (auto-infection) by penetrating through the intestinal wall or from the skin around the anus.
- Chronic infections lead to recurrent pulmonary and GI symptoms.
- When the worm moves around the body it causes itchy red tracks on the skin between the neck and knees that last for several hours to days. The worm/rash moves 5-10cm per hour and the rash comes and goes. This rash is called **larva currens**.

DIAGNOSIS

Larvae may be detected in a stool examination.

TREATMENT

- **First line: Ivermectin if available.**
- **Second line: albendazole** Adult/Child >6m: 400mg OD for 3 days.
 - if >6m but <10kg give 200mg OD)
- See *Worm treatment table, p.122*

PREVENTION

Wearing shoes or sandals.

25.5 NON-INFECTIVE SKIN RASH

25.5.1. URTICARIA (ALLERGIC RASH)

For photo, see
Appendix 1

DEFINITION

Allergic skin reaction. Often it is impossible to find the cause of the allergy, but common causes are:

- Medication: If the patient is under a new treatment (e.g. quinine, amoxicillin, co-trimoxazole)
- Insect bites, cat hair, worms, colouring in drinks, contact with plants/metals, food, pesticides

SIGNS AND SYMPTOMS

A raised, oedematous, red rash that changes quickly in size and shape (within minutes) on the whole body. Swellings are transient (they persist only for minutes - maximum 24 hours). Very itchy.

TREATMENT

1. Cool down with water.
2. Remove the cause: stop new medication, stop contact with plants, metals, foods etc.
3. Cut fingernails to prevent scratching which can lead to infection.
4. If severe itching: give **chlorpheniramine** until itching stops.

In case of oedema of the face or difficulty breathing or wheeze follow DRS ABCDE anaphylactic shock protocol, see p.16

25.5.2. ECZEMA

For photo, see
Appendix 1

DEFINITION

Non-specific inflammatory skin reaction to special factors (depends on the patient).

SIGNS AND SYMPTOMS

- Red, scaly/dry, itchy lesions
- Anywhere on the body, usually on both sides of the body (especially at the front of the elbows and behind the knees (flexure areas).
- It may be localised or widespread, dry or wet but usually long lasting.
- The dry lesions are very itchy and there is serous (like water) exudation, there may be vesicles.
- It can appear and disappear many times at the same place.
- Chronic eczema can cause thickening of the skin (lichenification)
- Secondary infections are common.
- Eczema can look similar to ringworm, especially on the face.

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If infected, treat with antibiotics first and then the eczema.
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TREATMENT

- **Do not** scratch; try socks over the hands at night to prevent unconscious scratching.
 - Wash skin only with water: do not use soap on affected areas. **Do not** scrub with water
 - Advise cotton clothing.
 - Look for and treat any other skin disease e.g. scabies, secondary bacterial infection
 - **Rinse clothes very well, so that no soap stays on.**
1. **Mild:** areas of dry skin sometimes itchy, may have small areas of redness
 - **Vaseline/** white soft paraffin apply QID (advise to protect skin from sun when using Vaseline)
 - **+/- chlorpheniramine** oral if very itchy
 2. **Moderate:** dry skin, red patches with scratch marks, may have small areas of skin thickening
 - **Vaseline/** white soft paraffin apply QID (advise to protect skin from sun when using vaseline) or use before bedtime and cover the skin (e.g. long pants and shirt, socks on feet and hands) to keep in the moisture
 - **+/- chlorpheniramine** oral if very itchy
 - **Hydrocortisone 1% cream (mild steroid),**
 - **Note:** if there is bacterial infection, treat bacterial infection first
 - Apply small amount at night for 1 week, increase to BID if not improved
 - Always use for shortest time possible, once improved stop or decrease
 - Avoid any areas of broken skin
 - If really need to use for long time then consider alternate days or weekly.
 3. **Severe:** large areas of dry skin, constant itching, red, may be bleeding/weeping/infected, large areas of thickened skin.
 - As for moderate eczema
 - **Triamcinolone (moderate steroid)**
 - Apply small amount BID
 - Always use for the shortest time possible, once improved decrease to hydrocortisone BD
 - Consider betamethasone (high strength steroid) if not improved with triamcinolone.
 - Avoid face, eyes, axillae and genital areas because the skin is very thin
 - If very severe and above treatment doesn't work can consider **PO prednisolone** 0.5mg/kg/day.

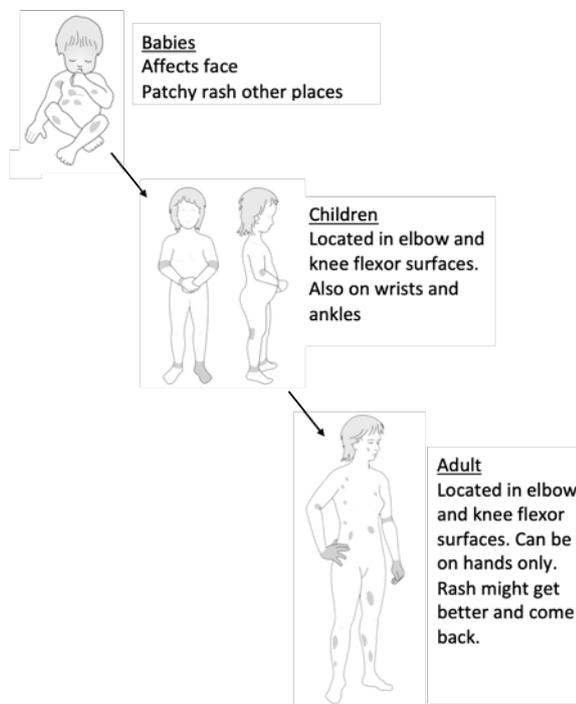
Steroid creams have different strengths: **hydrocortisone** is mild, **triamcinolone** is moderate, **betamethasone** is high strength. Be careful when applying moderate or high strength steroid creams for a long time as it can damage the skin. Use the weakest cream that you can for the shortest time possible.

COMPLICATION

Eczema herpeticum

- Is a serious skin infection with herpes virus mostly seen as a complication of eczema
- Localised eruption of blisters with crusting. Systemically unwell with fever.
- Treat with **acyclovir** PO 200mg (100mg if <2yrs old) 5 times per day for 10 days. If immunocompromised e.g. HIV give double dose.

Figure 25.2 Distribution of eczema rash on the body



25.5.3. PSORIASIS

For photo, see
Appendix 1

DEFINITION

A chronic inflammatory skin condition that produces thick scaly skin.

SIGNS AND SYMPTOMS

- Skin: chronic scaly pink lesions on extensor surfaces e.g. front of knees, elbows, scalp, trunk, sometimes itchy.
- Nails: pits in nails, yellow colour.
- Joints: can get swollen joints, especially hands and feet (psoriatic arthritis).

There are many different types of psoriasis. Two most common types are:

1. **Plaque psoriasis:** lesions on extensor surfaces.
2. **Guttate psoriasis:** multiple 1-10mm lesions small scaly lesions (like tear drops) mainly on trunk, upper arms and thighs.

TREATMENT

1. Stop smoking, avoid alcohol and decrease weight if overweight
2. Expose skin to sunlight
3. Apply **Vaseline** QID
4. Consider **hydrocortisone** cream if not improving or if acute flare up (see information above about steroid cream).
5. Give **NSAIDs** +/- **omeprazole** for stomach protection in cases of arthritis.
6. For very thickened skin lesions try **Whitfield ointment** twice a week – but stop if getting worse.

For photo, see
Appendix 1

25.6 LEPROSY

Leprosy can look like many other skin conditions, some nerve and bone and eye conditions

DEFINITION

Leprosy is caused by a bacteria, *Mycobacterium Leprae*. If treatment is not given, smear positive patients can spread the bacteria from their noses into the air. Risk of infection from air is not very high. Touching the skin of a person with leprosy does NOT cause infection. Almost all properly treated patients are NOT infectious. Most people do NOT get leprosy illness even if they are in contact with the bacteria.

Think of leprosy when you have a patient with:

- **One or more skin patches** that is
 - Pale or discoloured (reddish or copper-brown colour)
 - Do not itch
 - Lasts for 6 weeks or more
 - Does not look like one of the common skin conditions
 - Does not improve with other treatment.
- **Both skin changes AND nerve signs** (enlargement of nerve, reduced feeling or loss of movement). A pale or discoloured skin patch with reduced feeling and an enlarged nerve is very likely to be leprosy.

Leprosy should be considered in all patients with painless injuries, burn wounds or ulceration of the hands or feet.

SIGNS AND SYMPTOMS

Skin	Maculae (flat), often pale centre with raised red edges. Papules (raised, solid, rounded), often red. Plaques (raised, spread), often red.
Nerves	Enlargement of peripheral nerves in legs, arms, neck or head outside brain. Peripheral nerve pain, nerve tenderness, reduced skin feeling, weakness or loss of muscle strength (claw hand, wrist drop, foot drop, facial palsy), muscle wasting.
Eyes	Loss of feeling over conjunctiva (front surface of eye). The patient is not able to close the eye (lagophthalmos), the lower eye lid turns out (ectropion). Eyebrow loss, eyelashes thin and turn in (entropion). Dry eyes, conjunctivitis, corneal damage, iritis (inflammation of the iris), blindness.

If your area has a leprosy control programme, refer any suspected patient for diagnosis and management.

History

Short duration (3 weeks or less), and itching make the diagnosis less likely.

Physical examination

1. Check the patient's **entire body**, in a good light, for abnormal patches of skin - colour change, dryness, thicker than normal, loss of hair.
2. Check **nerves for enlargement** (can see or palpate nerve):
 - Ulnar - inside and slightly above the elbow in the ulnar groove (keep arm bent).
 - Median - in front of the elbow and in front of wrist.
 - Radial - over the distal radius, on the thumb side above the wrist.
 - Peroneal (lateral popliteal) - behind the fibula at the outside of the knee (knee bent)
 - Tibial - behind the medial malleolus at the inside of the ankle.
 - Posterior auricular - in the neck, below and behind the ear, turn the neck.
 - Cutaneous nerves near to a skin patch.
3. Check for **sensation** by testing the centre of skin lesions for loss of 'light touch' feeling using a piece of cotton wool or paper. Also for pain with a common pin (pinprick) and temperature sensation loss. Loss of sensation suggests leprosy. 'Light touch' feeling is lost before pain sensation.
4. Check **cornea** (trigeminal nerve) for loss of touch sensation, using cotton wool.
5. Check muscles of the feet, hands and face for **weakness** and for loss of muscle

Figure 25.3 Leprosy nodules on auricle and pinna



If suspect a patient has leprosy – discuss with a doctor, the patient will need to be referred to a special leprosy programme for diagnosis and treatment

Below is an overview of the treatment that would be undertaken in the specialist centre/hospital.

DIAGNOSIS

Diagnosis is confirmed by finding the bacteria in:

1. Split skin smear test- scraping of skin from 2-4 areas with lesions and 2 normal areas of skin (normally ear lobes) and sent on a slide for Ziehl Neelsen (ZN) and AFB testing. This is often only done in specialist clinics/hospitals.
2. Nasal swab

Even if the skin and nose smears are negative, a patient can still have leprosy. Therefore, diagnosis of leprosy relies on clinical signs and symptoms in cases when split skin/nasal swab smear is negative. Thorough clinical examination is important.

TREATMENT (if not available, refer for treatment)

1. Medical treatment with drugs is the best way to help patients with leprosy.
2. It is easy to treat the infection, but nerve damage will never go away. It is important to diagnose and start treatment early, to prevent nerve damage.
3. **Early recognition and effective treatment can prevent deformity and disability.**
4. Multiple drug treatment (MDT) is used for leprosy in order to prevent development of drug resistance.
5. Counsel the patient to:
 - a. Take the drugs regularly as prescribed
 - b. Take correct doses
 - c. Finish all treatment until finished
 - d. Finishing treatment is very important to prevent drug resistance and to prevent disease from returning (relapse).
6. Treatment regimen varies depending on the clinical staging of the disease (by World Health Organisation (WHO)).
See Figure 25.4 below.

Figure 25. 4 WHO Staging for leprosy:

Stage	Characteristics	Treatment regimen (dosage for adult)
Multibacillary leprosy	> 5 skin lesions	Rifampicin 600mg once/month x 12 months AND Clofazimine 50mg OD daily + 300mg once/month x 12 months
Paucibacillary leprosy	2-5 skin lesions	Rifampicin 600mg once/month x 6 months AND Dapsone 100mg OD daily x 6 months
Single skin lesion paucibacillary leprosy	Single skin lesion	Rifampicin 600mg STAT AND Ofloxacin 400mg STAT AND Minocycline 100mg STAT (single dose of each)

Drug side-effects:

- Dapsone can produce haemolytic anaemia and G6PD activity should be tested before giving. Dapsone should be used under close supervision or avoided in G6PD-deficient patients.
- Dapsone may cause skin rash/skin reaction, sometimes severe.
- Clofazimine turns the skin dry or reddish /brown. Skin discoloration fades slowly when the drug treatment is finished. Vaseline or vegetable oil can be applied to relieve from skin dryness.
- Ethionamide or prothionamide are alternatives to clofazimine and may cause liver problems.
- Rifampicin turns urine reddish colour. This does not cause any harm.

Acute medical emergencies in leprosy include:

1. **Severe reaction with sudden onset**, usually whilst on treatment, due to a strengthening of immunity reaction causing new nerve or skin damage and presenting with:
 - a) rapid nerve swelling with pain and tenderness.
 - b) sudden loss of motor function (wrist drop, foot drop, facial palsy).
 - c) old skin lesions becoming painful, tender, may ulcerate.

TREATMENT: **prednisolone** in high dose (adult 1mg/kg/day) for 3-5 days then decrease the dose every week (decrease by 5mg/day each week) over 3 to 4 months. Continue anti-leprosy treatment.

2. **Severe reaction in an inadequately treated patient**, due to weakening of immunity, with increasing new skin lesions and change in old lesions to become more 'lepromatous' (uniform, thick, extensive, nodular) in nature.

TREATMENT: Restart anti-leprosy drugs in proper dosage and use prednisolone

PREVENTION of damage to feet, hands and eyes that have lost sensation is very important.

- Use shoes with strong bottom sole (like car tyre rubber) to protect against trauma from walking.
- Gloves can help to protect hands during manual work and cooking.
- Plain glasses or goggles can help to protect eyes without sensation.
- Joint stiffness can be prevented by gentle rotation of affected joints every day.

EDUCATION

Educate patients how to prevent injury to numb hands, feet and eyes. Rest is the best, but is often not possible. Every day, the patient should check the numb area for trauma and come to the clinic if there is any wound. Be careful to avoid burns.

REHABILITATION

Surgery and physiotherapy are important for management of ulcers and bone and muscle deformities of the hands, feet and face. Many paralysed muscles can be helped by reconstructive surgery. It is important to emphasise that surgery and drugs cannot improve lost sensation. Organisations such as Handicap International may be able to help and referral should be considered.

IMPORTANT POINTS FOR LEPROSY

- Early detection, and treatment of the disease.
- Early recognition and adequate treatment of complications.
- Patient education in self-care.

Note: Many people with leprosy become depressed by how they are treated by other people. It is important to recognize the patient's feelings. It is also important to educate the community about the disease because it is easy to treat and not so infectious. This can help the community to accept leprosy patients.

25.7 WOUNDS

DEFINITION

A wound is a break in the skin that can be caused by many different things e.g. cut, bite, surgical wound etc.

TREATMENT

For every wound follow these steps to treat the wound. For more detail of each step see below.

1. Always take **general precautions** for you and the patient e.g. gloves
2. **Remove any old dressing**
3. **Examine** the wound
4. **Clean** the wound – clean with polyvidone iodine solution and sterile water or normal saline and rinse.
5. **Explore** the wound – use local anaesthetic **1% lidocaine** and wait for 2 minutes, look for foreign bodies.
6. **Tetanus prevention**
7. **Assess for sensation, function and blood supply** to the limb
8. **Excision** of the wound – remove non-viable tissue
9. **Suturing** – consider immediate or delayed suturing
10. **Dressing**
11. **Consider complications**

1. General precautions

- Make sure you explain the procedure to the patient.
- Always wear protective equipment e.g. gloves.
- Always have someone to help you.
- Try to be as sterile as possible, sterilise equipment between patients.
- Always go from clean to dirty e.g. if multiple wounds start with the cleaner wounds.
- Always give painkillers before examining wound, wait for enough time to allow the medication to work.
- Discard of all sharps in the sharps containers.
- If wounds are more than 6 hours or contaminated, then delay suturing.
- Give **Tetanus prevention care (see below)**.
- **Consider referring deep severe wounds or wounds that cover large areas.**

2. Remove old dressing

- Wash hands or disinfect with alcohol rub.
- Use non-sterile gloves, remove the tape/bandage.
- If the last bandage/gauze is stuck to the wound loosen with NSS or sterile water before removing.
- Look at the gauze, if there is lots of discharge/green colour/smells bad then suspect a wound infection and consider starting antibiotics (*see p.258 and 259*).
- Discard the dressing and non-sterile gloves in the correct place.

3. Examine the wound

- **Look at the wound colour**
 - Black area = necrosis, wet or dry infected eschar (be careful to distinguish from dark red old blood and black).
 - Yellow/green area = infected tissue/pus.
 - Red area = granulation – usually a sign of healing (but red edges = inflammation or infection). If the granulation tissue is heaped up higher than the edges of the normal skin, you should dress the wound with some pressure to push down the granulation tissue. This will allow the normal skin edges to grow over the granulation tissue.
 - Pink area = epithelisation, final stages of wound healing.
- **Look for infection**
 - If the wound is sutured and you see the following signs, then there is an infection and you should remove one or more of the sutures and assess for general signs of infection e.g. fever:
 - Red, indurated and painful edges.
 - Drainage of pus between the sutures by itself or when pressure applied.
 - Lymphangitis or subcutaneous crepitations around the wound.
 - If you think the wound is infected (or it is a high risk wound (*see below*)) treat with **cloxacillin** (*see cellulitis p.259*). Note in immunosuppression e.g. diabetes, kidney failure, HIV etc. healing can be delayed. Treat with antibiotics for a longer time if there is a slowly healing infection.

4. Clean the wound

- Wash hands again/disinfect with alcohol rub.
- Use sterile gloves if available, otherwise use a new pair of non-sterile gloves.
- Clean according to what the wound looks like:
 - **Clean sutured or clean open wound**; use NSS to remove any dirt, work from the cleanest to the dirtiest area, use new swabs for each stroke, dab dry with sterile gauze.
 - **Necrotic or infected open wounds** – clean with polyvidone iodine (7.5% scrub 1 part solution + 4 parts of NSS). Rinse thoroughly with normal saline then dab dry with sterile gauze.

5. Explore the wound

- If the wound is not clean and you are worried that there may be a foreign body inside use local anaesthetic **1% lidocaine** and wait for 2 minutes, explore the wound to look for foreign bodies.

6. Consider Tetanus Prevention

- If high risk wound: deep wounds, war wounds, wounds with bone fractures, wounds with devitalized (dead, necrotic) tissue, extensive burns, foreign body; wounds older than 6 hours inject tetanus immunoglobulin around the wound (*see below*).

7. Assess for sensation, function and blood supply to the limb

- Make sure the patient can still move and feel the affected area, and that the skin is pink, not cold and cap refill is <2 seconds.
- If there is any abnormality discuss with the doctor. If the wound is severe then the patient may need an amputation which may not be available at the clinic, so consider referral.

8. Excise the wound

- Remove any non-viable tissue carefully using sterile equipment.

9. Suture the wound (if necessary)

- Immediately suture:** if the wound is clean, skin is normal, wound is less than 6 hours old (or less than 24 hours old if on face, scalp, upper limbs, or hands).
- Delay suture:** if bite, bullet/shell/mine/shrapnel wound, if the skin has bruising or necrosis, if does not fit criteria for immediate suturing, do daily dressing change with cleaning and removal of necrotic tissue and consider suturing after 72 hours.

10. Dressing the wound

- Clean sutured or clean open wound:** re-cover a wound with sterile gauze and bandage.
- Necrotic or infected open wounds:** Apply sterile Vaseline and remove all necrotic tissue at each dressing change until the wound is clean.

11. Consider complications

- Foreign body (from the trauma or from gauze packing) can delay healing and make the wound worse. If the wound is not healing, inspect wound inside for foreign bodies. May need to do incision to inspect deep wounds.
- Granulation tissue grows faster than surrounding skin, and the skin edges cannot grow over the heaping granulation tissue. Use skin grafting over the granulated tissue. If skin graft is not available, use moderate pressure dressing to push down the granulation tissue and this will allow skin edges to cover the large wound or ulcer. It can be many weeks of daily dressing changes until the wound is completely healed.

Figure 25.5 Tetanus prevention for wounds

RISK	PATIENT VACCINATION COMPLETE			PATIENT VACCINATION NOT COMPLETE (< 3 doses)
	Last booster was: < 5 years	> 5 years	> 10 years	
LOW *	None	None	Booster	Start or complete vaccination (full course of 5 doses)
HIGH **	Antibiotics	Antibiotics Booster	Antibiotics Serotherapy Booster	Antibiotics Serotherapy Start or complete vaccination

* Low risk wound: minor wounds, scratch.

** High risk wound: deep wounds, war wounds, wounds with bone fractures, wounds with devitalised tissue, extensive burns, foreign bodies, wounds older than 6 hours.

Antibiotics:

Cloxacillin Adult: 500mg QID; Child: 15mg/kg QID for 5 days

Consider adding ciprofloxacin Adult: 500mg BID; Child 7.5mg/kg BID x 5-7 days if the wound was exposed to soil (e.g. wounds on the feet, wound caused by wood or bamboo), or if there is no improvement with cloxacillin.

Booster:

Tetanus toxoid vaccine 0.5 ml IM into upper arm or buttock

Serotherapy:

Adults and children: **250 units Tetanus Immune Globulin (TIG)** IM STAT with part of the dose injected around the wound.

If the injury occurred >24 hours ago, there is serious infection or after burns give **500 units Tetanus Immune Globulin (TIG)**

Note: Inject the vaccine and the immunoglobulin in two different sites using separate syringes for each.

25.8 BURNS

DEFINITION

Burns are injuries to tissues caused by heat, friction, electricity, radiation or chemicals.

HISTORY

- When did the burn take place?
- What caused the burn? Electrical burns can cause more extensive damage than is first seen.
- What is the age of the patient? Burns are more severe in the very old and very young.
- Has there been any inhalation of hot smoke? Look for dyspnoea with chest wall indrawing, burned nose hairs or soot around the nose and mouth.

EXAMINATION

Severity of burns are evaluated on the basis of the **depth**, **location**, and **size** of the burn.

1. Depth of the burn:

Superficial burn:	Red, dry and painful, it does not blister.
Superficial partial thickness burn:	Pink and moist blisters may be present.
Deep partial thickness burn:	White or mottled pink, with some painless areas.
Full thickness burn:	White, mottled or charred and are dry.

Note: Patients with electrical burns need an ECG

2. Location of the burn:

Document in the IPD chart or lemma the location of the burn)

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Burns are more severe when on the face, hands, joints and perineum.

.....

3. Size of the burn:

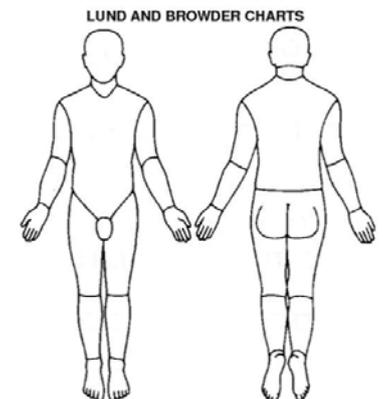
To calculate the amount of burned skin (% body surface area) use the following table:

Figure 25.6 Body surface area percentage by age

Lund-Browder table – Percentage of body surface area according to age

Location	< 1 year	1-4 years	5-9 years	10-15 years	Adults
Head	19	17	13	10	7
Neck	2	2	2	2	2
Anterior trunk	13	13	13	13	13
Posterior trunk	13	13	13	13	13
Right buttock	2.5	2.5	2.5	2.5	2.5
Left buttock	2.5	2.5	2.5	2.5	2.5
Perineum/genitalia	1	1	1	1	1
Right upper arm	4	4	4	4	4
Left upper arm	4	4	4	4	4
Right lower arm	3	3	3	3	3
Left lower arm	3	3	3	3	3
Right hand	2.5	2.5	2.5	2.5	2.5
Left hand	2.5	2.5	2.5	2.5	2.5
Right thigh	5.5	6.5	8.5	8.5	9.5
Left thigh	5.5	6.5	8.5	8.5	9.5
Right leg	5	5	5.5	6	7
Left leg	5	5	5.5	6	7
Right foot	3.5	3.5	3.5	3.5	3.5
Left foot	3.5	3.5	3.5	3.5	3.5

Figure 25.7 Body surface area chart



For example:

2 year old with burn to right upper arm (=4%), right lower arm (=3%), and hand (=2.5%).

Total body surface = 4 + 3 + 2.5 = **9.5%**

CLASSIFICATION

Mild burn:

- Patient is in good condition
- No burns on face, neck hands, joints or perineum. Skin is intact (maybe with vesicles)
- Area: partial thickness less than 10% in children, 15% in adults; full thickness less than 2%

Severe burn (always admit to IPD):

- Burns on face, hands, neck joints or perineum
- Inhalation of hot smoke: burns on face, burnt nasal hairs, noisy breathing
- Electrical and chemical burns or burns from explosions
- Area: partial thickness more than 10% children or 15% adults; or full thickness burn
- Age <3yrs or >60yrs or significant co-morbidities e.g. epilepsy, malnutrition

TREATMENT OF SEVERE BURN

1. On admission:

****Note:** For all unwell patients a full DRS AB-CABDE/S assessment and treatment (see p.13) should be done. You should ALWAYS assess for everything and TREAT any abnormality BEFORE moving to the next step**

Figure 25.8 DRS ABCDE for burns

	ASSESS FOR	TREATMENTS LIKELY TO BE NEEDED FOR SHOCK DUE TO BURNS
DRS	Danger Response Send for help	Gloves Safe place Dall for help
A	Airway obstruction Speaking, stridor, swelling, secretions	Simple airway manoeuvres +/- airway if needed Suction if needed (and available) Oxygen (high flow) if any signs of smoke inhalation
B	RR, SpO ₂ , cyanosis Chest indrawing/ tracheal tug Listen to chest	Position patient: If dyspnoea sit up right (but if very low BP raise legs to level above head)
C	HR, BP, Cap refill Urine output, Temp Listen to HS	Put in 2 biggest (16G or 18G) IV cannula – take bloods e.g. Hct, CBC, MS, BC, dextrose etc. If signs of shock give fluid bolus RL (Ringer's Lactate)
D	Check dextrose Any drugs needed e.g. antibiotics, paracetamol	Give analgesia e.g. paracetamol, tramadol Give dextrose if low
E	AVPU/GCS Expose and examine all over body	Assess whole body for burns If chemical burn flush with lots of water for 15-30minutes Review notes and charts History, further investigations, treatment plan
DISCUSS WITH DOCTOR		
ASSESS RESPONSE – continue cycle with CABDE/S assessment		

Note: Consider referral if burn is:

1. >10% in size
2. Involves the face, genitalia or joints
3. Is all the way around a limb e.g. circle around the arm
4. Electrical burn
5. Signs of smoke inhalation

Is associated with other trauma

2. Once patient is stabilised:

- Remove clothes that are not stuck to the burn.
- Take a history of the burn.
- Assess the burn using sterile gloves– extent, depth, location, associated injuries e.g. fractures.
- Use the table above to calculate the %BSA (body surface area) affected.
- Keep patient warm with sterile/clean sheet.
- If burns >15% BSA or electrical burns or burns of perineum/genitalia insert a catheter.

3. Management in first 48 hours:

Figure 25.9 Fluid resuscitation for burns

	Less than 12yrs	12 years or more
0-8 hrs	2ml/kg x % BSA of RL + maintenance fluid per hour for 8 hrs	2ml/kg x % BSA of RL
8-24 hrs	2ml/kg x % BSA of RL + maintenance fluid per hour for 16 hrs	2ml/kg x % BSA of RL
24-48 hrs	Daily maintenance IV minus oral fluids e.g. milk, clear soup (do not count drinking water)	40ml/kg RL minus oral fluids e.g. milk, clear soup (do not count drinking water)

RL = Ringer Lactate

Maintenance Fluid = alternate RL and D5W

Nutrition

- Start feeding at or before 8 hours.
- If BSA is >20% need high energy foods.

Antibiotics

- Only give antibiotics if there are signs of infection.
- Use precautions against infection e.g. good hygiene, careful wound management.

Tetanus immunization/prophylaxis

Physiotherapy

- Advise the patient/family that need to move the affected limb as much as pain allows to prevent contractions (thick scarring of skin near joints) and disability in the future. This is most important when burns cover joints (e.g. fingers, wrist, shoulder, knees, toes). If possible, can consider referral to organisations e.g. Handicap International.

4. Local treatment

- Ensure sterile technique at all times when possible.
- Ensure adequate analgesia or sedation e.g. ketamine, diazepam
- Clean the burn with polyvidone iodine scrub solution (1 volume 7.5% solution mixed with 4 volumes of NSS).
- Remove any blisters with forceps and scissors.
- Rinse with NSS and dry the skin with sterile gauze.
- Apply silver sulfadiazine (or cetrimide cream) (avoid antibiotic creams) if available.
- Apply a greasy dressing or gauze with sterile Vaseline over the wound, cut the gauze to the exact size of the wound.
- Cover with sterile gauze and a loose bandage - be careful: if the bandage is too tight it can stop the blood supply to the limb.
- Try to keep the limb raised.
- Dress every 48hours or every day if infected or in certain areas e.g. perineum – assess for signs of ischaemia e.g. cyanosis, pale extremity, slow cap refill, no sensation.
- Monitor every day for pain, bleeding, healing and infection.

APPENDICIES

Appendix No.	Title
Appendix 1	Diseases in coloured pictures ^{*update}
Appendix 2	Thailand and Myanmar vaccine schedules 2019 ^{*new}
Appendix 3	Trachoma grading card
Appendix 4	Family planning guide ^{*update} – flowsheet, version 2, 04 Dec 2019
Appendix 5	GBV pocket guide (Burmese language) ^{*new}
Appendix 6	GBV SMRU guide ^{*new} – flowsheet, version 6_5, 03 Jan 2020
Appendix 7	Surveillance outbreak management
Appendix 8	How to make ORS
Appendix 9	IV fluid table, version 1, 19 Feb 2014
Appendix 10	UTI management in children < 3 years old ^{*update} , updated 5 Nov 2019
Appendix 11	BP medication aid ^{*new} (use if more expensive BP drugs are available)
Appendix 12a	Paediatric blood pressure tables for boys ^{*new} (Sep 2017) (Flynn JT, Kaelber DC, Baker-Smith CM, et al. Clinical practice guideline for screening and management of high blood pressure in children and adolescents. Pediatrics. 2017 Sep 1;140(3):e20171904)
Appendix 12b	Paediatric blood pressure tables for girls ^{*new} (Sep 2017)
Appendix 13	Management of haemolysis SOP ^{*update} , version 18 Nov 2019
Appendix 14	IV iron treatment protocol ^{*new}
Appendix 15	Management of the febrile infant, version Nov 2010
Appendix 16	Management of meningitis in children ^{*update} , version 5 Nov 2019
Appendix 17	Antibiotic classes ^{*new}
Appendix 18	WHO growth charts for boys and girls (2007)
Appendix 19	Oxygen weaning guidelines ^{*update} , version 1, 17 Mar 2020
Appendix 20	SMRU PMTCT Guidelines ^{*update} , 7 th Edition

Appendix 1. Diseases in pictures

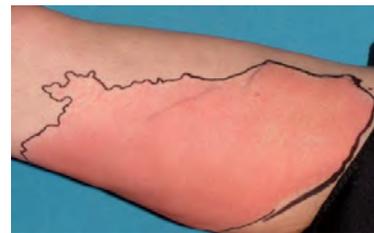
SKIN DISEASE



IMPETIGO



ABSCESS



CELLULITIS



ERYSIPELAS



RINGWORM



SCABIES



CHICKENPOX



SHINGLES



CUTANEOUS LARVA MIGRANS (ANIMAL HOOKWORM)



LARVA CURRENS



ECZEMA HERPETICUM



PSORIASIS



URTICARIAL RASH



ECZEMA



LEPROSY



MEASLES



MASTOIDITIS

Appendix 1. Diseases in pictures

EAR DISEASE



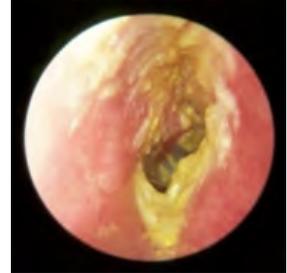
NORMAL EAR DRUM



CHRONIC (SUPPURATIVE) OTITIS MEDIA



ACUTE OTITIS MEDIA



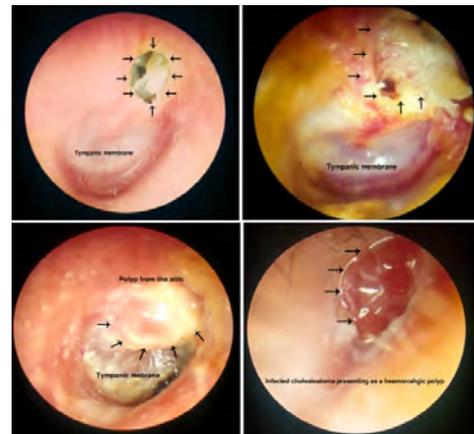
OTITIS EXTERNA



FUNGAL OTITIS EXTERNA

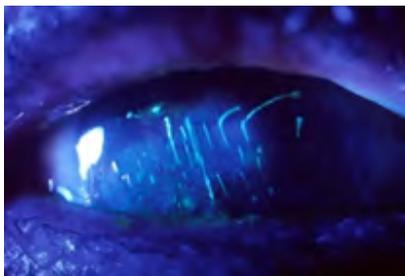


LOCALISED OTITIS EXTERNA

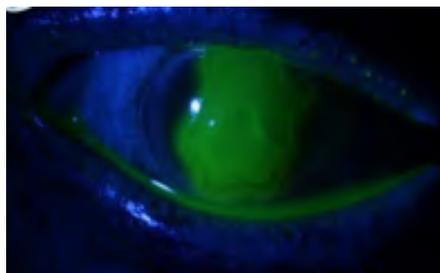


CHOLESTEATOMA

EYE DISEASE



CORNEAL ABRASION - seen with fluorescein dye



CORNEAL ULCER - seen with fluorescein dye



BITOT'S SPOT



CATARACT – can be removed with surgery. In newborns, surgery should be done within 2 weeks after birth or will cause blindness.



PTERYGIUM – extra tissue growth from sun damage. Only causes problem if extends onto the pupil. Prevent with sunglasses.



CONJUNCTIVITIS

Appendix 1. Diseases in pictures

NORMAL VARIATIONS IN THE ORAL CAVITY



EPSTEIN PEARL – single or grouped white lesions on midline palate.



BOHN'S NODULES – white nodule on the upper gum.



NATAL TEETH – usually normal. Do not remove. (<https://med.stanford.edu/newborns/professional-education/photo-gallery/mouth.html>)



MUCOCELE – benign mucosal lesion. May resolve by itself. Can refer to dentist if needed. (<https://www.merckmanuals.com/professional/multimedia/image/v37570714>)



CRYPTIC TONSILS – holes in the tonsils. This is normal. Sometimes food or other material can get stuck inside. (<https://healthool.com/holes-crypts-in-tonsils/>)



SUBMUCOSAL CLEFT PALATE - located in the soft palate. (<https://www.nationwidechildrens.org/family-resources-education/700childrens/2018/05/submucous-cleft-palate>)



BIFID UVULA – Can be sign of submucosal cleft palate, so should palpate the soft palate. Surgical treatment only needed if eating or speech are affected. (<https://www.healthline.com/health/bifid-uvula>)



GEOGRAPHIC TONGUE – most commonly is hereditary. (Thakur S, Gupta M, Tegta GR, Verma K. Indian Journal of Paediatric Dermatology. 2018 Apr 1;19(2):130.)

Appendix 1. Diseases in pictures

ABNORMALITIES OF THE MOUTH AND NECK



HERPES SIMPLEX



ORAL CANDIDA



APTHOUS ULCERS

(<https://emedicine.medscape.com/article/867080-overview>)



GINGIVITIS AND PERIODONTITIS



BACTERIAL TONSILLITIS



VIRAL PHARYNGITIS



PERI TONSILLAR ABSCESS
with displaced uvula



DIPHTHERIA – with typical grey membrane typical



MUMPS – <https://www.advanceer.com/resources/blog/2017/april/dallas-sees-outbreak-of-mumps/> and <https://doctorlib.info/infectiology/infections-central-nervous-system/17.html> (original photo from CDC)

Appendix 2. Local vaccination schedules for infants and children

THAILAND Paediatric vaccine schedule 2018 or latest available (adapted from WHO)*

Vaccine	Schedule	Notes
BCG	birth	
HepB (paediatric)	Birth, 1 mo	Dose at 1 mo given only if mother is an HB carrier
DTwP / Hep B	2, 4, 6 mo	
DTwP	18 mo, 4yo	
Td	Every 10 years after 4yo	
OPV	2, 4, 6, 18 mo, 4yo	
MMR	9mo, 2.5yo	
JEV (live attenuated)	1yr, 2.5yo	
Rotavirus	2, 4, 6mo	Start in Feb 2020 as part of routine vaccines
HPV	11 yo, repeat in 6 months	Pilot phase
Influenza (paediatric)	6mo-2yo, repeat annually	Additionally, for children with chronic disease

*Accessed on 4 Nov 2019, at

http://apps.who.int/immunization_monitoring/globalsummary/countries?countrycriteria%5Bcountry%5D%5B%5D=THA

MYANMAR Paediatric vaccine schedule 2018 or latest available (adapted from WHO)*

Vaccine	Schedule	Notes
BCG	Birth-2mo	
HepB (paediatric)	Birth	
DTwP / HIB / Hep B	2, 4, 6 mo	
OPV	2, 4, 6 mo	
MR	9mo, 18mo	
JEV (live attenuated)	9mo	
Pneumococcal (conjugated)	2, 4, 6 mo	

* Accessed on 4 Nov 2019, at

http://apps.who.int/immunization_monitoring/globalsummary/countries?countrycriteria%5Bcountry%5D%5B%5D=MMR

If you have questions, please ask the **vaccine team on site**. They can answer some questions (e.g. what if the child lives with someone who is immunosuppressed? How to give BCG in the older child?) and **give updates** (new vaccinations or new vaccine schedule).

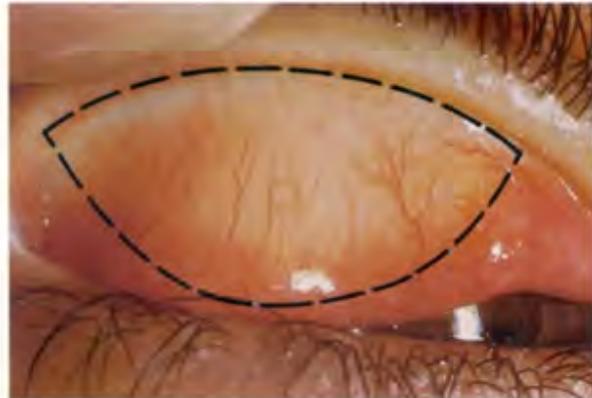
Do not give prophylactic **paracetamol** to the infant or family. You may give paracetamol if the parent asks or if the patient lives very far away. You should also give counseling to bring the infant to clinic if there is prolonged or very high fever. It may not be from the vaccination. Do not give paracetamol for low grade fever after vaccination.

TRACHOMA GRADING CARD

- Each eye must be examined and assessed separately.
- Use binocular loupes (x 2.5) and adequate lighting (either daylight or a torch).
- Signs must be clearly seen in order to be considered present.

The eyelids and cornea are observed first for inturned eyelashes and any corneal opacity. The upper eyelid is then turned over (everted) to examine the conjunctiva over the stiffer part of the upper lid (tarsal conjunctiva).

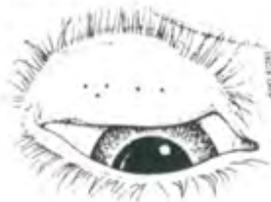
The normal conjunctiva is pink, smooth, thin and transparent. Over the whole area of the tarsal conjunctiva there are normally large deep-lying blood vessels that run vertically.



Normal tarsal conjunctiva (x 2 magnification). The dotted line shows the area to be examined.

TRACHOMATOUS INFLAMMATION – FOLLICULAR (TF): the presence of five or more follicles in the upper tarsal conjunctiva.

Follicles are round swellings that are paler than the surrounding conjunctiva, appearing white, grey or yellow. Follicles must be at least 0.5mm in diameter, i.e., at least as large as the dots shown below, to be considered.



Trachomatous inflammation – follicular (TF).

TRACHOMATOUS INFLAMMATION – INTENSE (TI): pronounced inflammatory thickening of the tarsal conjunctiva that obscures more than half of the normal deep tarsal vessels.

The tarsal conjunctiva appears red, rough and thickened. There are usually numerous follicles, which may be partially or totally covered by the thickened conjunctiva.



Trachomatous inflammation – follicular and intense (TF + TI).

Appendix 3. Trachoma grading card

TRACHOMATOUS SCARRING (TS): the presence of scarring in the tarsal conjunctiva.

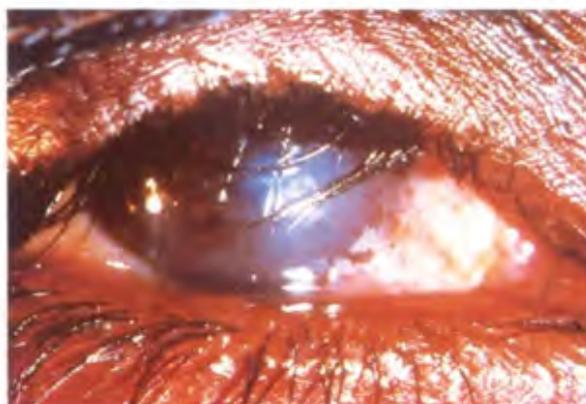
Scars are easily visible as white lines, bands, or sheets in the tarsal conjunctiva. They are glistening and fibrous in appearance. Scarring, especially diffuse fibrosis, may obscure the tarsal blood vessels.



Trachomatous scarring (TS)

TRACHOMATOUS TRICHIASIS (TT): at least one eyelash rubs on the eyeball.

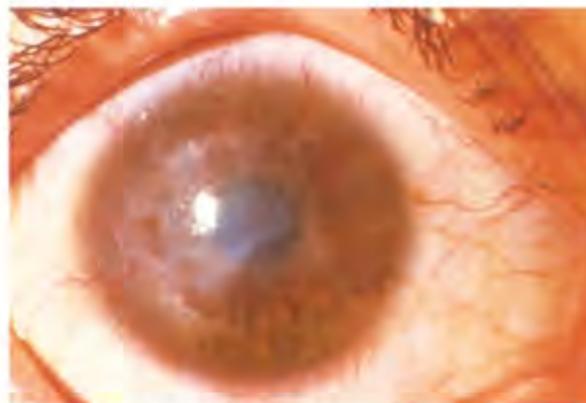
Evidence of recent removal of inturned eyelashes should also be graded as trichiasis.



Trachomatous trichiasis (TT)

CORNEAL OPACITY (CO): easily visible corneal opacity over the pupil.

The pupil margin is blurred viewed through the opacity. Such corneal opacities cause significant visual impairment (less than 6/18 or 0.3 vision), and therefore visual acuity should be measured if possible.



Corneal opacity (CO)

TF:– give topical treatment (e.g. tetracycline 1%).
TI:– give topical and consider systemic treatment.
TT:– refer for eyelid surgery.

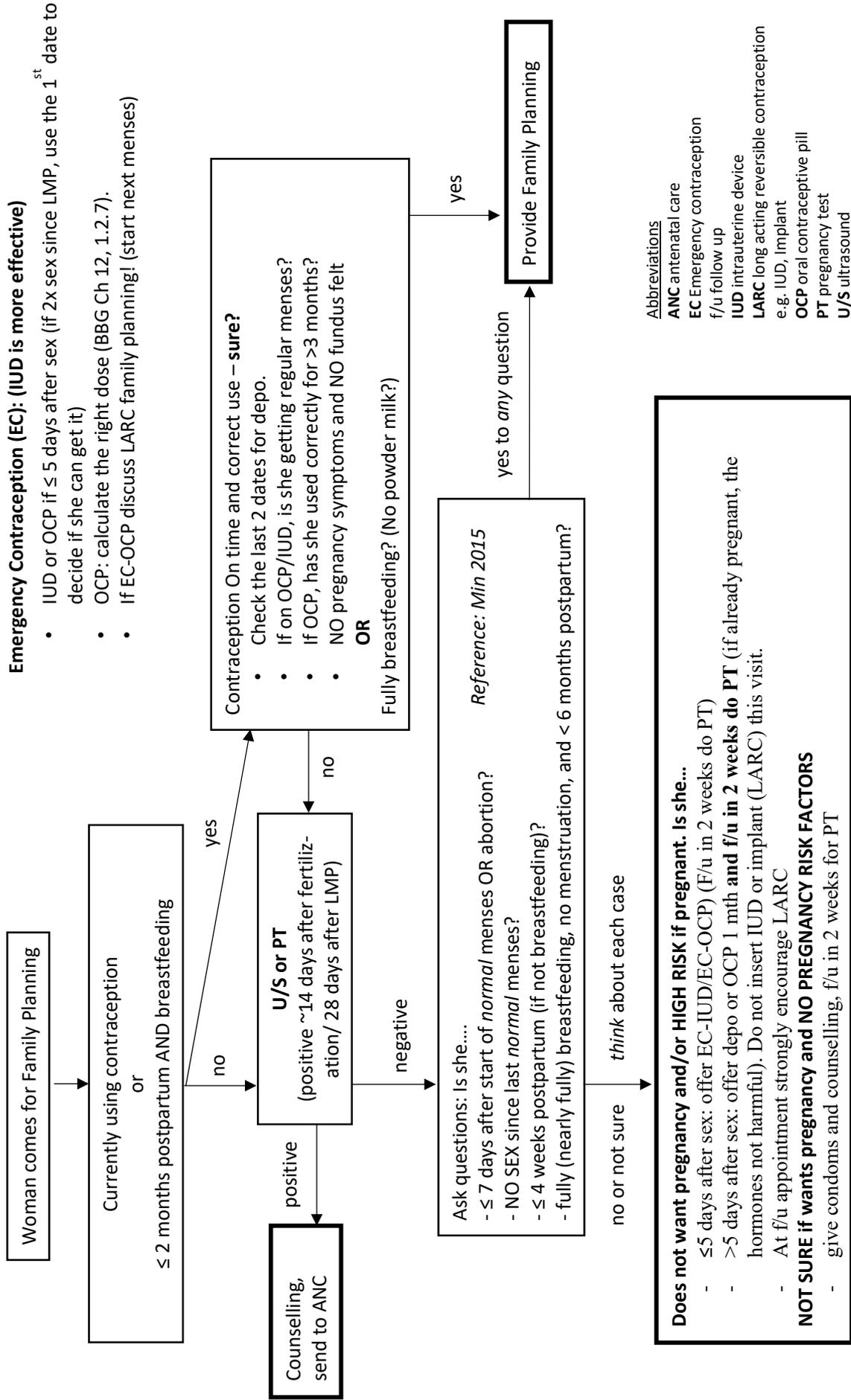


**WORLD HEALTH ORGANIZATION
PREVENTION OF BLINDNESS AND DEAFNESS**



Support from the partners of the WHO Alliance for the Global Elimination of Trachoma is acknowledged.

Appendix 4. Family Planning flowsheet



Appendix 5. GBV pocket guide.
This resource is taken from: www.gbvguidelines.org

သင့်ဧည့်သည်

ကျားမရေးရာအခြေပြု အကြမ်းဖက်မှုအတွက်

လုပ်ဆောင်ပေးနေသူများ မရှိပါက

ရှင်သန်ကျန်ရစ်သူအား
ထောက်ပံ့ပေးရန်အတွက်
ဒီဂစ်တယ်ဆောင်ရွက်မှု



This resource is a companion guide to the 2015 IASC GBV Guidelines.
www.gbvguidelines.org

www.gbvguidelines.org/pocketguide



GBV Pocket Guide

ဝန်ဆောင်မှုသတင်းအချက်အလက်စာရွက်

မိမိ၏ဆေးတွင် ရရှိနိုင်သော ဝန်ဆောင်မှုများကို ဤသတင်းအချက်အလက်စာရွက်တွင် ပြင်ဆင်တင်စား အလွယ်တကူ လက်လှမ်းမီနိုင်သည့် နေရာတွင် ထားပါ။

မိမိ၏ GBV ကျွမ်းကျင်သည့် ရေဒီယို၊ မိမိ၏ အဖွဲ့ခေါင်းဆောင်၊ မိတ်ဆက်များနှင့်အတူတွင် (၀) လူသားချင်းစာနာထောက်ထားမှုလုပ်ငန်း၊ လုပ်ဆောင်နေသော မိတ်ဆက်များမှ ဆောင်ရွက်ပေးနေသည့် ရရှိနိုင်သော ဝန်ဆောင်မှုများနှင့် (၂) သာသနာရေးအဖွဲ့များ/ ဘုရားဝတ်ပြုပေးပေးခြင်းဖြင့်အဖွဲ့များ၊ အမျိုးသမီးအဖွဲ့များ၊ သောနိဂြိုဟ်အဖွဲ့အစည်းများ၊ စသည်တို့ကိုသို့ လူထုအခြေပြုဝန်ဆောင်မှုများကို သတ်မှတ်ဖော်ထုတ်ပါ။

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	စာရင်းများ	
ကုသရေး	သတင်းအချက်အလက်များ	
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အစားအစာပျက်သည့် ထောက်ပံ့ပစ္စည်းများ/ dignity kit များ အပါအဝင် WASH	သတင်းအချက်အလက်များ	
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အခြား	သတင်းအချက်အလက်များ	
	စာရင်းများ	

ဆောင်ရွက်၊ ရှောင်ရှားနှင့် ပြောဆိုရမည့်စကားများ



ငြော့ပျက်

- ရှင်သန်ကျန်ရစ်သူ သင့်ထံ ရှင်းကပ်လာခြင်းကို ရွံရှင်ပြုပါ။ ၎င်း၏ လိုအပ်ချက်များကို နားထောင်ပါ။
- အရေးပေါ်လိုအပ်သည့် နေထိုင်မှုအခြေခံ လိုအပ်ချက်များကို သင့်အနေဖြင့် မညီညွတ် ဖြည့်ဆည်း ပံ့ပိုးပေးနိုင်မည် ဆိုသည့်ကို ဦးစွာပေးပါ။ ရှင်သန်ကျန်ရစ်သူအမျိုးမျိုးသည် အေးမိကျသောစောင့်ရှောက်မှု သို့မဟုတ် အထောက်အထားများကို ရျက်ချင်း လိုအပ်ပါသည်။
- သင် ရှိနေသည့် နေရာတွင် သင့်ကို စကားပြောရန် ရှင်သန်ကျန်ရစ်သူအနေဖြင့် သက်တောင့်သက်သာ ရှိ/မရှိ ပေးပါ။ ရှင်သန်ကျန်ရစ်သူတွင် အဖော်လိုက်လာသူတစ်ဦး ပါဝင် ထိုသူ၏ ဓမ္မတွင် ရှင်သန်ကျန်ရစ်သူ၏ အတွေးအကြံကို မေးမြန်း ပြောဆိုရန် အန္တရာယ်ရှိနိုင်ဟု တထစ်ချ ယူဆပါရန်။
- အမှောင်အယုတ်ကပ်စွာ သိမ်းသိမ်းသိမ်းသိမ်း နေနိုင်သည့် နေရာ၊ တစ်သျှား၊ စာသင်တန်း၊ မြင်းကဲ့သို့ လက်စွဲလှုပ်ရှားသော အကူအညီများကို ပေးပါ။
- လိုအပ်ပါက ရှင်သန်ကျန်ရစ်သူအတွက် ဘာသာပြန်စာအုပ်ပေး၍ သို့မဟုတ် ကူညီပံ့ပိုးပေးနိုင်မည့် သို့မဟုတ် နှစ်ရက်လုံး လုပ်ပေးနိုင်မည့် သူ/သူမအတွက် အဆင်ပြေမည့်သူ တစ်ဦးကို ရွေးချယ်ပေးလို အထက်ဖွဲ့ခံမှား၊ ကြီးစား၍ ပြောပါ။

ပြောဆိုရမည့်စကား နှုတ်ချာများ ...

- "သင့်ကို ကြည့်ရတာ အရမ်းနာကျင်စရာပဲ။ နေထိုင်မှုပုံစံကလေးနဲ့ သွားချင်သလား။"
- "ဒီနေရာက သင့်အတွက် အဆင်ပြေသလား။ သင့်အတွက် ပိုပြီးအဆင်ပြေမည့် တခြားနေရာ တစ်နေရာ ရှိသလား။ ဒီမှာ စကားပြောရတာကို စိတ်သက်တောင့်သက်သာ ရှိပါသလား။"
- "ရေတောက်ချင်သလား။ လွတ်လွတ်လပ်လပ် ထိုင်ပါရအောင်။"

နားထောင်ပါ

ငြော့ပျက်

- ရှုထောင့်တစ်ခု သဘာဝအချက်အလက် နှင့်သမျှ တို့ လျှောက်ဆိုင်ဆိုင်ပေးပါ။ ရှင်သန်ကျန်ရစ်သူကို အထောက်အပံ့ ပံ့ပိုးကူညီပေးမည့် နည်းလမ်းနှင့် စစ်လျစ်၍ အကြံဉာဏ်နှင့် လမ်းညွှန်မှု ရယူရန် လိုအပ်ပါက ကျွမ်းကျင်သူ သို့မဟုတ် သင်၏ လုပ်ပေးလိုက်သောစောင့်ရှောက်မှုနှင့် တိုင်ပင်ဆွေးနွေးရန် ရှင်သန်ကျန်ရစ်သူထံမှ ခွင့်ပြုချက် တောင်းပါ။ ရှင်သန်ကျန်ရစ်သူ၏ ပိုမိုပိုင်ဆိုင်မှုအချက်အလက်များကို ထုတ်ဖော်ခြင်းမရှိဘဲ တိုင်ပင်ဆွေးနွေးပါ။
- ဝိစိ ချောက်ဖျက် နေရာပေးသော အခြေအနေအရ လိုအပ်လျှင် သင်၏ လျှို့ဝှက်ဆိုင်ဆိုင်ပေးနိုင်မှု ကန့်သတ်ချက်များအပေါ် ရှင်သန်ကျန်ရစ်သူများ လွန်ကဲစွာ ထောက်ပံ့ပေးနိုင်ပါသည်။
- သင်၏ အနီးကပ်စွာ/တာဝန်အပေါ် လွန်ကဲစွာ ရှေ့လှည့်ချက်ထောက်ပံ့ပေးရန် လုပ်ဆောင်ပါ။
- သင်က ပြောဆိုခြင်းထက် နားထောင်ခြင်းကို ပိုလုပ်ပါ။
- နှစ်သိန်းပေးသည့် စေမေးပေးသည့် စကားအမျိုးမျိုး ပြောဆိုအောင် ပြောပါ။ မြစ်ဖျက်သည့်များသည် ငှက်ဆွဲ၏ အမြင်ပေးပေးခြင်း၊ နားလည်လက်ခံအောင် ပြောပေးပါ။

ပြောဆိုရမည့်စကား နှုတ်ချာများ ...

- "ကျွန်တော်/ကျွန်မ သာယာလှပစွာပေးပါ။"
- "ကျွန်တော်/ကျွန်မတို့ကြားမှာ ပြောဆိုသမျှကိုး၊ တခြား ဘယ်သူမှ မသိစေရပါဘူး။ သင့်ရဲ့ ခွင့်ပြုချက်ရရင် ဘယ်သူ့ကိုမှ ဘာကိုမှ အသိပေးမှာ မဟုတ်ပါဘူး။"
- "သင့်ကို ကူညီဖို့ ကျွန်တော်/ကျွန်မ တတ်နိုင်သမျှ ကြိုးစားပေးပါမယ်။ ဒါပေမဲ့ ကျွန်တော်/ကျွန်မတို့ နှစ်သိန်းဆွေးနွေးပေးသူတစ်ဦး မဟုတ်ပါဘူး။ သင့်အတွက် ရရှိနိုင်မည့် အကူအညီတွေနှင့် စစ်လျစ်၍ သဘာဝအချက်အလက်အတွက် ကျွန်တော်/ကျွန်မ ဖွဲ့စည်းပေးပါမယ်။"
- "ပြောပြချင်တာမှန်သမျှ ပြောပြပါ။ ဒါပေမဲ့ သင် ကြိုးစားပေးရတာတွေကို ကျွန်တော်/ကျွန်မတို့ စေခြင်းပြုပါ။ သင့်အတွက် ရရှိနိုင်မည့် အကူအညီများနှင့် စစ်လျစ်၍ သဘာဝအချက်အလက်များကို ရှုမဝပေးမှာ ဖြစ်ပါမယ်။"
- "သင် ကြိုးစားပေးနေတာတွေအတွက် ကျွန်တော်/ကျွန်မ စိတ်မကောင်းပါဘူး။"
- "မြစ်ဖျက်ခံစားရတာက သင့်အပြစ် မဟုတ်ပါဘူး။"

ငြော့ပျက်ဆောင်ရွက်ပေးရန် GBV Constant Companion မှ နားထောင်ပေးနိုင်ရန် နည်းလမ်းများကို ဖော်ပြထားပါသည်။



နှစ်သိမ့်အားပေးပါ

- တလေးလယ်/ဆယ်ကျော်သက်အား အခြေခံပျောက်ပျက်စိမ့်အားပြောရာတွင် စိတ်ပူပန်စေရန် အားပေးပါ။
- တလေးလယ်၏ အခြေခံ ယုံကြည်ချက်များနှင့် အတွေ့အကြုံများကို လေးစားပါ။
- ယဉ်ကျေးမှုနှင့် တိုက်ညီသည့်အတိုင်း အားပေးခြင်း၊ နှစ်သိမ့်သော စကားများကို ပြောဆိုပါ။ ပဉ္စမာ-ပဉ္စမာ/သမီးကို ယုံကြည်ပါ။
- ယုံကြည်မှုတည်ဆောက်ခြင်း။
- "သား/သမီး၊ နုလုံး ပြောပြတာ ဝမ်းသာပါစေပါ"
- တလေးလယ်နှင့် ဆက်ဆံရေးတည်ဆောက်ခြင်း။
- "သား/သမီး၊ အတွေ့အကြုံပြောပြလို့ ကျေးဇူးတင်ပါတယ်"
- စားနပ်ရိက္ခာ တတ်မြောက်ခြင်း။
- "နုလုံး ပြောပြတာ သား/သမီးက သိပ်ကို သတ္တိရှိတဲ့ တလေးလယ်ပဲ"

- အားပေးနှစ်သိမ့်ခြင်းနှင့် လုပ်နိုင်စွမ်းရှိသည်ဟု ခံစားထိရှိစေခြင်း။
- မိမိ ပေးနိုင်သည့် ကာကွယ်ရေးပေးပါစေခြင်း။
- ပဉ္စမာ တလေးလယ်၏ အဆင်ပြေ ကျန်းမာပျော်ရွှင်မှုအတွက် ဆောင်ရွက်ပေးရမည့် အရာများသည် မိမိ၏ စိတ်ဆိုးရွားမှုအတွင်းတွင် ဖန်တီးနိုင် "အားလုံးအဆင်ပြေသွားမှာပဲ" ဟု ပြောဆိုခြင်း။
- တလေးလယ်/ဆယ်ကျော်သက်ကို သူ/သူမ ဆန္ဒမရှိလျှင် မိမိနှင့် ဆက်ဆံကားပြောရုံ မိအား ပေးပါစေခြင်း။



ချီတက်ပေးပါ

- တလေးလယ်/ဆယ်ကျော်သက် ယုံကြည်အားပေးသည့်သူ တစ်ဦး၊ ရှိ/မရှိ စေပါ။ ထိုသူကို ဆက်သွယ်ပေးစေလိုခြင်း။ သို့မဟုတ် ထိုသူကို သွားရာတွင် အတော်လိုက်ပေးစေလိုခြင်း ရှိ/မရှိ စေပါ။
- တလေးလယ်/ဆယ်ကျော်သက်သည် တေးကမ်း လိုက်ပြီး တစ်ဖက်တစ်ဖက် အထိ သို့မဟုတ် သူ/သူမ တာ အန္တရာယ်ကင်းစွာ ယုံကြည်ရသည်ဟု သတ်မှတ် သူတစ်ဦး၏ စောင့်ရှောက်မှုကို ရရှိသည်အထိ သူ/သူမနှင့် အတူ နေပေးပါ။
- တလေးလယ်/ဆယ်ကျော်သက်နှင့် သူ/သူမ ယုံကြည်အားကိုးသော လူကြီးကို ရရှိနိုင်သော ဝန်ဆောင်မှုများနှင့် ထိပ်ခန်းဆောင်မှုများကို ရယူနိုင်သည့် နည်းလမ်းများအကြောင်း တိကျစွာ အသုံးဝင်သော သတင်းအချက်အလက်များကို ပေးပါ။
- သင် တာကို သိရှိသည့် တာကို ဝယ်ယူ ဟူသည်ကို ပြောပြပါ။ တောင်းဆိုသည့် သတင်းအချက်အလက် သင်ထံတွင်မရှိပါက ကျွန်တော်/ကျွန်မ ဝယ်ယူပါ။" သို့မဟုတ် "ကျွန်တော်/ကျွန်မ ဝယ်ယူမှာ အဲဒီသတင်း အချက်အလက် ဝေဖန်ပေးပါ" ဟု ပြောပါ။

ရမှတ်ပေးခြင်း၊ ဆိုင်ရာ ရည်ရွယ်ချက်များကို ကာကွယ်

တလေးလယ် သို့မဟုတ် ဆယ်ကျော်သက် တစ်ဦး၏ ငယ်တိုက်ပိုင်ခွင့်နှင့် ငယ်တိုက် သက်ဆိုင်ရာ ပြုစုစောင့်ရှောက်မှု(များ) ဝတ်စားပုံ ညီညွတ်စွာ ဆုံးဖြတ်ချက်များ ရမှတ်ပေးခြင်း၊ ရှိ/မရှိ ဆုံးဖြတ်ပေးနိုင်ရန် အကောင်းဆုံး အခန်း အထားတွင် ရှိသူမှာ GBV အခြေခံပျောက်မှု ခံစားရုံအထက် တလေးလယ်/ ဆယ်ကျော်သက်များနှင့် အထူးပြုကျွမ်းကျင်သူတစ်ဦးသာ ဖြစ်ခြင်း၊ သတိပြုပါ။

အထူးပြုကျွမ်းကျင်သူတစ်ဦးမဟုတ်သည့် သင်၏တာဝန်မှာ တလေးလယ်/ဆယ်ကျော်သက် ပြောဆိုချက်ကို နားထောင်ပေးရန်၊ အားပေးနှစ်သိမ့်ရန်၊ ငယ်တိုက် ယုံကြည်အားကိုးသူ တစ်ဦးနှင့် ဆက်သွယ်ပေးရန်၊ ရရှိနိုင်သည့် ဝန်ဆောင်မှုများအကြောင်း သတင်းအချက်အလက်များကို ဖြေပေးရန်သာ ဖြစ်ပါသည်။ အောက်ဖော်ပြပါ အသက်အရွယ် အမျိုးအစားများသည် ချစ်ခြင်းမေတ္တာရှိမှုအတွက် အထူးပြုကျွမ်းကျင်သူများဖြစ်ပြီး အသက်အရွယ်၊ ခင်တွက်မှု အတိုင်းအတာ၊ မိမိ၏အဆင့်နှင့် အခြား အကြောင်းအချက်များပေါ် မူတည်ကာ ပြောင်းလဲသွားနိုင်ပါသည်။

- အသက် ၁၅ နှစ်နှင့်အထက် ရှိသော ဆယ်ကျော်သက်များသည် ယေဘုယျအားဖြင့် ငယ်တိုက်ပိုင်ခွင့် ဆုံးဖြတ်ချက်များ ရမှတ်ပိုင်ခွင့်လက်ခံရပြီး ငယ်တိုက် ပြုစုစောင့်ရှောက်မှုများကို နားလည်နိုင်လောက်အောင် ရင့်ကျက် ဖန်တီးနိုင်ပါသည်။
- သင်၏ အခန်းကဏ္ဍ
- (၁) ဆယ်ကျော်သက်မှ ငယ်တိုက် အတွေ့အကြုံကို ပြောပြခြင်းကို နားထောင်ပေးရန်၊
- (၂) ကျွန်ုပ်တို့ကဲ့သို့ ဆက်လက်ရရှိသွားရန် အတွက် ငယ်တိုက်ပိုင်ခွင့်များသည် သူ တစ်ဦး ဦးနှင့် ဆက်သွယ်နိုင်အောင် ကူညီပေးရန်၊
- (၃) ရရှိနိုင်သော ဝန်ဆောင်မှုများနှင့် ထိုဝန်ဆောင်မှုများကို ရယူနိုင်မည့် နည်းလမ်းများ အကြောင်း၊ သတင်းအချက်အလက်များကို ပေးရန်။

အသက် ၆ နှစ်မှ ၉ နှစ်ကြား တလေးလယ်များနှင့် အသက် ၁၀ နှစ်မှ ၁၄ နှစ်ကြား ဆယ်ကျော်သက်များသည် အခြေခံပျောက်မှု အတွေ့အကြုံများကို ငယ်တိုက်ဘာသာ ပြောပြနိုင်စွမ်းရှိနိုင်သည့် သို့မဟုတ် ရှိရန်ရှိနိုင်ပါသည်။ ငယ်တိုက်ပိုင်ခွင့်၊ ငယ်တိုက်ပိုင်ခွင့်၊ ငယ်တိုက်ပိုင်ခွင့် ရရှိနိုင်သည့် သို့မဟုတ် ရှိကောင်းမှ ရှိမည်ဖြစ်သည်။

သင်၏ အခန်းကဏ္ဍ

(၁) တလေးလယ်/ဆယ်ကျော်သက် ရှေ့ဆက်လုပ်ရမည့် ကိစ္စများအတွက် ငယ်တိုက် ကူညီပံ့ပိုးပေးရန်၊ ငယ်တိုက် ယုံကြည်စိတ်ချရသည့် လူကြီးတစ်ဦးအား ရှာဖွေနိုင်အောင် ကူညီပေးရန်၊ (၂) တလေးလယ်/ ဆယ်ကျော်သက်နှင့် ငယ်တိုက်အချင်းအမိများ နှစ်ဦးစလုံးကို ရရှိနိုင်သော ဝန်ဆောင်မှုများနှင့် ထိုဝန်ဆောင်မှုများကို ရယူနိုင်မည့် နည်းလမ်းများ အကြောင်း၊ သတင်းအချက်အလက်များကို ပေးရန်။

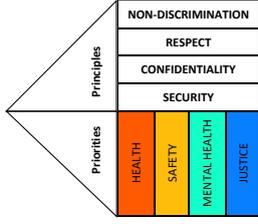
၀ ဖွဲ့စည်းပုံ ၅ နှစ်ကြား တစ်နှစ်အောက် တလေးလယ်နှင့် လမ်းလျှောက်တတ်ပါစေ တလေးလယ်သည် ဆက်သွယ်ပြောဆိုနိုင်စွမ်း ရှိပါက နည်းပါးသည့် အတွက် အခြေခံပျောက်မှု အတွေ့အကြုံများကို ငယ်တိုက်ဘာသာ ပြောပြနိုင်စွမ်း ရှိပါက၊ မိတ်ဆွေ၊ မိမိတို့အဖွဲ့အစည်းများကို သို့မဟုတ် ခင်ပွန်းမိတ်ဆွေ၊ မိမိတို့အဖွဲ့အစည်းများကို ပေးသည့် အခြားသူတစ်ဦးက တလေးလယ်ကိုယ်တိုင် အကူအညီတောင်းဆိုနိုင်ခြေ ရှိပါသည်။

သင်၏ အခန်းကဏ္ဍ

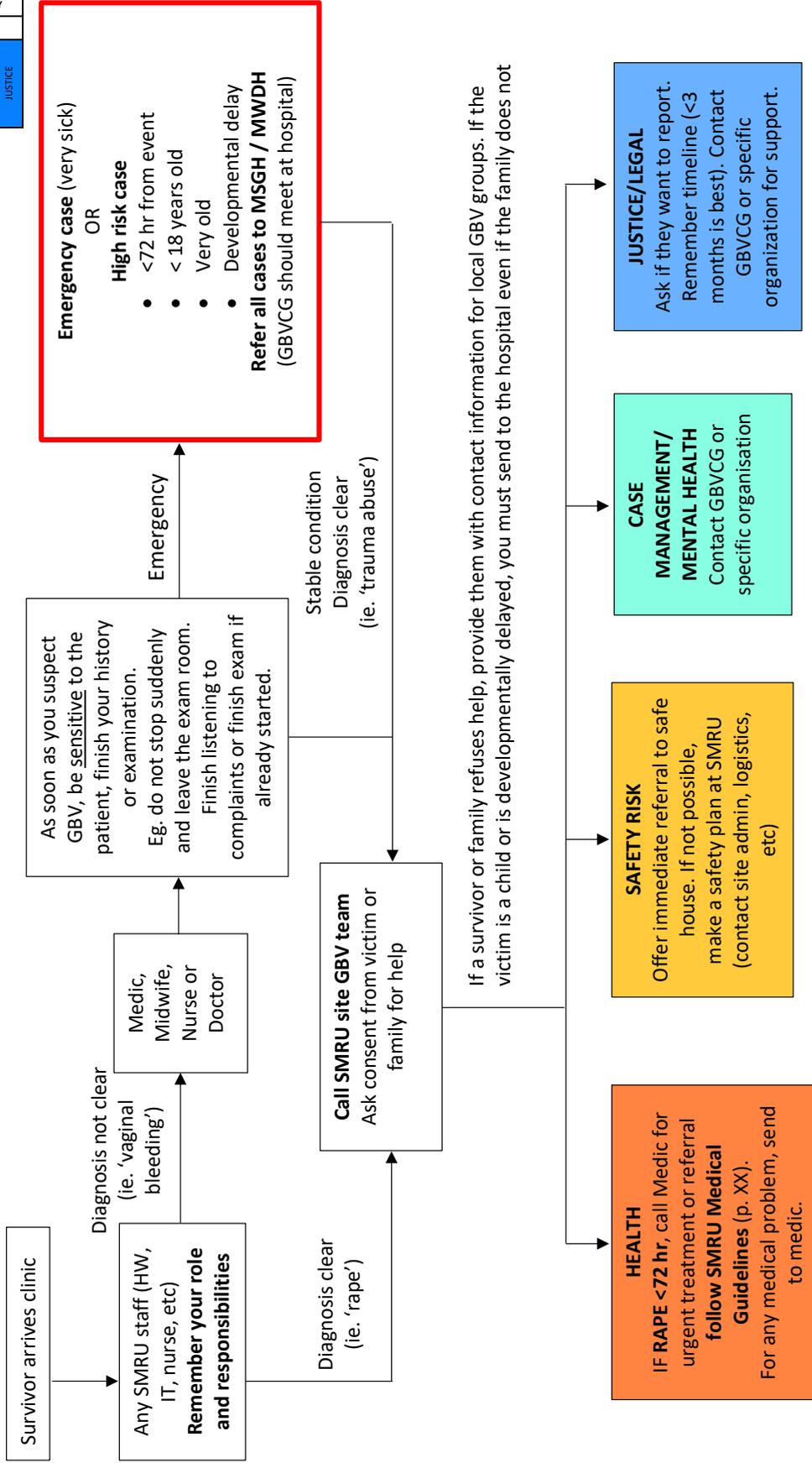
အတော်ပါလာသူကို ရရှိနိုင်သော ဝန်ဆောင်မှုများနှင့် ထိပ်ခန်းဆောင်မှုများကို ရယူနိုင်မည့် နည်းလမ်းများအကြောင်း သတင်းအချက်အလက်များကို ပေးရန်။

UNHCR ၏ ရှင်သန်ကျန်းမာရေးအတွက် အကောင်းဆုံးဖြစ်စေရန် ရည်ရွယ်ချက်ဖြင့် လမ်းညွှန်ချက်များ (Best Interest Determination Guidelines)၊ JOOI IRC/UNICEF - လိင်မှားမှုနှင့် စောင့်ရှောက်မှု ပြုစုစောင့်ရှောက်မှု အတွက် ရှင်သန်ကျန်းမာရေး တလေးလယ်ကို ပြုစုစောင့်ရှောက်ခြင်း (Caring for Child Survivors of Sexual Abuse) ၂၀၂၂ ဝန်း ခေါ်ကျော်သည့် မြင်ဆင်ပေးခြင်းပါသည်။

Appendix 6. Gender Based Violence (GBV) guideline for SMRU cases, version 6_5_03 January 2020

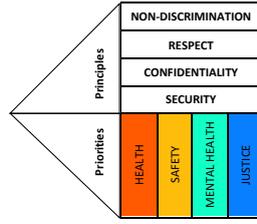


Remember: NON-DISCRIMINATION, RESPECT, CONFIDENTIALITY, SAFETY



NOTE:

Anyone can call directly to the GBVCG contact or another NGO. You do not need to register or see SMRU staff first (ie. you are a victim and you contact directly to GBVCG to keep your problem confidential, or patient refuse to see medic or SMRU GBV team).



PRINCIPLES OF GBV MANAGEMENT FOR NON-GBV SPECIALIST

Survivors have the right to self-respect (dignity). This right was taken away by the attacker. We must understand that it is not the survivor’s fault and the attacker is wrong. Do not judge the survivor or make them think it is their fault.

1. **NON-DISCRIMINATION** – everyone has the right to have treatment and management. You CANNOT choose the survivors that you want or do not want to treat. You must treat all with the same respect and dignity.
2. **RESPECT** – Respect the survivor’s choices. Do not judge them or tell them what to do. Do not ask “What happened?”. This should be done by a trained counselor on the SMRU Site GBV team.
3. **CONFIDENTIALITY AND CONSENT** – Must have written consent from survivor to share information. Think before you talk when you discuss the case. If you have sadness or stress because of the case, please debrief (share your feelings) with the staff involved in the case and the SMRU Site GBV team.
4. **SECURITY/SAFETY** – The survivor and any other persons at risk (e.g. children) must be removed from harm.

CLINICAL ROLE AND RESPONSIBILITIES

ROLE: Apply principles of GBV management, diagnose, treat and manage medical issues

RESPONSIBILITIES:

1. Basic counseling: listen, be kind
2. Diagnosis – Sometimes it is not obvious, so need to *think about GBV on differential diagnosis*
3. Give STI/PEP treatment if rape <72 hr
4. Give pregnancy prevention if rape <120 hr
5. Do NOT ask history about event (GBV teams will do)
6. Do NOT wash/shower/change clothes
7. Do NOT examine trauma area. Better to refer to GBV specialist. If you do a general exam, must document normal and abnl findings (can take photo, except face, as evidence)
8. Keep as confidential as possible. Discuss referrals with site GBV team – how/what to keep confidential
9. Get consent to share information with site GBV team. Communicate plan (eg. “Will you allow me to share your situation with site GBV team? They can help you. Please wait, I will go now to find them.”)

SITE GBV TEAM ROLE AND RESPONSIBILITIES

ROLE: Give psychosocial support for the patient. Case referral and management.

RESPONSIBILITIES:

1. Available to support clinical staff for GBV survivor referral (24hr every day)
2. Use counseling skills: listen, be kind, watch body language, address survivor’s feelings
3. Get written consent from survivor before referral outside SMRU
4. Know what information needed for referral to GBVCG or hospital – demographics, family address, basic diagnosis/kind of case, needs of the victim.
5. Have basic skills to interview and counsel GBV survivors – if the NGO cannot take a case urgently.
6. Assess when a physical examination is needed by SMRU or GBV specialist outside SMRU.
7. Able to explain referral options to the patient
8. Know and update the GBVCG (GBV Coordination Group) contact information at clinic site
9. Communicate plan
10. Organise follow up at SMRU if GBV organization not involved
11. Have regular case review - manage cases, close cases, re-open case, etc.

ALL STAFF ROLE AND RESPONSIBILITIES

ROLE: Apply principles of GBV management. Understand needs of the GBV survivor. Coordinate with team, especially site GBV team. Keep confidentiality. Offer referral.

RESPONSIBILITIES:

Health

1. Assess for any immediate life-threatening injuries
2. Assess for high risk cases that need immediate referral

Safety

1. Assess risk for another attack or suicide.
2. Are there other children at home?
3. If risk for harm, need to manage survivor correctly (eg. safe house)
4. Think about staff safety if survivor admitted to SMRU

Psychosocial

1. Listen. Do not try to solve the problem. Offer information. Let survivor decide.
2. Assess if survivor +family needs money, food, clothes, or transportation

Legal/Justice

1. Encourage survivor to report event
2. Refer to NGO to help with justice issues

Appendix 7. Surveillance and outbreak

A health surveillance system is in place in collaboration with the Tak Public Health Office (Tak PHO). Any reports of diseases on the list below should be discussed with the site administrator because reporting is done locally. The management of new disease outbreaks and are first discussed with the central SMRU administration, clinical and laboratory teams. After a clear plan is made then the reporting will be coordinated with the site teams.

OBJECTIVES of this system are:

1. To monitor disease trends along the border.
2. To detect disease outbreaks along the border.
3. To institute timely prevention and control measures of diseases along the border.

DISEASES UNDER SURVEILLANCE

- Acute diarrhoea
- Dysentery
- Cholera
- Typhoid fever
- Tuberculosis
- Measles
- Diphtheria
- Pertussis
- AFP / suspected Poliomyelitis
- Dengue
- Malaria
- Filariasis
- Scrub typhus
- Meningitis
- Encephalitis
- Leptospirosis
- STI
- Others: Abnormal or severe cases, deaths of unknown infectious origin

The system is PASSIVE SURVEILLANCE from which health service centres notify regularly to the district health office. The notification has been classified into 3 categories as follows:

1. Routine: A monthly report form is sent to the district health offices. Diseases under routine surveillance by the Bureau of Epidemiology and CCSDPT are indicated with:

SURVEILLANCE
See Appendix 7

2. Urgent: The following diseases must be reported within 24 hours due to the need of rapid investigation: Malaria, Cholera, Measles, Diphtheria, Acute Flaccid Paralysis (poliomyelitis), Meningococcal meningitis, abnormal or severe cases, deaths of unknown origin, or where the suspected cause of death is infectious disease. Diseases which must be reported within 24 hours are indicated with:

URGENT REPORT
SEE Appendix 7

3. Outbreak: For a suspected disease cluster or an outbreak (e.g. Measles, Dengue, Chikungunya), notify the district health officer immediately to allow early investigation.

OUTBREAK DATA FORM

In case of an outbreak of one of the diseases mentioned above both MoPH and the CCSDPT HIS Programme need to be contacted within 24 hours.

DATA COLLECTION INSTRUCTIONS

Once the notifiable disease has been detected, complete the outbreak data form. There may be a specific form (e.g. measles). If there is not a specific form, then collect as much pertinent information as possible (demographics, mobile number, clinical information). This should be shared with the site administrator and reported to the district health office.

CASE DEFINITIONS FOR SURVEILLANCE:

1. Acute Diarrhoea: Patient passing three or more loose or watery stools within 24 hours with or without dehydration.
2. Dysentery: Patient with Diarrhoea with visible blood in the stools OR laboratory confirmed cases of dysentery caused by *Shigella* dysentery type 1.
3. Cholera: Patient over 5 years old with severe dehydration from acute watery diarrhoea and *Vibrio cholerae* O1 or O139 isolated (the case definition can be extended to patients over 2 years old without laboratory confirmation in the case of an outbreak).
4. Typhoid Fever:
 - Suspected Typhoid Fever: Patient who presents with fever $\geq 38.5^{\circ}\text{C}$ (axillary) for more than 7 days, and negative malaria slide and no other identified cause of fever and at least one of the following: abdominal pain and/or diarrhoea and/or constipation and/or relative bradycardia.
 - Confirmed case: Patient who has blood culture positive for *Salmonella typhi*
5. Tuberculosis: Newly diagnosed patient who is in one of these categories (based on WHO diagnostic criteria):
 - Pulmonary Tuberculosis, sputum smear positive: patient with at least two initial sputum smear examinations (direct smear microscopy) positive for Acid-Fast Bacilli (AFB), or Patient with one sputum examination positive for

Appendix 7. Surveillance and outbreak

acid-fast bacilli and radiographic abnormalities consistent with active pulmonary tuberculosis as determined by the treating medical officer, or Patient with one sputum specimen positive for acid-fast bacilli and at least one sputum that is culture positive for acid-fast bacilli.

- Pulmonary Tuberculosis, sputum smear negative: Patient with symptoms suggestive of tuberculosis and having one of the following: Three sputum specimens negative for acid-fast bacilli, Radiographic abnormalities consistent with pulmonary tuberculosis and a lack of clinical response to one week of a broad-spectrum antibiotic, Decision by a physician to treat with a full curative course of anti-tuberculosis chemotherapy
 - Extra pulmonary tuberculosis: Tuberculosis of organs other than lungs: pleura, lymph nodes, abdomen, genitourinary tract, skin, joints and bones, tuberculous meningitis, etc. Diagnosis should be based on one culture positive specimen from an extra pulmonary site, or histological or strong clinical evidence consistent with active extra-pulmonary tuberculosis, follow by medical officer decision to treat with a full course of anti-tuberculosis therapy. Any patient diagnosed with both pulmonary and extra-pulmonary tuberculosis should be classified as a case of pulmonary tuberculosis
6. Measles: Patient with a 3-day history of fever greater than or equal to 38.5°C AND maculopapular (non-vesicular) rash AND at least one of the following: coryza OR cough OR conjunctivitis.
 7. Diphtheria: An upper respiratory tract illness characterised by sore throat, low grade fever, and an adherent membrane of the tonsil(s), pharynx, and/or nose. Or a patient with laboratory confirmation of *Corynebacterium diphtheriae* from a clinical specimen.
 8. Pertussis: Patient presenting with cough for at least 2 weeks and paroxysms of coughing and/or whooping and/or post tussive vomiting.
 9. Acute Flaccid Paralysis: Patient presenting with acute flaccid paralysis, including Guillain-Barre Syndrome among children aged less than 15 years and all cases of suspected poliomyelitis among persons of any age.
 10. Dengue Infection: Patient with lab confirmed Dengue fever or in an epidemic the case definition can be extended to a patient with fever less than 7 days and malaria slide neg. with at least 2 of the following: headache, pain behind the eyes, myalgia & arthralgia (severe body pain), haemorrhagic signs (including pos. tourniquet test).
 11. Chikungunya: Patient with confirmed infection on a laboratory test. The case definition for SMRU is any patient with at least 2 of the following: high fever, joint pain, rash.
 12. Malaria: Patient with a positive malaria slide (PF, PV, PM or mixed) or rapid diagnostic test (RDT).
 13. Filariasis: Person with positive either *Wuchereria Bancrofti* or *Brugia Malayi* by laboratory test.
 14. Scrub Typhus: Patient with sudden onset of fever (within 48 hours), negative malaria slide, and a 24 hour-response to doxycycline and eschar and at least two of the following: Rash and/or generalised enlargement of lymph nodes and/or extreme headache and/or acute confusion.
 15. Meningitis: Patient who presents with sudden onset of fever > 38°C (axillary), negative malaria slide and at least one of the following: meningeal syndrome (headache, neck stiffness) or positive Kernig' s sign or bulging fontanel in an infant or with cloudy CSF. Meningococcal meningitis: Patient with sudden onset of fever, and petechial or purpurral rash and at least one of the following: neck stiffness, altered consciousness, other meningeal sign or laboratory confirmed.
 16. Encephalitis: Patient with fever and negative malaria slide and altered consciousness, with headache or convulsion.
 17. Leptospirosis: Patient with acute fever and at least one of the following: jaundice and/or headache and/or dark colour urine and/or conjunctival suffusion or calf pain AND positive laboratory testing or in an epidemic.
 18. STD: one of:
 - Urethral discharge
 - Abnormal Vaginal discharge excluding Candidiasis
 - Genital ulcer
 - Pelvic inflammatory disease (PID): symptoms of lower abdominal pain and pain during sexual intercourse with an examination showing vaginal discharge, lower abdominal tenderness on palpation, and /or temperature > 38°C.

Appendix 8. Oral rehydration solutions

These can be used if you do not have the ORS powder available.

ORS

HOW TO MAKE ORAL REHYDRATION SOLUTION

Use one ORS powder sachet and mix it with clean boiled water that has been cooled.
Read the directions on the sachet to see how much water to add.

Dilute ORS

HOW TO MAKE DILUTE ORAL REHYDRATION SOLUTION

1 packet (size for 750cc water) of ORS powder + **1500** cc clean water
+ 30g sugar + 1.5g potassium

OR

1 packet (size for 1000cc water) of ORS powder + **2000** cc clean water
+ 40g sugar + 2.5g potassium

Sugar Salt Solution

HOW TO MAKE A SUGAR SALT SOLUTION FOR ORAL REHYDRATION

Take 1 litre of boiled water that has been cooled,
add half of a teaspoon of salt and 8 teaspoons of sugar

A teaspoon is a 5 ml spoon. If you do not have spoons or 1 litre containers available, then the 'pinch and scoop' method can also be used:

Take one cup of water (240 ml)
add a small pinch of salt using 3 fingers.
Before you add the sugar, taste the drink to make sure it's no saltier than tears. Too much salt can be harmful.
If then the drink tastes right, then add a small hand palm scoop of sugar.

Boiled Rice Water

HOW TO MAKE A RICE BASED DRINK FOR ORAL REHYDRATION

Note: AsiaMIX can be used instead of rice paste if the child is NOT severely malnourished.

- 1 Take one handful (20 to 25 grams) of rice grain.
Wash and soak the rice in water until it is soft.
 - 2 Grind the soaked rice with a pestle and mortar (or any other grinder)
until it becomes a paste.
 - 3 Put two and a quarter glasses of water (about 600ml) into a cooking pot
and mix in the rice paste.
 - 4 Stir well, and heat the mixture until it begins to bubble and boil.
Then take the pan off the fire, and leave the solution to cool.
 - 5 Add a pinch of salt using 3 fingers (up to the first finger joints) (1.5 grams) to the mixture, and stir well. The solution is now ready to be given to the person with diarrhoea.
- Storage:** this solution should be covered and kept in a cool clean place.
It should be used not more than six to eight hours after preparation.
After this time, throw away any leftover solution.

Appendix 9. IVF table

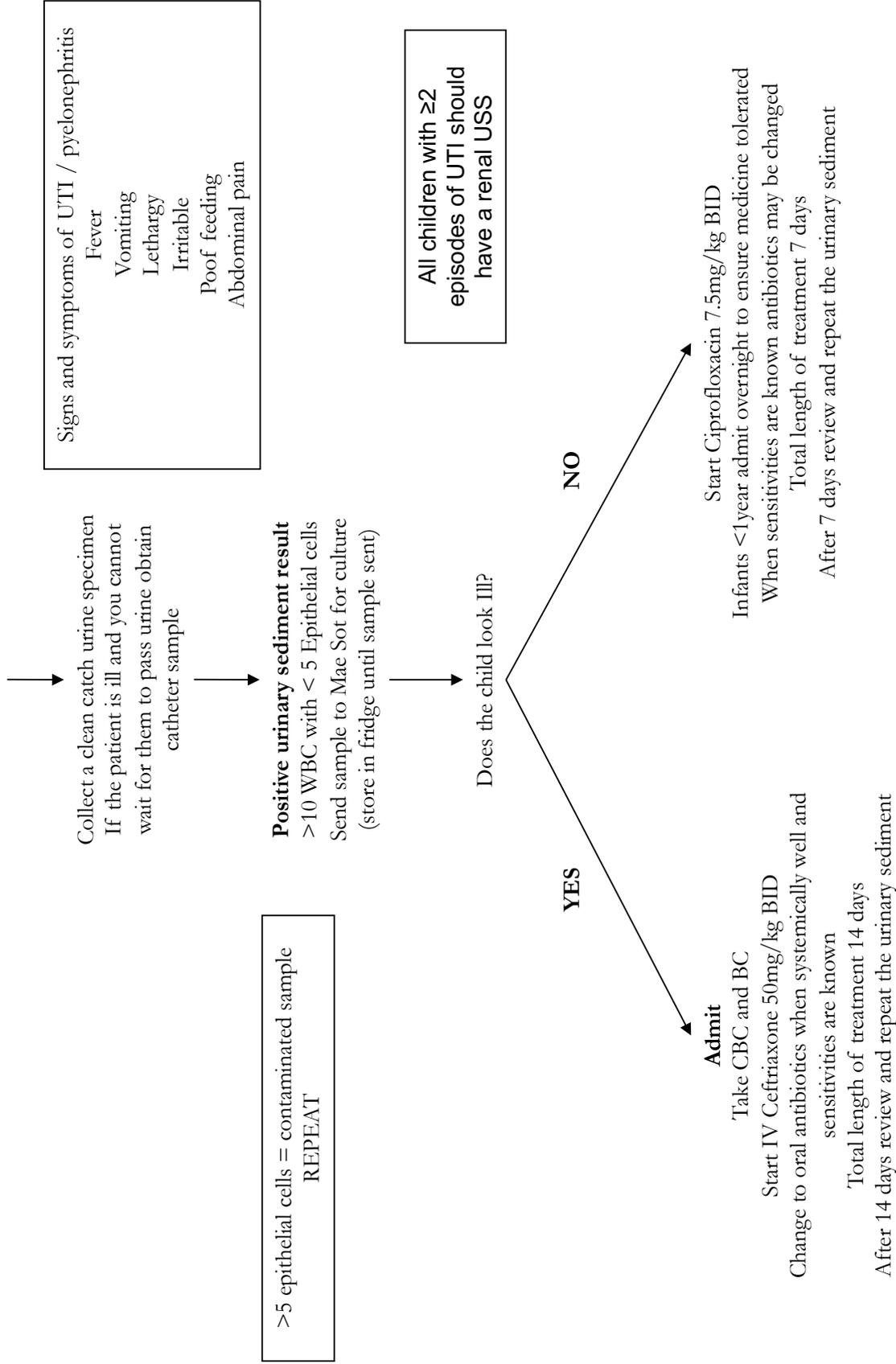
Intravenous fluid requirements

		NORMAL FLUID REQUIREMENTS (maintenance)			IF Resp Rate > normal OR IF TEMP > 38,5 °C			IF Resp Rate > normal AND TEMP > 38,5 °C				
Weight kg	ml/hr	drops/min	drops/min	ml/24 hr	ml/hr	drops/min	drops/min	ml/24 hr	ml/hr	drops/min	drops/min	ml/24 hr
		Adult	Adult	Metroset		Adult	Adult			Adult	Metroset	
4	16	16	19	384	19	19	23	23	23	23	552	
5	20	20	24	480	24	24	28	28	28	28	672	
6	24	24	29	576	29	29	36	36	36	36	864	
7	28	28	34	672	34	34	40	40	40	40	960	
8	32	32	38	768	38	38	46	46	46	46	1104	
9	35	35	42	840	42	42	52	52	52	52	1248	
10-11	40	40	48	960	48	48	58	58	58	58	1392	
12-13	45	45	54	1080	54	54	64	64	64	64	1536	
14-15	50	50	60	1200	60	60	72	72	72	72	1728	
16-17	55	55	66	1320	66	66	78	78	78	78	1872	
18-19	60	60	72	1440	72	72	86	86	86	86	2064	
20-24	65	65	78	1560	78	78	92	92	92	92	2208	
25-29	65	65	78	1560	78	78	92	92	92	92	2208	
30-34	70	23	84	1680	84	28	100	33	100	33	2400	
35-39	75	25	90	1800	90	30	106	35	106	35	2544	
40-44	80	27	96	1920	96	32	114	38	114	38	2736	
45-49	85	28	102	2040	102	34	120	40	120	40	2880	
50-59	90	30	108	2160	108	36	128	43	128	43	3072	
60-69	95	32	114	2280	114	38	136	45	136	45	3264	
70-79	100	33	120	2400	120	40	144	48	144	48	3456	

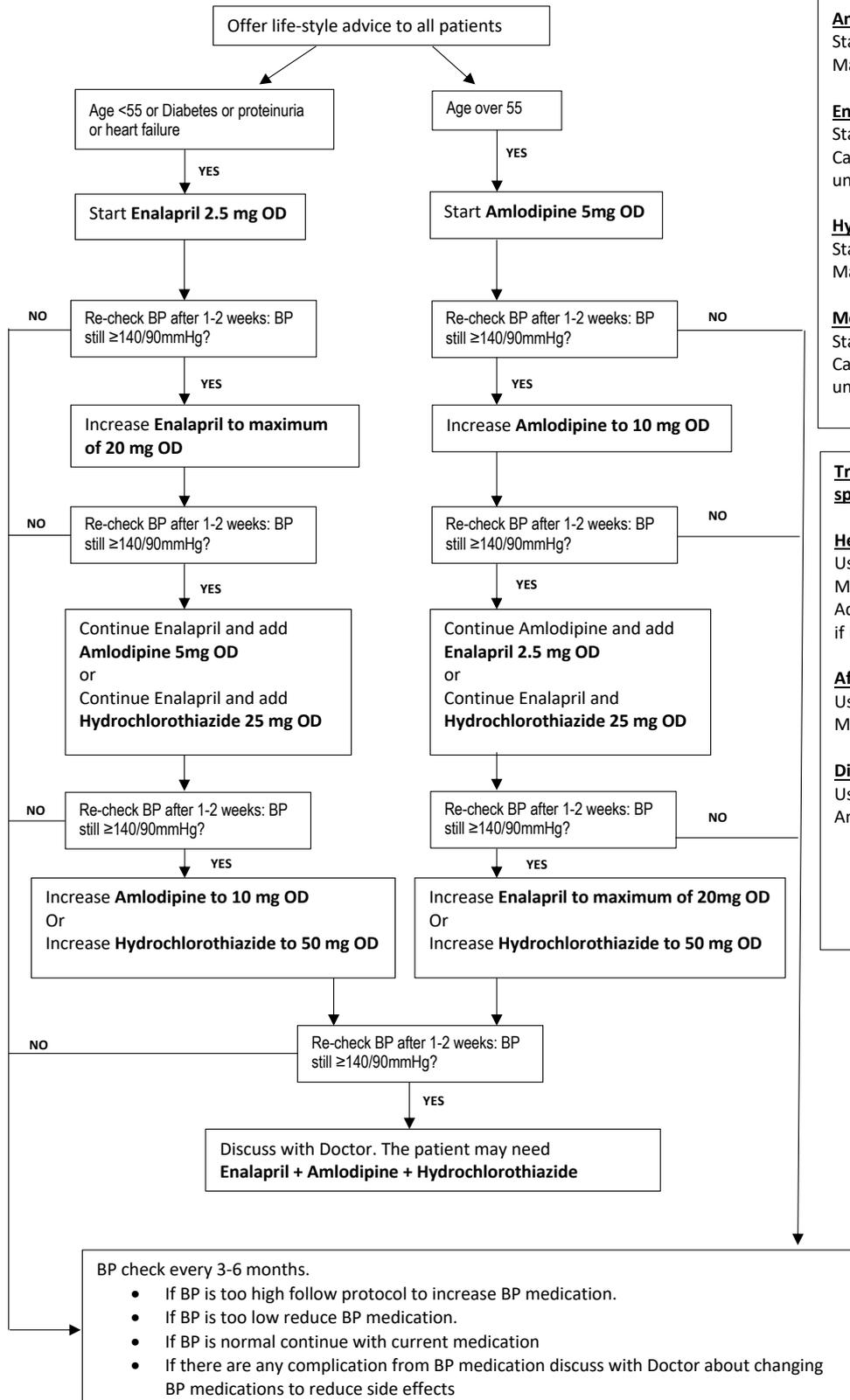
	NORMAL RR
Infant < 2 months	30-60
Infant 2 months - 1 year	30-50
Toddler (1-4 year)	24-40
Child (5-12 year)	18-30
Adult	12-20

**Appendix 10.
Urinary Tract Infection
Child and Infant < 3 Years**

Suspect UTI in child or infant, who has fever $\geq 38.0\text{ }^{\circ}\text{C}$ or $\geq 37.5\text{ }^{\circ}\text{C}$ 4 hours apart without an obvious focus



Appendix 11. BP medication protocol (can use if the other drugs are available)



Types of BP medication at SMRU

Amlodipine
Start at 5mg OD
Maximum dose 10mg OD

Enalapril
Start at 2.5mg OD
Can increase by 2.5mg until maximum 20mg OD

Hydrochlorothiazide
Start at 25mg OD
Maximum dose 50mg OD

Metoprolol
Start at 25 mg OD
Can increase by 25mg OD until maximum 100 mg OD

Treating BP in specific diseases

Heart failure
Use Enalapril and Metoprolol
Add spironolactone if have fluid overload

After Heart attack
Use Enalapril and Metoprolol

Diabetes
Use Enalapril and Amlodipine

Appendix 12a. Paediatric BP tables for boys

TABLE 4 BP Levels for Boys by Age and Height Percentile

Age (y)	BP Percentile	SBP (mm Hg)										DBP (mm Hg)									
		Height Percentile or Measured Height										Height Percentile or Measured Height									
		5%	10%	25%	50%	75%	90%	95%	95%	90%	75%	50%	25%	50%	75%	90%	95%				
1	Height (in)	30.4	30.8	31.6	32.4	33.3	34.1	34.6	34.6	34.1	30.8	31.6	32.4	33.3	34.1	34.6	34.6				
	Height (cm)	77.2	78.3	80.2	82.4	84.6	86.7	87.9	87.9	86.7	78.3	80.2	82.4	84.6	86.7	87.9	87.9				
	50th	85	85	86	86	87	88	88	88	88	40	40	41	41	42	42	42				
	90th	98	99	99	100	100	101	101	101	101	52	53	53	54	54	54	54				
	95th	102	102	103	103	104	105	105	105	105	54	55	55	56	57	57	57				
2	95th + 12 mm Hg	114	114	115	115	116	117	117	117	117	66	67	67	68	69	69	69				
	Height (in)	33.9	34.4	35.3	36.3	37.3	38.2	38.8	38.8	38.2	34.4	35.3	36.3	37.3	38.2	38.8	38.8				
	Height (cm)	86.1	87.4	89.6	92.1	94.7	97.1	98.5	98.5	97.1	87.4	89.6	92.1	94.7	97.1	98.5	98.5				
	50th	87	87	88	89	89	90	91	91	90	43	44	44	45	46	46	46				
	90th	100	100	101	102	103	103	104	104	103	55	56	56	57	58	58	58				
3	95th + 12 mm Hg	116	117	117	118	119	119	120	120	119	69	70	71	72	73	73	73				
	Height (in)	36.4	37	37.9	39	40.1	41.1	41.7	41.7	41.1	36.4	37.9	39	40.1	41.1	41.7	41.7				
	Height (cm)	92.5	93.9	96.3	99	101.8	104.3	105.8	105.8	104.3	93.9	96.3	99	101.8	104.3	105.8	105.8				
	50th	88	89	89	90	91	92	92	92	92	45	46	47	48	49	49	49				
	90th	101	102	102	103	104	105	105	105	105	58	59	59	60	61	61	61				
4	95th + 12 mm Hg	118	118	119	119	120	121	121	121	121	72	73	74	75	76	76	76				
	Height (in)	38.8	39.4	40.5	41.7	42.9	43.9	44.5	44.5	43.9	39.4	40.5	41.7	42.9	43.9	44.5	44.5				
	Height (cm)	98.5	100.2	102.9	105.9	108.9	111.5	113.2	113.2	111.5	100.2	102.9	105.9	108.9	111.5	113.2	113.2				
	50th	90	90	91	92	93	94	94	94	94	48	49	50	51	52	52	52				
	90th	102	103	104	105	105	106	107	107	106	61	62	62	63	64	64	64				
5	95th + 12 mm Hg	119	119	120	120	121	122	122	122	122	75	77	78	79	80	80	80				
	Height (in)	41.1	41.8	43.0	44.3	45.5	46.7	47.4	47.4	46.7	41.8	43.0	44.3	45.5	46.7	47.4	47.4				
	Height (cm)	104.4	106.2	109.1	112.4	115.7	118.6	120.3	120.3	118.6	106.2	109.1	112.4	115.7	118.6	120.3	120.3				
	50th	91	92	93	94	95	96	96	96	96	51	52	53	54	55	55	55				
	90th	103	104	105	106	107	108	108	108	108	64	65	65	66	67	67	67				
6	95th + 12 mm Hg	119	120	121	121	122	123	124	124	123	78	80	81	82	83	83	83				
	Height (in)	43.4	44.2	45.4	46.8	48.2	49.4	50.2	50.2	49.4	44.2	45.4	46.8	48.2	49.4	50.2	50.2				
	Height (cm)	110.3	112.2	115.3	118.9	122.4	125.6	127.5	127.5	125.6	112.2	115.3	118.9	122.4	125.6	127.5	127.5				
	50th	93	93	94	95	96	97	98	98	97	54	55	56	57	58	58	58				
	90th	105	105	106	107	109	110	110	110	110	66	67	68	68	69	69	69				
7	95th + 12 mm Hg	120	121	122	123	124	125	126	126	125	81	82	83	84	85	85	85				
	Height (in)	45.7	46.5	47.8	49.3	50.8	52.1	52.9	52.9	52.1	47.8	49.3	50.8	52.1	52.9	52.9	52.9				
	Height (cm)	116.1	118	121.4	125.1	128.9	132.4	134.5	134.5	132.4	118	121.4	125.1	128.9	132.4	134.5	134.5				
	50th	94	94	95	97	98	98	99	99	98	56	57	58	58	59	59	59				
	90th	106	107	108	109	110	111	111	111	111	68	69	70	70	71	71	71				
95th + 12 mm Hg	122	122	123	124	126	127	128	128	127	83	84	85	86	86	86	86					

Appendix 12a. Paediatric BP tables for boys

Age (y)	BP Percentile	SBP (mm Hg)										DBP (mm Hg)																		
		Height Percentile or Measured Height					Height Percentile or Measured Height					Height Percentile or Measured Height					Height Percentile or Measured Height													
		5%	10%	25%	50%	75%	90%	95%	5%	10%	25%	50%	75%	90%	95%	5%	10%	25%	50%	75%	90%	95%								
8	Height (in)	47.8	48.6	50	51.6	53.2	54.6	55.5	47.8	48.6	50	51.6	53.2	54.6	55.5	47.8	48.6	50	51.6	53.2	54.6	55.5	47.8	48.6	50	51.6	53.2	54.6	55.5	
	Height (cm)	121.4	123.5	127	131	135.1	138.8	141	121.4	123.5	127	131	135.1	138.8	141	121.4	123.5	127	131	135.1	138.8	141	121.4	123.5	127	131	135.1	138.8	141	
	50th	95	96	97	98	99	99	100	57	57	58	59	59	59	60	57	57	58	59	59	59	60	57	57	58	59	59	60	60	
	90th	107	108	109	110	111	112	112	69	70	70	71	71	72	73	69	70	70	71	71	72	72	72	72	72	72	72	73	73	
	95th	111	112	112	114	115	116	117	72	73	73	74	75	75	75	72	73	73	74	74	75	75	75	75	75	75	75	75	75	
9	95th + 12 mm Hg	123	124	124	126	127	128	129	84	85	85	86	87	87	87	84	85	85	86	87	87	87	87	87	87	87	87	87		
	Height (in)	49.6	50.5	52	53.7	55.4	56.9	57.9	49.6	50.5	52	53.7	55.4	56.9	57.9	49.6	50.5	52	53.7	55.4	56.9	57.9	49.6	50.5	52	53.7	55.4	56.9		
	Height (cm)	126	128.3	132.1	136.3	140.7	144.7	147.1	126	128.3	132.1	136.3	140.7	144.7	147.1	126	128.3	132.1	136.3	140.7	144.7	147.1	126	128.3	132.1	136.3	140.7	144.7	147.1	
	50th	96	97	98	99	100	101	101	57	58	59	60	61	61	62	57	58	59	60	61	62	62	62	62	62	62	62	62	62	
	90th	107	108	109	110	112	113	114	70	71	71	72	72	73	74	70	71	72	73	73	74	74	74	74	74	74	74	74	74	
10	95th + 12 mm Hg	112	112	113	115	116	118	119	74	74	75	76	77	77	77	74	75	76	76	77	77	77	77	77	77	77	77	77	77	
	Height (in)	124	124	125	127	128	130	131	86	86	87	88	88	89	89	86	87	87	88	88	89	89	89	89	89	89	89	89	89	
	Height (cm)	51.3	52.2	53.8	55.6	57.4	59.1	60.1	51.3	52.2	53.8	55.6	57.4	59.1	60.1	51.3	52.2	53.8	55.6	57.4	59.1	60.1	51.3	52.2	53.8	55.6	57.4	59.1	60.1	
	50th	97	98	99	100	101	102	103	59	60	61	62	63	63	64	59	60	61	62	63	63	63	63	63	63	63	63	63	63	63
	90th	108	109	111	112	113	115	116	72	73	74	74	75	75	76	72	73	74	74	75	75	75	75	75	75	75	75	75	75	76
11	95th + 12 mm Hg	112	113	114	116	118	120	121	76	76	77	77	78	78	78	76	77	77	77	78	78	78	78	78	78	78	78	78	78	
	Height (in)	124	125	126	128	130	132	133	88	88	89	89	89	89	90	88	89	89	89	89	90	90	90	90	90	90	90	90	90	
	Height (cm)	53	54	55.7	57.6	59.6	61.3	62.4	53	54	55.7	57.6	59.6	61.3	62.4	53	54	55.7	57.6	59.6	61.3	62.4	53	54	55.7	57.6	59.6	61.3	62.4	
	50th	99	99	101	102	103	104	106	61	61	62	63	63	63	64	61	62	62	63	63	63	63	63	63	63	63	63	63	63	63
	90th	110	111	112	114	116	117	118	74	74	75	75	75	75	76	74	74	75	75	75	75	75	75	75	75	75	75	75	75	76
12	95th + 12 mm Hg	114	114	116	118	120	123	124	77	78	78	78	78	78	78	77	78	78	78	78	78	78	78	78	78	78	78	78	78	
	Height (in)	126	126	128	130	132	135	136	89	89	90	90	90	90	90	89	90	90	90	90	90	90	90	90	90	90	90	90	90	
	Height (cm)	55.2	56.3	58.1	60.1	62.2	64	65.2	55.2	56.3	58.1	60.1	62.2	64	65.2	55.2	56.3	58.1	60.1	62.2	64	65.2	55.2	56.3	58.1	60.1	62.2	64	65.2	
	50th	101	101	102	104	106	108	109	61	61	62	62	62	62	62	61	62	62	62	62	62	62	62	62	62	62	62	62	62	62
	90th	113	114	115	117	119	121	122	75	75	75	75	75	75	76	75	75	75	75	75	75	75	75	75	75	75	75	75	75	76
13	95th + 12 mm Hg	116	117	118	121	124	126	128	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	
	Height (in)	128	129	130	133	136	138	140	90	90	90	90	90	90	91	90	90	90	90	90	90	90	90	90	90	90	90	90	91	
	Height (cm)	57.9	59.1	61	63.1	65.2	67.1	68.3	57.9	59.1	61	63.1	65.2	67.1	68.3	57.9	59.1	61	63.1	65.2	67.1	68.3	57.9	59.1	61	63.1	65.2	67.1	68.3	
	50th	103	104	105	108	110	111	112	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61	61
	90th	115	116	118	121	124	126	126	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	77
14	95th + 12 mm Hg	119	120	122	125	128	130	131	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	78	
	Height (in)	131	132	134	137	140	142	143	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	90	93	
	Height (cm)	60.6	61.8	63.8	65.9	68.0	69.8	70.9	60.6	61.8	63.8	65.9	68.0	69.8	70.9	60.6	61.8	63.8	65.9	68.0	69.8	70.9	60.6	61.8	63.8	65.9	68.0	69.8	70.9	
	50th	105	106	109	111	112	113	113	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60	60
	90th	119	120	123	126	127	128	129	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	74	79
95th + 12 mm Hg	123	125	127	130	132	133	134	77	78	79	81	82	82	82	77	78	79	81	82	82	82	82	82	82	82	82	82	82	84	
	Height (cm)	135	137	139	142	144	145	146	89	90	91	91	91	91	91	89	90	91	91	91	91	91	91	91	91	91	91	91	95	

Appendix 12a. Paediatric BP tables for boys

TABLE 4 Continued

Age (y)	BP Percentile	SBP (mm Hg)					DBP (mm Hg)								
		Height Percentile or Measured Height					Height Percentile or Measured Height								
		5%	10%	25%	50%	75%	90%	95%	5%	10%	25%	50%	75%	90%	95%
15	Height (in)	62.6	63.8	65.7	67.8	69.8	71.5	72.5	62.6	63.8	65.7	67.8	69.8	71.5	72.5
	Height (cm)	159	162	166.9	172.2	177.2	181.6	184.2	159	162	166.9	172.2	177.2	181.6	184.2
	50th	108	110	112	113	114	114	114	61	62	64	65	66	67	68
	90th	123	124	126	128	129	130	130	75	76	78	79	80	81	81
	95th	127	129	131	132	134	135	135	78	79	81	83	84	85	85
16	95th + 12 mm Hg	139	141	143	144	146	147	147	90	91	93	95	96	97	97
	Height (in)	63.8	64.9	66.8	68.8	70.7	72.4	73.4	63.8	64.9	66.8	68.8	70.7	72.4	73.4
	Height (cm)	162.1	165	169.6	174.6	179.5	183.8	186.4	162.1	165	169.6	174.6	179.5	183.8	186.4
	50th	111	112	114	115	115	116	116	63	64	66	67	68	69	69
	90th	126	127	128	129	131	131	132	77	78	79	80	81	82	82
17	95th	130	131	133	134	135	136	137	80	81	83	84	85	86	86
	95th + 12 mm Hg	142	143	145	146	147	148	149	92	93	95	96	97	98	98
	Height (in)	64.5	65.5	67.3	69.2	71.1	72.8	73.8	64.5	65.5	67.3	69.2	71.1	72.8	73.8
	Height (cm)	163.8	166.5	170.9	175.8	180.7	184.9	187.5	163.8	166.5	170.9	175.8	180.7	184.9	187.5
	50th	114	115	116	117	117	118	118	65	66	67	68	69	70	70
	90th	128	129	130	131	132	133	134	78	79	80	81	82	82	83
	95th	132	133	134	135	137	138	138	81	82	84	85	86	86	87
	95th + 12 mm Hg	144	145	146	147	149	150	150	93	94	96	97	98	98	99

Use percentile values to stage BP readings according to the scheme in Table 3 (elevated BP: ≥90th percentile; and stage 2 HTN: ≥95th percentile; and stage 1 HTN: ≥95th percentile; and stage 2 HTN: ≥95th percentile + 12 mm Hg). The 50th, 90th, and 95th percentiles were derived by using quantile regression on the basis of normal-weight children (BMI <85th percentile).⁷⁷

Appendix 12b. Paediatric BP tables for girls

TABLE 5 BP Levels for Girls by Age and Height Percentile

Age (y)	BP Percentile	SBP (mm Hg)										DBP (mm Hg)									
		Height Percentile or Measured Height										Height Percentile or Measured Height									
		5%	10%	25%	50%	75%	90%	95%	5%	10%	25%	50%	75%	90%	95%						
1	Height (in)	29.7	30.2	30.9	31.8	32.7	33.4	33.9	29.7	30.2	30.9	31.8	32.7	33.4	33.9						
	Height (cm)	75.4	76.6	78.6	80.8	83	84.9	86.1	75.4	76.6	78.6	80.8	83	84.9	86.1						
	50th	84	85	86	86	87	88	88	84	85	86	86	87	88	88						
	90th	98	99	99	100	101	102	102	98	99	99	100	101	102	102						
	95th	101	102	102	103	104	105	105	101	102	102	103	104	105	105						
2	95th + 12 mmHg	113	114	114	115	116	117	117	113	114	114	115	116	117	117						
	Height (in)	33.4	34	34.9	35.9	36.9	37.8	38.4	33.4	34	34.9	35.9	36.9	37.8	38.4						
	Height (cm)	84.9	86.3	88.6	91.1	93.7	96	97.4	84.9	86.3	88.6	91.1	93.7	96	97.4						
	50th	87	87	88	89	90	91	91	87	87	88	89	90	91	91						
	90th	101	101	102	103	104	105	106	101	101	102	103	104	105	106						
3	95th	104	105	106	106	107	108	109	104	105	106	106	107	108	109						
	95th + 12 mmHg	116	117	118	118	119	120	121	116	117	118	118	119	120	121						
	Height (in)	35.8	36.4	37.3	38.4	39.6	40.6	41.2	35.8	36.4	37.3	38.4	39.6	40.6	41.2						
	Height (cm)	91	92.4	94.9	97.6	100.5	103.1	104.6	91	92.4	94.9	97.6	100.5	103.1	104.6						
	50th	88	89	89	90	91	92	93	88	89	89	90	91	92	93						
4	90th	102	103	104	104	105	106	107	102	103	104	104	105	106	107						
	95th	106	106	107	108	109	110	110	106	106	107	108	109	110	110						
	95th + 12 mmHg	118	118	119	120	121	122	122	118	118	119	120	121	122	122						
	Height (in)	38.3	38.9	39.9	41.1	42.4	43.5	44.2	38.3	38.9	39.9	41.1	42.4	43.5	44.2						
	Height (cm)	97.2	98.8	101.4	104.5	107.6	110.5	112.2	97.2	98.8	101.4	104.5	107.6	110.5	112.2						
5	50th	89	90	91	92	93	94	94	89	90	91	92	93	94	94						
	90th	103	104	105	106	107	108	108	103	104	105	106	107	108	108						
	95th	107	108	109	109	110	111	112	107	108	109	109	110	111	112						
	95th + 12 mmHg	119	120	121	121	122	123	124	119	120	121	121	122	123	124						
	Height (in)	40.8	41.5	42.6	43.9	45.2	46.5	47.3	40.8	41.5	42.6	43.9	45.2	46.5	47.3						
6	Height (cm)	103.6	105.3	108.2	111.5	114.9	118.1	120	103.6	105.3	108.2	111.5	114.9	118.1	120						
	50th	90	91	92	93	94	95	96	90	91	92	93	94	95							
	90th	104	105	106	107	108	109	110	104	105	106	107	108	109							
	95th	108	109	109	110	111	112	113	108	109	109	110	111	112	113						
	95th + 12 mmHg	120	121	121	122	123	124	125	120	121	121	122	123	124	125						
7	Height (in)	43.3	44	45.2	46.6	48.1	49.4	50.3	43.3	44	45.2	46.6	48.1	49.4	50.3						
	Height (cm)	110	111.8	114.9	118.4	122.1	125.6	127.7	110	111.8	114.9	118.4	122.1	125.6	127.7						
	50th	92	92	93	94	96	97	97	92	92	93	94	96	97	97						
	90th	105	106	107	108	109	110	111	105	106	107	108	109	110	111						
	95th	109	109	110	111	112	113	114	109	109	110	111	112	113	114						
8	95th + 12 mmHg	121	121	122	123	124	125	126	121	121	122	123	124	125	126						
	Height (in)	45.6	46.4	47.7	49.2	50.7	52.1	53	45.6	46.4	47.7	49.2	50.7	52.1	53						
	Height (cm)	115.9	117.8	121.1	124.9	128.8	132.5	134.7	115.9	117.8	121.1	124.9	128.8	132.5	134.7						
	50th	92	93	94	95	97	98	99	92	93	94	95	97	98	99						
	90th	106	106	107	109	110	111	112	106	106	107	109	110	111	112						
9	95th	109	110	111	112	113	114	115	109	110	111	112	113	114	115						
	95th + 12 mmHg	121	122	123	124	125	126	127	121	122	123	124	125	126	127						
	Height (in)	47.7	48.5	49.7	51.1	52.5	53.9	54.7	47.7	48.5	49.7	51.1	52.5	53.9	54.7						
	Height (cm)	121.1	122.8	124.9	126.8	128.8	130.7	132.5	121.1	122.8	124.9	126.8	128.8	130.7	132.5						
	50th	93	94	95	96	98	99	100	93	94	95	96	98	99	100						
10	90th	106	106	107	109	110	111	112	106	106	107	109	110	111	112						
	95th	109	110	111	112	113	114	115	109	110	111	112	113	114	115						
	95th + 12 mmHg	121	122	123	124	125	126	127	121	122	123	124	125	126	127						
	Height (in)	48.5	49.2	50.5	51.9	53.3	54.7	55.5	48.5	49.2	50.5	51.9	53.3	54.7	55.5						
	Height (cm)	123.8	125.0	126.8	128.8	130.7	132.5	134.3	123.8	125.0	126.8	128.8	130.7	132.5	134.3						

Appendix 12b. Paediatric BP tables for girls

TABLE 5 Continued

Age (y)	BP Percentile	SBP (mmHg)										DBP (mmHg)									
		Height Percentile or Measured Height										Height Percentile or Measured Height									
		5%	10%	25%	50%	75%	90%	95%	5%	10%	25%	50%	75%	90%	95%						
8	Height (in)	47.6	48.4	49.8	51.4	53	54.5	55.5	47.6	48.4	49.8	51.4	53	54.5	55.5						
	Height (cm)	121	123	126.5	130.6	134.7	138.5	140.9	121	123	126.5	130.6	134.7	138.5	140.9						
	50th	93	94	95	97	98	99	100	56	56	57	59	60	61	61						
	90th	107	107	108	110	111	112	113	69	70	71	72	72	73	73						
	95th	110	111	112	113	115	116	117	72	73	74	74	75	75	75						
9	95th + 12 mm Hg	122	123	124	125	127	128	129	84	85	86	86	87	87	87						
	Height (in)	49.3	50.2	51.7	53.4	55.1	56.7	57.7	49.3	50.2	51.7	53.4	55.1	56.7	57.7						
	Height (cm)	125.3	127.6	131.3	135.6	140.1	144.1	146.6	125.3	127.6	131.3	135.6	140.1	144.1	146.6						
	50th	95	95	97	98	99	100	101	57	58	59	60	60	61	61						
	90th	108	108	109	111	112	113	114	71	71	72	73	73	73	73						
10	95th + 12 mm Hg	124	124	125	126	128	129	130	86	86	87	87	87	87	87						
	Height (in)	51.1	52	53.7	55.5	57.4	59.1	60.2	51.1	52	53.7	55.5	57.4	59.1	60.2						
	Height (cm)	129.7	132.2	136.3	141	145.8	150.2	152.8	129.7	132.2	136.3	141	145.8	150.2	152.8						
	50th	96	97	98	99	101	102	103	58	59	59	60	61	61	62						
	90th	109	110	111	112	113	115	116	72	73	73	73	73	73	73						
11	95th + 12 mm Hg	125	126	126	128	129	131	132	87	87	88	88	88	88	88						
	Height (in)	53.4	54.5	56.2	58.2	60.2	61.9	63	53.4	54.5	56.2	58.2	60.2	61.9	63						
	Height (cm)	135.6	138.3	142.8	147.8	152.8	157.3	160	135.6	138.3	142.8	147.8	152.8	157.3	160						
	50th	98	99	101	102	104	105	106	60	60	60	61	62	63	64						
	90th	111	112	113	114	116	118	120	74	74	74	74	74	75	75						
12	95th + 12 mm Hg	127	128	129	130	132	135	136	88	89	89	89	89	89	89						
	Height (in)	56.2	57.3	59	60.9	62.8	64.5	65.5	56.2	57.3	59	60.9	62.8	64.5	65.5						
	Height (cm)	142.8	145.5	149.9	154.8	159.6	163.8	166.4	142.8	145.5	149.9	154.8	159.6	163.8	166.4						
	50th	102	102	104	105	107	108	108	61	61	61	62	64	65	65						
	90th	114	115	116	118	120	122	122	75	75	75	75	76	76	76						
13	95th + 12 mm Hg	130	131	132	134	136	137	138	90	90	90	90	91	91	91						
	Height (in)	58.3	59.3	60.9	62.7	64.5	66.1	67	58.3	59.3	60.9	62.7	64.5	66.1	67						
	Height (cm)	148.1	150.6	154.7	159.2	163.7	167.8	170.2	148.1	150.6	154.7	159.2	163.7	167.8	170.2						
	50th	104	105	106	107	108	108	109	62	62	63	64	65	65	66						
	90th	116	117	119	121	122	123	123	75	75	75	76	76	76	76						
14	95th + 12 mm Hg	133	134	135	136	138	138	139	91	91	91	91	92	92	93						
	Height (in)	59.3	60.2	61.8	63.5	65.2	66.8	67.7	59.3	60.2	61.8	63.5	65.2	66.8	67.7						
	Height (cm)	150.6	153	156.9	161.3	165.7	169.7	172.1	150.6	153	156.9	161.3	165.7	169.7	172.1						
	50th	105	106	107	108	109	109	109	63	63	64	65	66	66	66						
	90th	118	118	120	122	123	123	123	76	76	76	76	77	77	77						
14	95th + 12 mm Hg	135	135	136	137	138	139	139	92	92	92	92	93	93	94						
	Height (in)	60.2	60.2	61.8	63.5	65.2	66.8	67.7	60.2	60.2	61.8	63.5	65.2	66.8	67.7						
	Height (cm)	153	153	156.9	161.3	165.7	169.7	172.1	153	153	156.9	161.3	165.7	169.7	172.1						
	50th	106	106	107	108	109	109	109	63	63	64	65	66	66	66						
	90th	123	123	124	125	126	127	127	80	80	80	80	81	81	82						

Appendix 12b. Paediatric BP tables for girls

TABLE 5 Continued

Age (y)	BP Percentile	SBP (mm Hg)					DBP (mm Hg)								
		Height Percentile or Measured Height					Height Percentile or Measured Height								
		5%	10%	25%	50%	75%	90%	95%	5%	10%	25%	50%	75%	90%	95%
15	Height (in)	59.7	60.6	62.2	63.9	65.6	67.2	68.1	59.7	60.6	62.2	63.9	65.6	67.2	68.1
	Height (cm)	151.7	154	157.9	162.3	166.7	170.6	173	151.7	154	157.9	162.3	166.7	170.6	173
	50th	105	106	107	108	109	109	109	64	64	64	65	66	67	67
	90th	118	119	121	122	123	123	124	76	76	76	77	77	78	78
	95th	124	124	125	126	127	127	128	80	80	80	81	82	82	82
16	95th + 12 mm Hg	136	136	137	138	139	139	140	92	92	92	93	94	94	94
	Height (in)	59.9	60.8	62.4	64.1	65.8	67.3	68.3	59.9	60.8	62.4	64.1	65.8	67.3	68.3
	Height (cm)	152.1	154.5	158.4	162.8	167.1	171.1	173.4	152.1	154.5	158.4	162.8	167.1	171.1	173.4
	50th	106	107	108	109	109	110	110	64	64	65	66	66	67	67
	90th	119	120	122	123	124	124	124	76	76	76	77	78	78	78
17	95th	124	125	125	127	127	128	128	80	80	80	81	82	82	82
	95th + 12 mm Hg	136	137	137	139	139	140	140	92	92	92	93	94	94	94
	Height (in)	60.0	60.9	62.5	64.2	65.9	67.4	68.4	60.0	60.9	62.5	64.2	65.9	67.4	68.4
	Height (cm)	152.4	154.7	158.7	163.0	167.4	171.3	173.7	152.4	154.7	158.7	163.0	167.4	171.3	173.7
	50th	107	108	109	110	110	110	111	64	64	65	66	66	66	67
95th	90th	120	121	123	124	124	125	125	76	76	77	77	78	78	78
	95th	125	125	126	127	128	128	128	80	80	80	81	82	82	82
	95th + 12 mm Hg	137	137	138	139	140	140	140	92	92	92	93	94	94	94

Use percentile values to stage BP readings according to the scheme in Table 3 (elevated BP: ≥90th percentile; stage 1 HTN: ≥95th percentile; and stage 2 HTN: ≥95th percentile + 12 mm Hg). The 50th, 90th, and 95th percentiles were derived by using quantile regression on the basis of normal-weight children (BMI <85th percentile).⁷⁷

The initial BP measurement may be oscillometric (on a calibrated machine that has been validated for use in the pediatric population) or auscultatory (by using a mercury or aneroid sphygmomanometer^{86,87}). (Validation status for oscillometric BP devices, including whether they are validated in the pediatric age group, can be checked at www.dableducational.org.) BP should be measured in the right arm by using standard measurement practices unless the child has atypical aortic arch anatomy, such as right aortic arch and aortic coarctation or left aortic arch with aberrant right subclavian artery (see Table 7). Other important aspects of proper BP measurement are illustrated in an AAP video available at <http://youtu.be/JLzkNBpqi0>. Care should be taken that providers follow an accurate and consistent measurement technique.^{88,89}

An appropriately sized cuff should be used for accurate BP measurement.⁸³ Researchers in 3 studies in the United Kingdom and 1 in Brazil documented the lack of availability of an appropriately sized cuff in both the inpatient and outpatient settings.^{91–94} Pediatric offices should have access to a wide range of cuff sizes, including a thigh cuff for use in children and adolescents with severe obesity. For children in whom the appropriate cuff size is difficult to determine, the midarm circumference (measured as the midpoint between the acromion of the scapula and olecranon of the elbow, with the shoulder in a neutral position and the elbow flexed to 90°^{86,95,96}) should be obtained for an accurate determination of the correct cuff size (see Fig 2 and Table 7).⁹⁵

If the initial BP is elevated (≥90th percentile), providers should perform 2 additional oscillometric or auscultatory BP measurements at the same visit and average them. If using auscultation, this averaged measurement is used to determine the child’s BP category (ie, normal,

Appendix 13. Clinical Haemolysis SOP

SOP title		Haemolysis_SOP_Clinical_v3.1	
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DATE OF ISSUE		18 Nov 2019	
ORIGINAL AUTHOR		Cindy Chu	
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Version	Reviewed By & Date	Changes made	Date of Issue
1	C Chu, 4 May 2018	New SOP (study specific)	4 May 2018
2.1	C Chu, 27 June 2018	Formatted to the SOP template. Added haemoglobin sampling to the alert and action points.	27 June 2018
3	C Chu, 24 Sep 2018	Changed SOP from study specific to clinical. Clinical details added. Contact information added.	24 Sep 2018
3.1	C Chu, 4 Nov 2019	Administrative changes. Added sections on 'Background information' and 'Points to consider'	5 Nov 2019

SOP TITLE

Management of Haemoglobin or Haematocrit reduction caused by hemolytic agents

PURPOSE AND SCOPE

This SOP covers the management of haemoglobin (Hb) or haematocrit(hct) reductions that are caused by hemolytic agents, especially in relation to G6PD deficiency.

BACKGROUND INFORMATION

G6PD deficiency is an enzyme problem inside the red blood cell (RBC). Some drugs and environmental agents cause oxidative stress and RBC's deficient in G6PD activity will haemolyse more quickly than RBC's with normal G6PD activity. The fluorescent spot test (currently used at SMRU labs) and Carestart rapid diagnostic test (RDT) can be used to determine if a patient is normal or abnormal for G6PD deficiency. Some individuals, notably females, are heterozygotes and will have a wide range of G6PD activity; deficient, intermediate or normal. The intermediate females will be diagnosed as G6PD normal on the G6PD tests that give a normal or abnormal result (qualitative tests). The SMRU studies using high dose primaquine, a haemolytic drug, show that G6PD intermediate females are also at risk for haemolysis. Therefore, you must be careful with diagnosing G6PD activity when female patients are presenting with acute haemolysis and anaemia.

POINTS TO CONSIDER

1. For patients who present for the first time, you may not know the baseline haematocrit or haemoglobin. In these cases, you need to make a careful assessment to know the diagnosis.
2. If the patient is in shock, refer to the BBG guidelines for management.
3. Do a complete medical history including medications taken and any environmental exposures (naphthalene balls, pesticides, traditional treatment).
4. Admit to the IPD for close observation.

5. Repeat haematocrit at least daily. You may want to check more often if the patient is not stable. Continue to follow haematocrit until it improves. See below for other investigations to follow.
6. When you give blood transfusions, you may want the donor to be G6PD normal. This means the donor should have a normal G6PD test AND be a male or female with known genotype.
7. There are new tests that give a quantitative G6PD activity results. These tests can diagnose G6PD intermediate females. We can use quantitative tests to find the people who might be at risk for haemolysis.

ALERT POINTS

1. If the Hb/Hct result is 10% different from the previous sample, repeat the sample or compare the clinic Hb/Hct result with the CBC Hb/Hct result.
2. Signs of anaemia due to significant haemolysis
 - a. Tachycardia and/or tachypnea
 - b. Low BP
 - c. Pallor
3. Symptoms of anaemia due to significant haemolysis
 - a. Dyspnoea or dyspnea on exertion (more than baseline)
 - b. Fatigue or tiredness
 - c. Dizziness
 - d. Palpitations
4. The biggest danger for severe haemolysis is acute kidney injury. This is caused by damage from the contents inside the RBC that are now in the blood (because the RBC is lysed) and are being filtered in the kidney (like Hb). Some patients can develop renal failure and require dialysis.
5. Compare all Hb/Hct to pre-dose or pre-haemolysis levels (this is called the fractional change).
Fractional change = (Current Hb/ Hct– pre-haemolysis Hb/Hct) / (Pre-haemolysis Hb/Hct)
6. If the fractional Hb/Hct change is >25% or if absolute Hb decreases >3g/dL or if absolute Hct decreases >10%, call the doctor.

ACTION POINTS

If fractional drop > 30% or Hb is < 7 g/dL or the patient has severe symptoms of anaemia

1. Stop the medication, environmental exposure or other haemolytic agent.
2. Call site doctor. For more advice, can call Cindy or Germana in the haematology lab.
3. Take blood samples (Clinical information “drug induced haemolysis”)
 - Hematocrit and malaria smear
 - Urine stick (please document urobilinogen)
 - Urine pregnancy test
 - CBC, reticulocyte count – send to Mae Sot lab.
 - G6PD spectro, G6PD genotype may not be necessary for clinical care but are useful for additional information and research purposes. For more advice, can call Cindy or Germana.
 - Haptoglobin level – send to **PCT** (*need to write in ‘other’*)
 - Liver function tests (ALT, AST, total and direct bilirubin, and LDH) – send to **PCT**
 - Kidney function tests (BUN, creatinine) – send to **PCT**
4. If Hb is <6g/dL or Hct <21%, give blood transfusion. Try to find a donor who is G6PD normal AND male or a female that we know is not a G6PD heterozygote. The risk for acute kidney injury is less if there is no more haemolysis.
5. Make an anaemia treatment plan based on SMRU guidelines. Be careful when prescribing Vitamin C. Large doses can cause haemolysis in G6PD deficiency.

Appendix 14. IV IRON (VENOFER) PROTOCOL

Before you start:

- Make sure you have a patient with significant iron deficiency (ferritin <30) and anemia.

Do not give if ferritin is high or normal.

- Calculate the dose you need:

Required iron dose (mg) = $(2.4 \times (\text{target Hb} - \text{actual Hb}) \times \text{pre-pregnancy weight (kg)}) + 1000$ mg for replenishment of stores

For pregnant women: target Hb = 12 g/dl (~ 36% HCT)

Calculate actual Hb = $\text{HCT}/3$ (eg. hct =27%, Hb=9 g/dL)

- Plan the schedule of infusions (maximum 200 mg per infusion, maximum 3 infusions per week). Monthly or every 2 weeks is okay if patient lives far.
- Ask if she has ever had a bad reaction to IV iron before. Tell her to inform the staff if she feels flushing, hot, dyspnea, itching, tingling, sweating, palpitations etc.
- Make sure you have adrenaline and syringe nearby – very low risk (~ 3 in 1 million) for anaphylaxis but be ready.

Procedure:

- Put in IV line, start close observation sheet, and check vital signs.
- Mix 1 vial (5 ml, 100 mg) Venofer with 95 ml NSS in metroset.
- Start infusion at 28 dpm x 5 min and repeat VS after 5 min. Ask symptoms.
- If VS normal and no symptoms, continue infusion at ~5 ml/min (too fast to count the drops).
- Check VS and symptoms every 10 minutes (or every 50 ml).
- Mix another 1 vial Venofer with 95 ml NSS and give at ~5 ml/min.

Note: you need to give 100 ml over **at least** 15 minutes, and 200 ml over **at least** 30 minutes. If you take more time (eg. 1 hr for 200 mg) you will have less risk of side effects. If the patient complains of flushing but is clinically stable and no signs of anaphylaxis, slow down the infusion and monitor the symptoms and vital signs.

Appendix 15. Febrile Infant and Child Protocol

Unwell child or infant less than 3 years with fever $\geq 38.0^{\circ}\text{C}$ or $\geq 37.5^{\circ}\text{C}$ 4 hours apart

Assess for Emergency

Take a full history and perform an examination

Malaria smear – if positive consider other diagnosis as well

For neonates see the Neonatal Guidelines

What is the child's main symptom?

Difficulty in breathing and cough

Acute Respiratory Distress Protocol

Diarrhoea

Gastroenteritis Treatment Protocol

Irritability, neck stiffness or bulging fontanelle

Meningitis Treatment Protocol

Fever

Consider the differential diagnosis

Child unwell and no focus of infection can be found on examination

Consider other available tests; Scrub RDT, Dengue RDT. Discuss with doctor for Chikungunya testing.

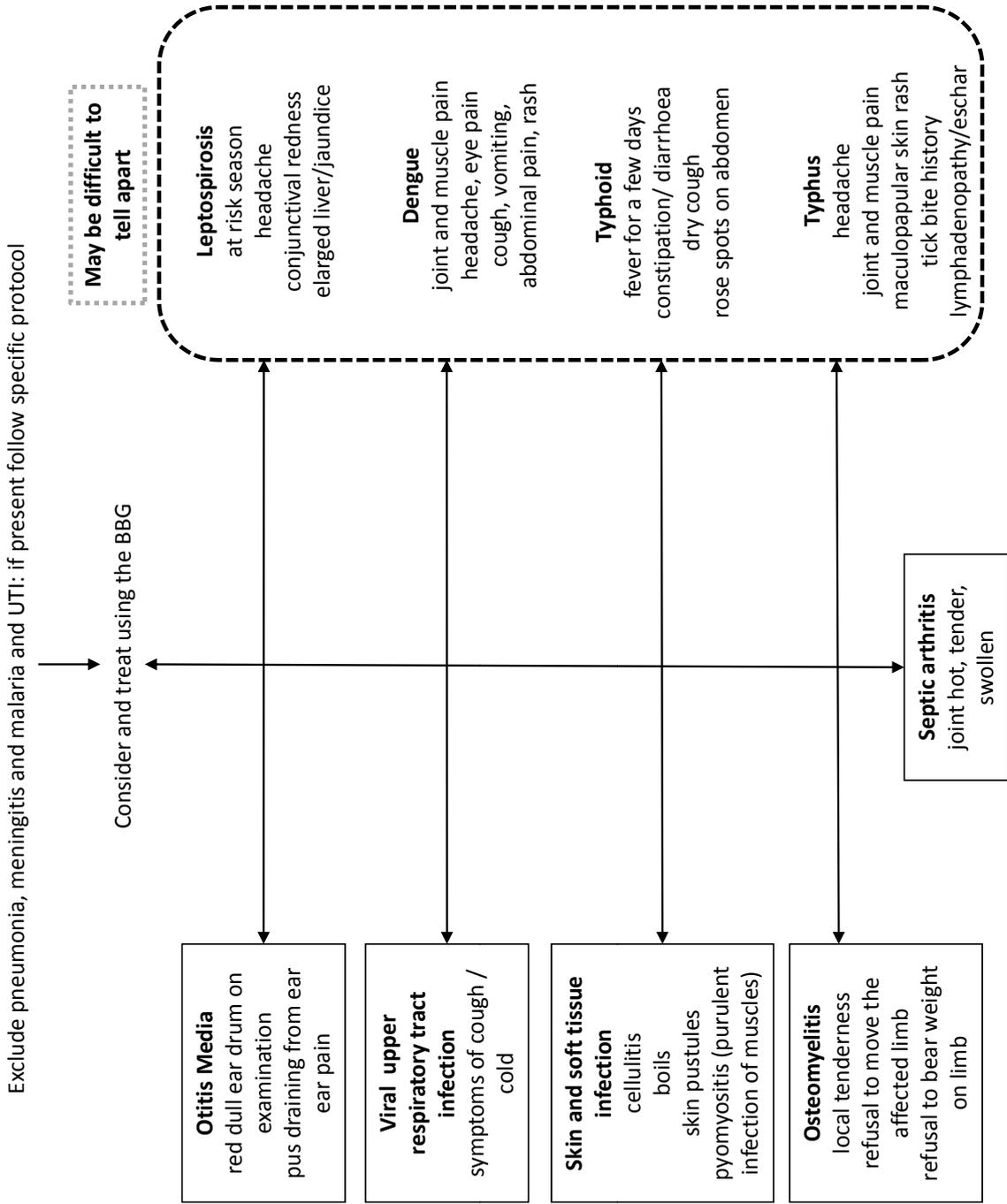
Take a FULL Septic Screen
CBC, Blood culture (CRP)

Urine sample (clean catch, catheter)
Lumbar puncture

Start IV ceftriaxone 50mg/kg BID if meningitis ; OD if sepsis

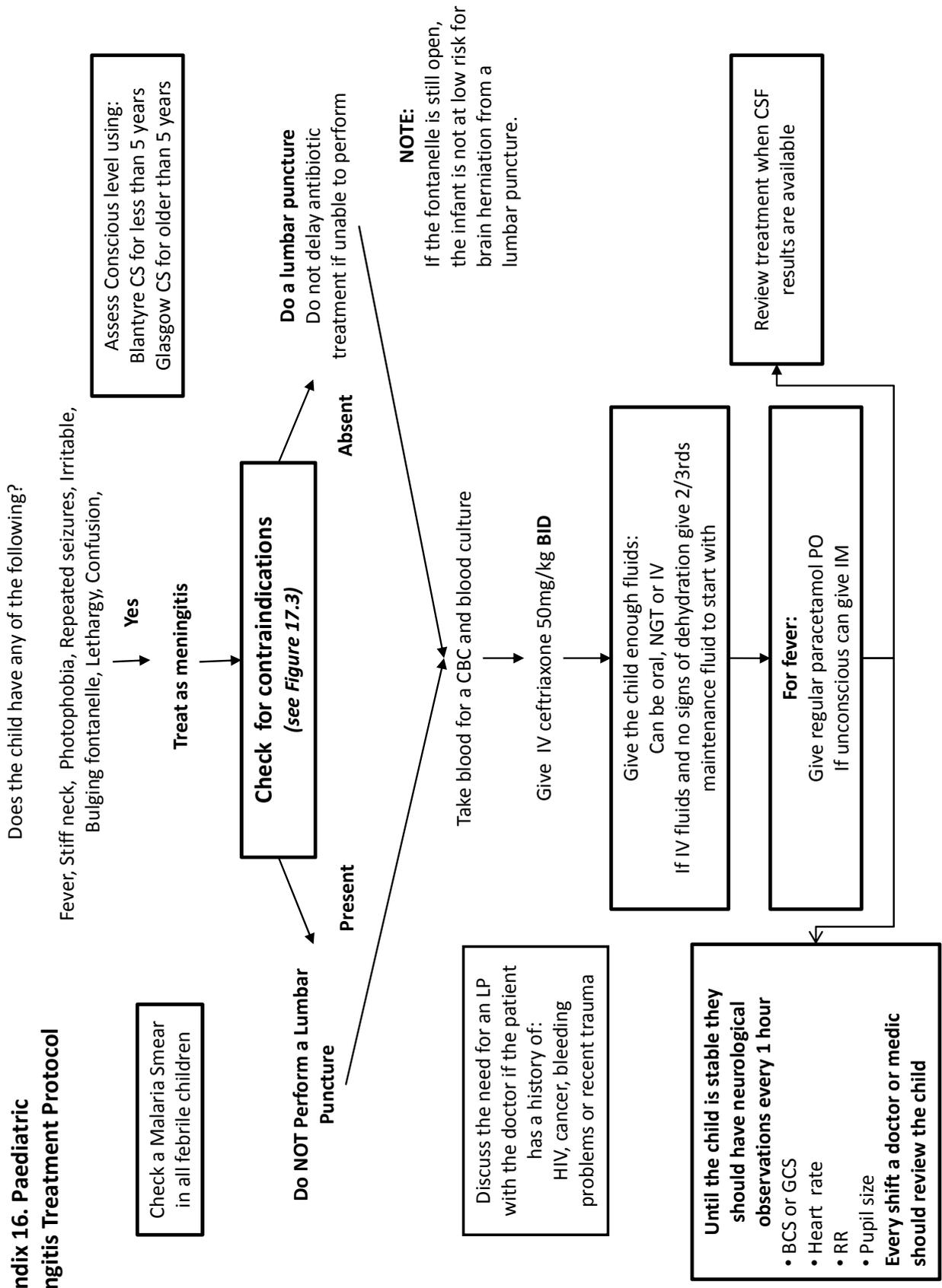
All infants presenting with a fever and not focus to explain the fever should have a urine examined to exclude a UTI

Appendix 15. Differential Diagnosis of Febrile Infant or Child



No changes made from Paediatric Guidelines Nov 2010

Appendix 16. Paediatric Meningitis Treatment Protocol

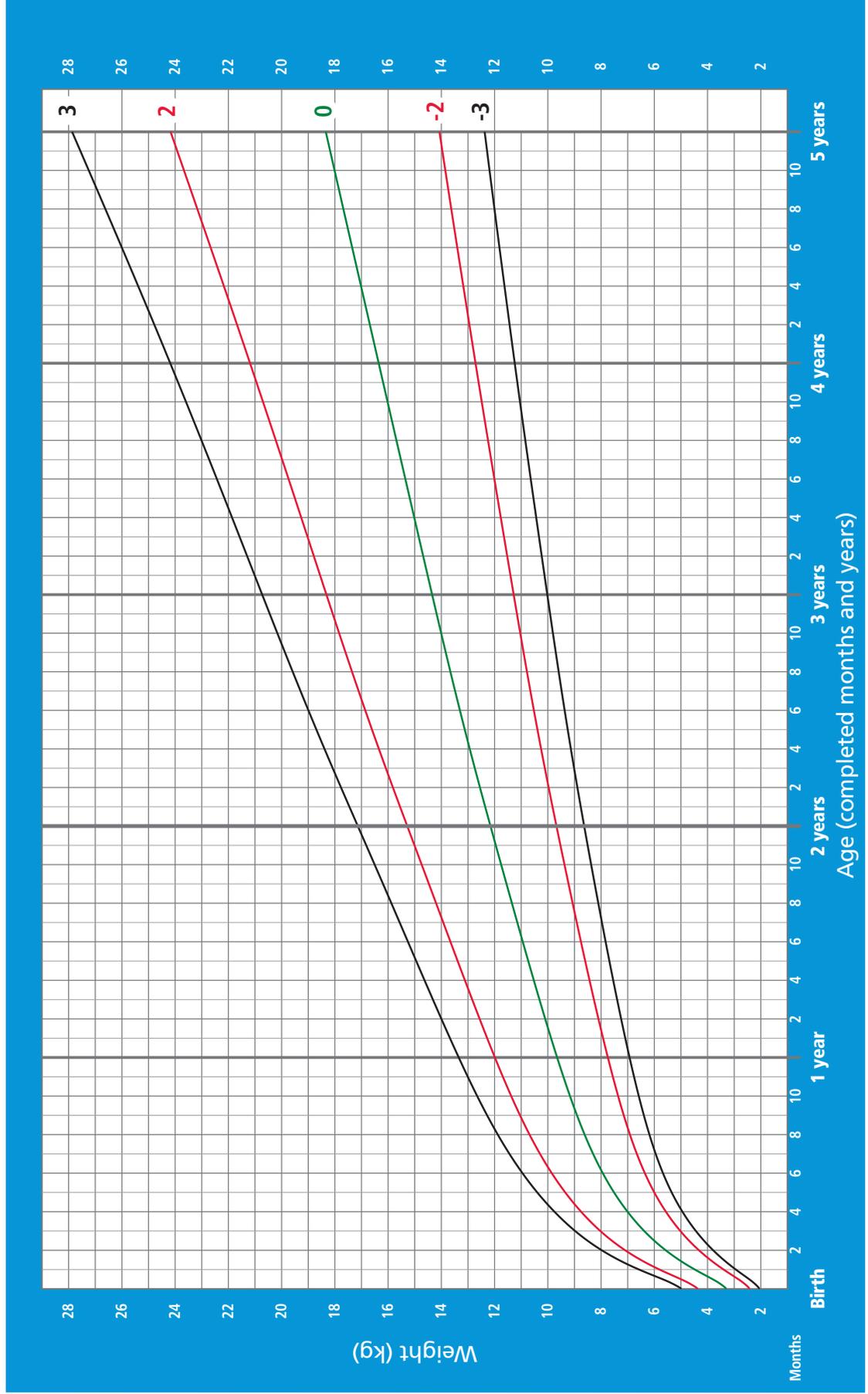


Appendix 17. Antibiotic Classes

Class	Antibiotic	Mechanism of Action	Antibiotic spectrum
Penicillins	Amoxicillin	Beta lactam drug that blocks cell wall synthesis	gram+, some gm-, some anaerobes
	Penicillin		
	Ampicillin		
	Cloxacillin		
	Augmentin (Amoxi/Clavulanate)		
Extended Spectrum PCN	Piperacillin (UreidoPCN)	Beta lactam drug that blocks cell wall synthesis	gm+ and gm-, Pseudomonas & Enterobacter (hospital infection)
	Ticarcillin (CarboxyPCN)		
Vancomycin		Glycopeptide drug that blocks cell wall synthesis	Staph aureus resistant to PCNs
Clindamycin		Blocks protein synthesis	gm+, anaerobes
Metronidazole			anaerobes
Tetracyclines	Doxycycline	Blocks protein synthesis	gm+, gm-, atypical organisms (Rickettsias)
	Minocycline		
	Tetracycline		
Macrolides	Erythromycin	Blocks protein synthesis	Atypical organisms (Mycoplasma), gm+, some gm- (Bordetella pertussis and typhoid for azithro)
	Azithromycin		
	Clarithromycin		
Sulfa	Cotrimazole (Trimethoprim/Sulfa)	Blocks folic acid synthesis	gm+, gm-
Chloramphenicol		Blocks protein synthesis	gm+, gm-, anaerobes
Cephalosporins	1 st generation: Cephalexin, Cefazolin	Beta lactam drug that blocks cell wall synthesis	gm+, some gm-
	2 nd generation: Cefuroxime, Cefaclor, Cefoxitin		gm+, more gm- than 1st generation
	3 rd generation: Ceftriaxone, Cefotaxime, Ceftazidime		gm+, more gm- than 2nd generation
	4 th generation: Cefipime		same as 3rd generation
Monobactam	Aztreonam	Beta lactam drug that blocks cell wall synthesis	gm-, anaerobes
Carbapenem	Imipenem	Beta lactam drug that blocks cell wall synthesis	gm+, gm-, anaerobes, Enterobacter (hospital infection)
	Meropenem		
Aminoglycosides	Gentamicin	Blocks protein synthesis	gm-
	Amikacin		
	Tobramycin		
Fluoroquinolones	1 st generation: Norfloxacin	Blocks DNA synthesis	gm-
	2 nd generation: Ciprofloxacin, Levofloxacin, Ofloxacin		gm- (especially Cipro), Atypical organisms, Levofloxacin good for S.
	3 rd generation: Gatifloxacin		more gm+ than 1st or 2nd
	4 th generation: Moxifloxacin, Trovofloxacin		gm+, gm- and anaerobes
Oxazolidinone	Linezolid		gm+, some gm-, anaerobes

Appendix 18. Weight-for-age BOYS

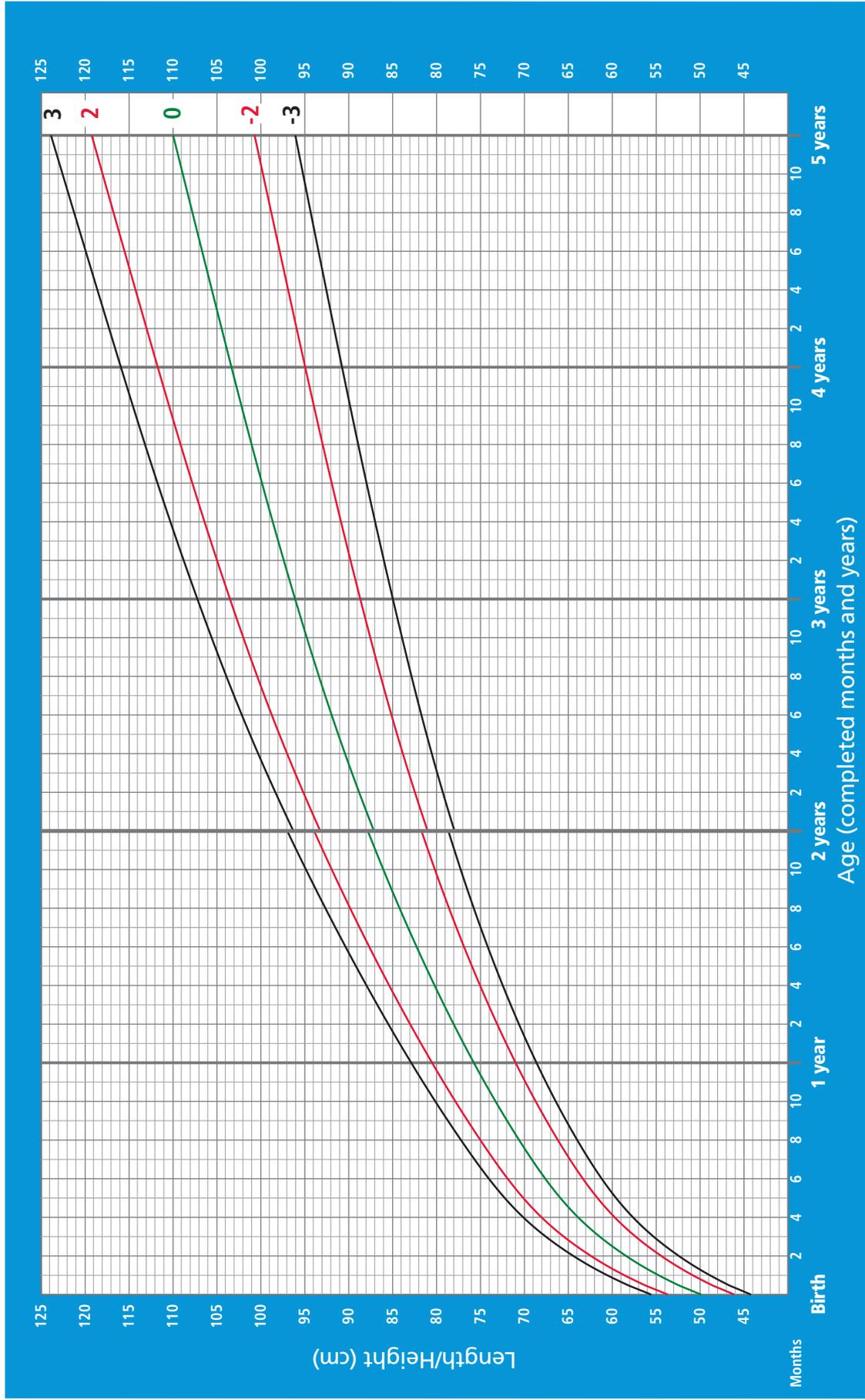
Birth to 5 years (z-scores)



Appendix 18. Length/height-for-age BOYS

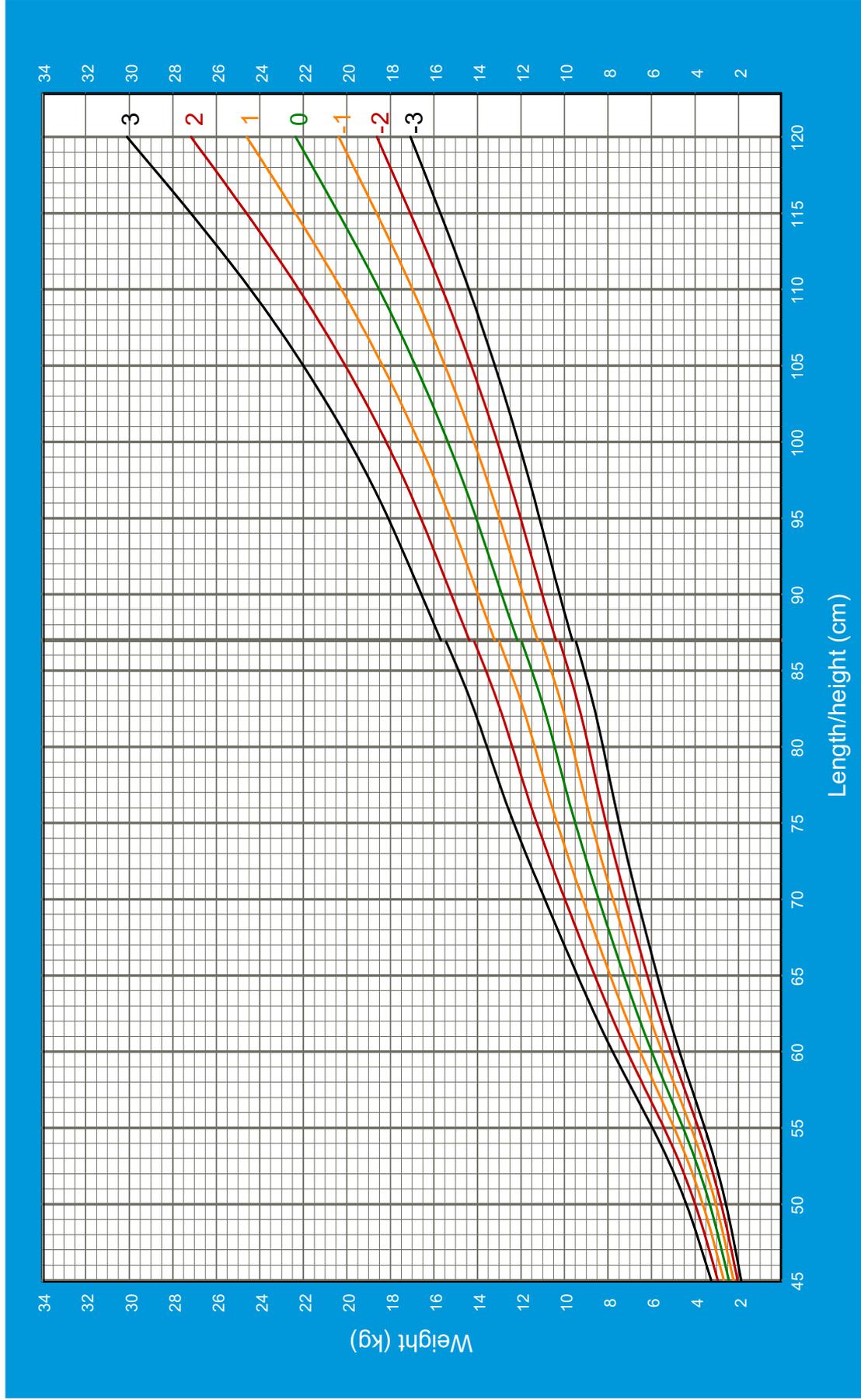


Birth to 5 years (z-scores)



Appendix 18. Weight-for-length/height BOYS

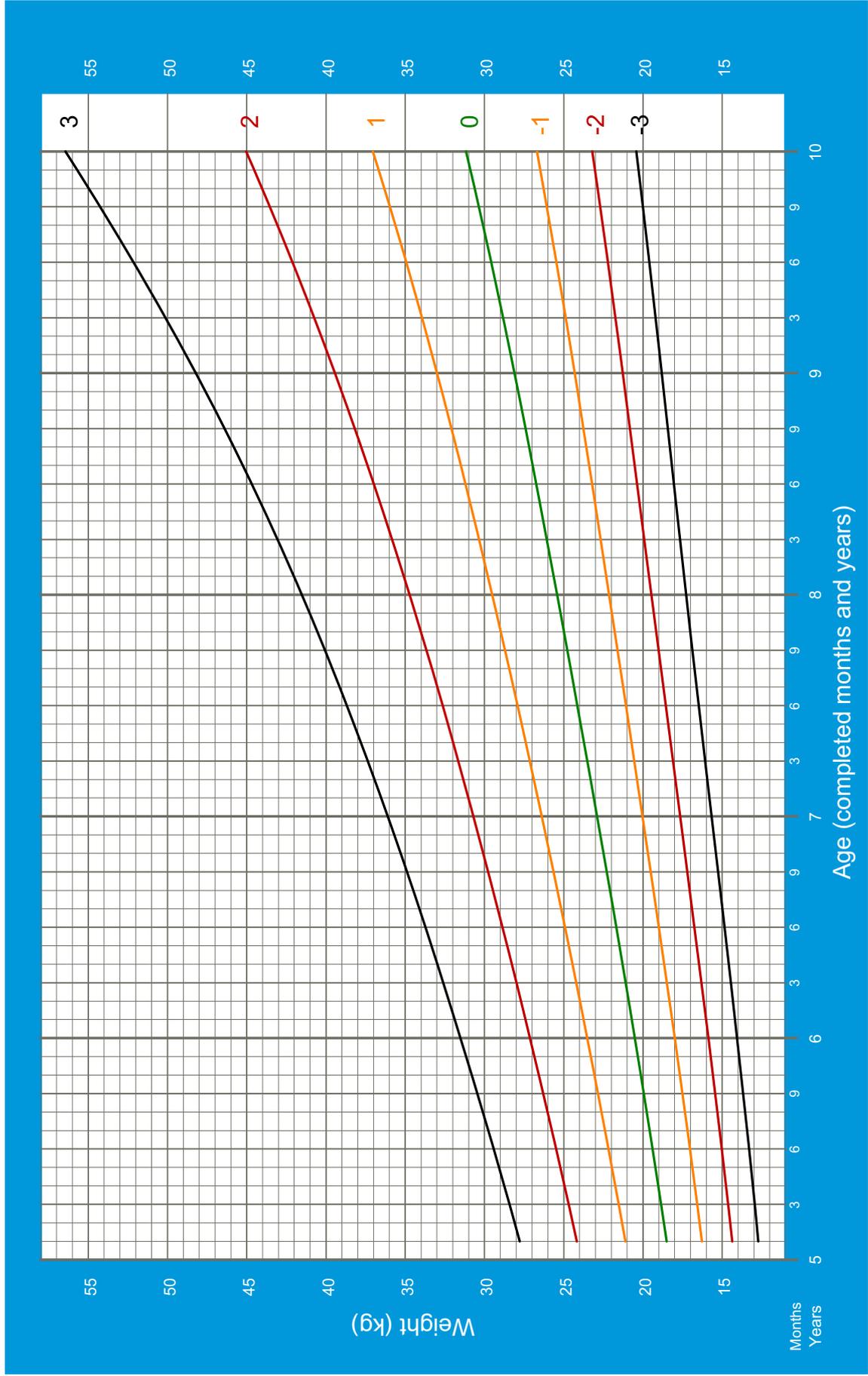
Birth to 5 years (z-scores)



WHO Child Growth Standards

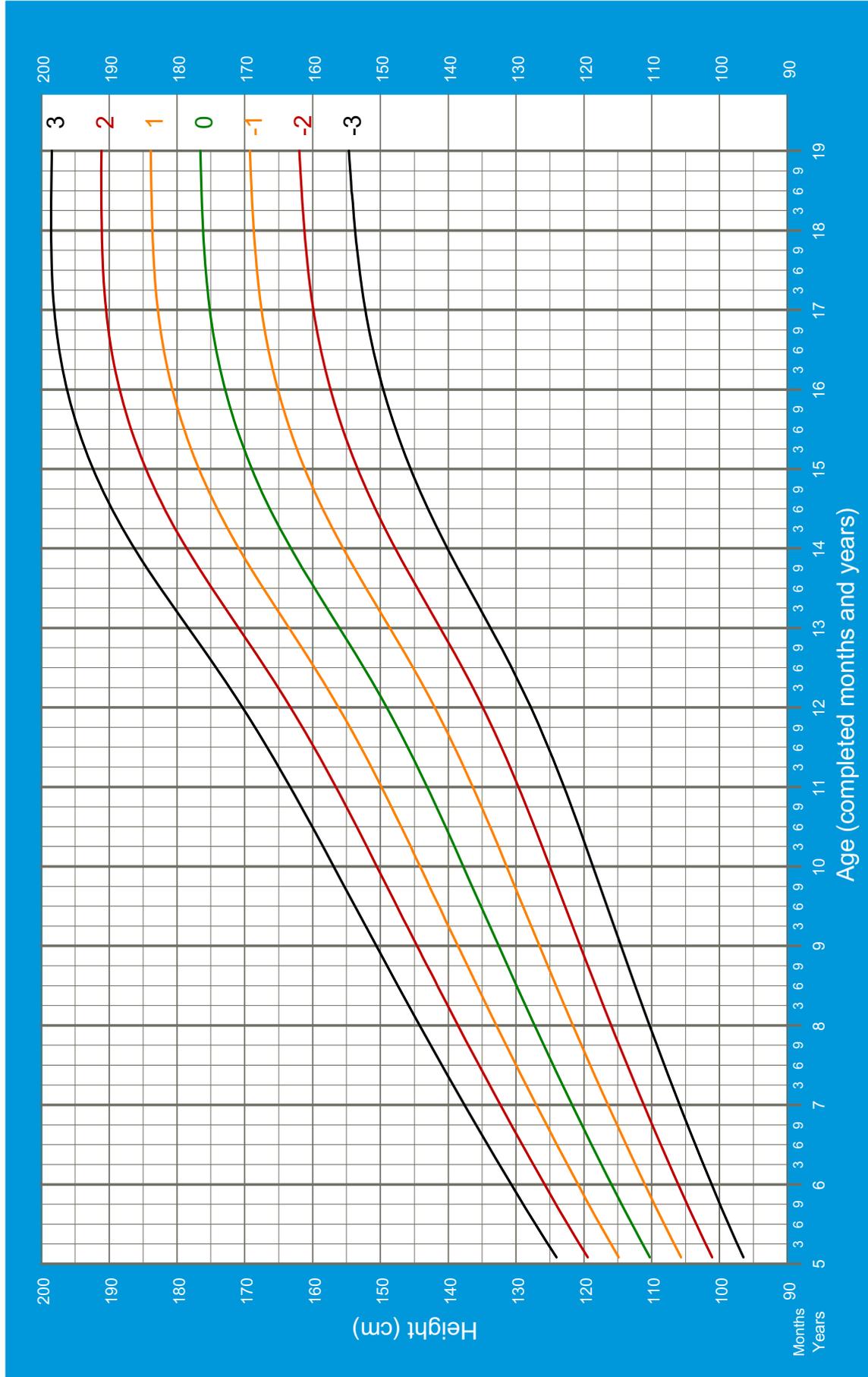
Appendix 18. Weight-for-age BOYS

5 to 10 years (z-scores)



Appendix 18. Height-for-age BOYS

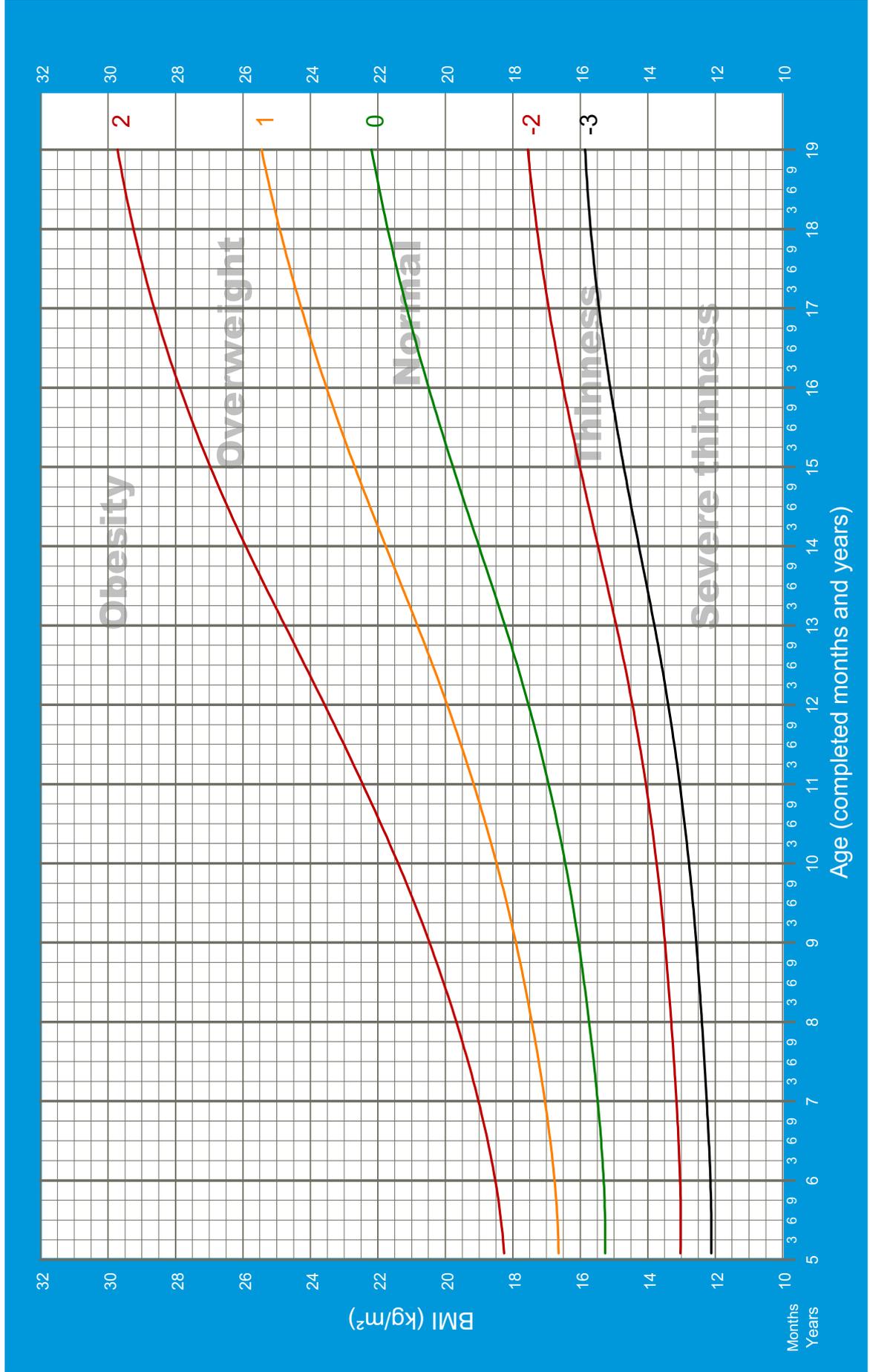
5 to 19 years (z-scores)



Appendix 18. BMI-for-age BOYS



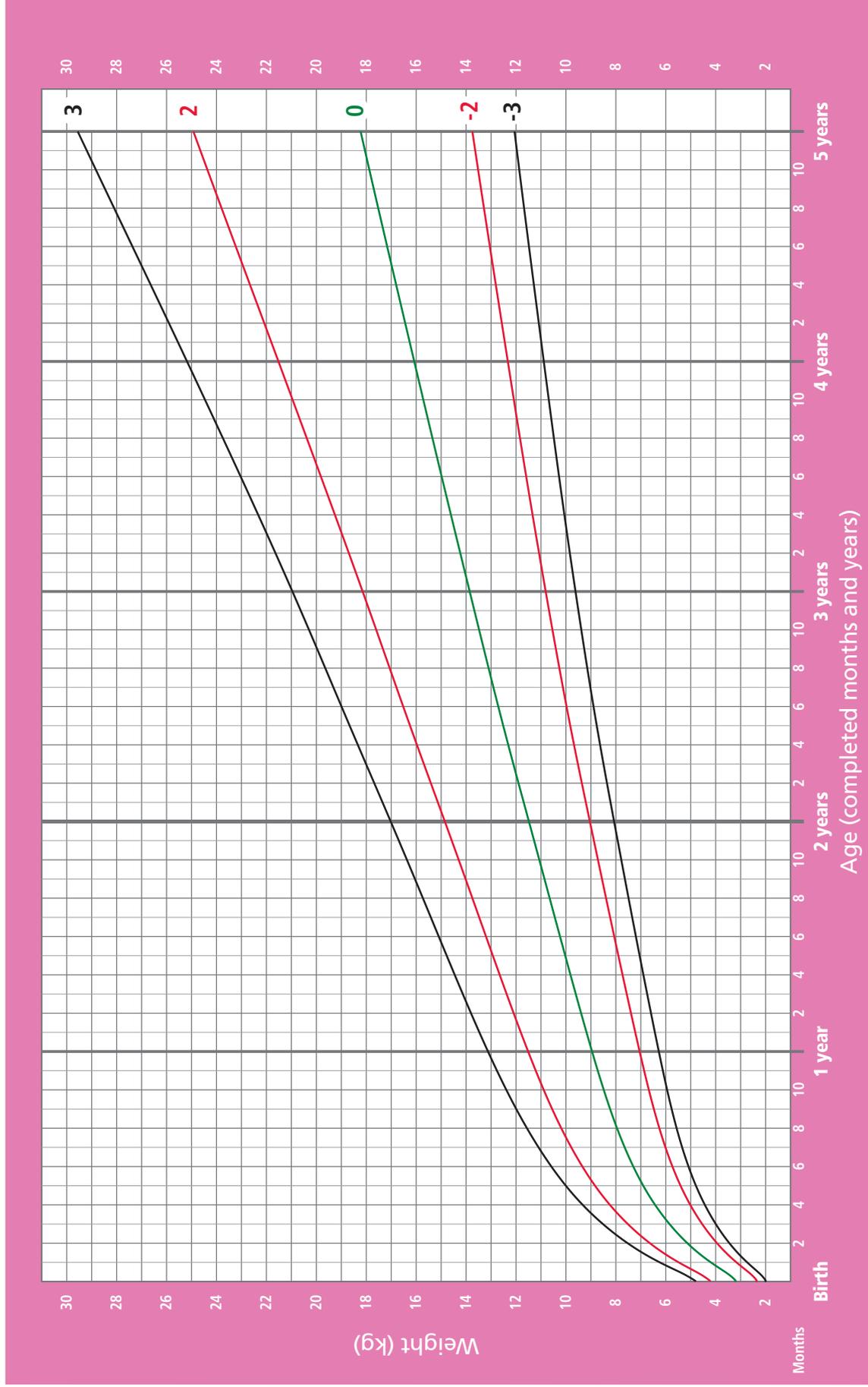
5 to 19 years (z-scores)



Appendix 18. Weight-for-age GIRLS



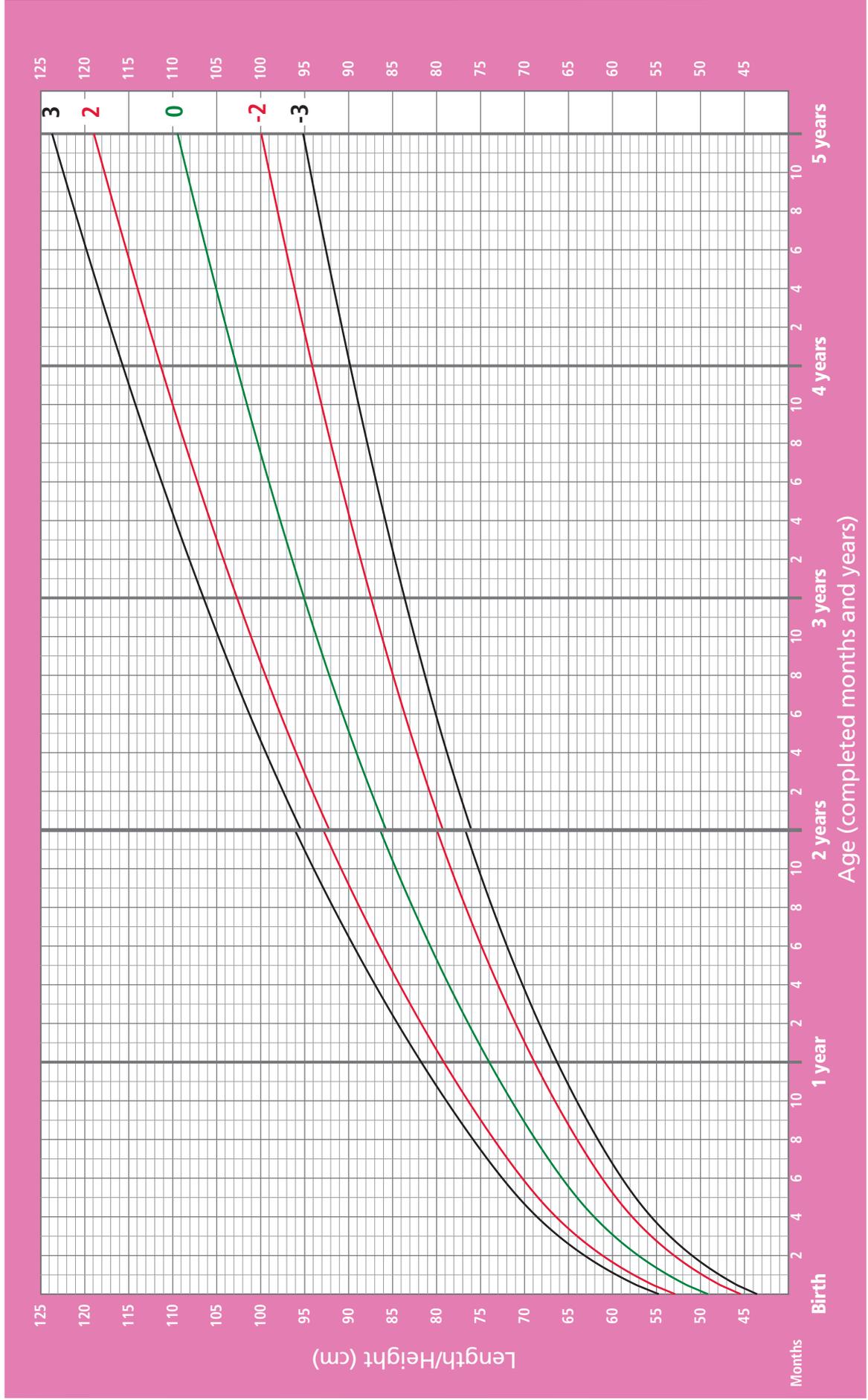
Birth to 5 years (z-scores)



Appendix 18. Length/height-for-age GIRLS



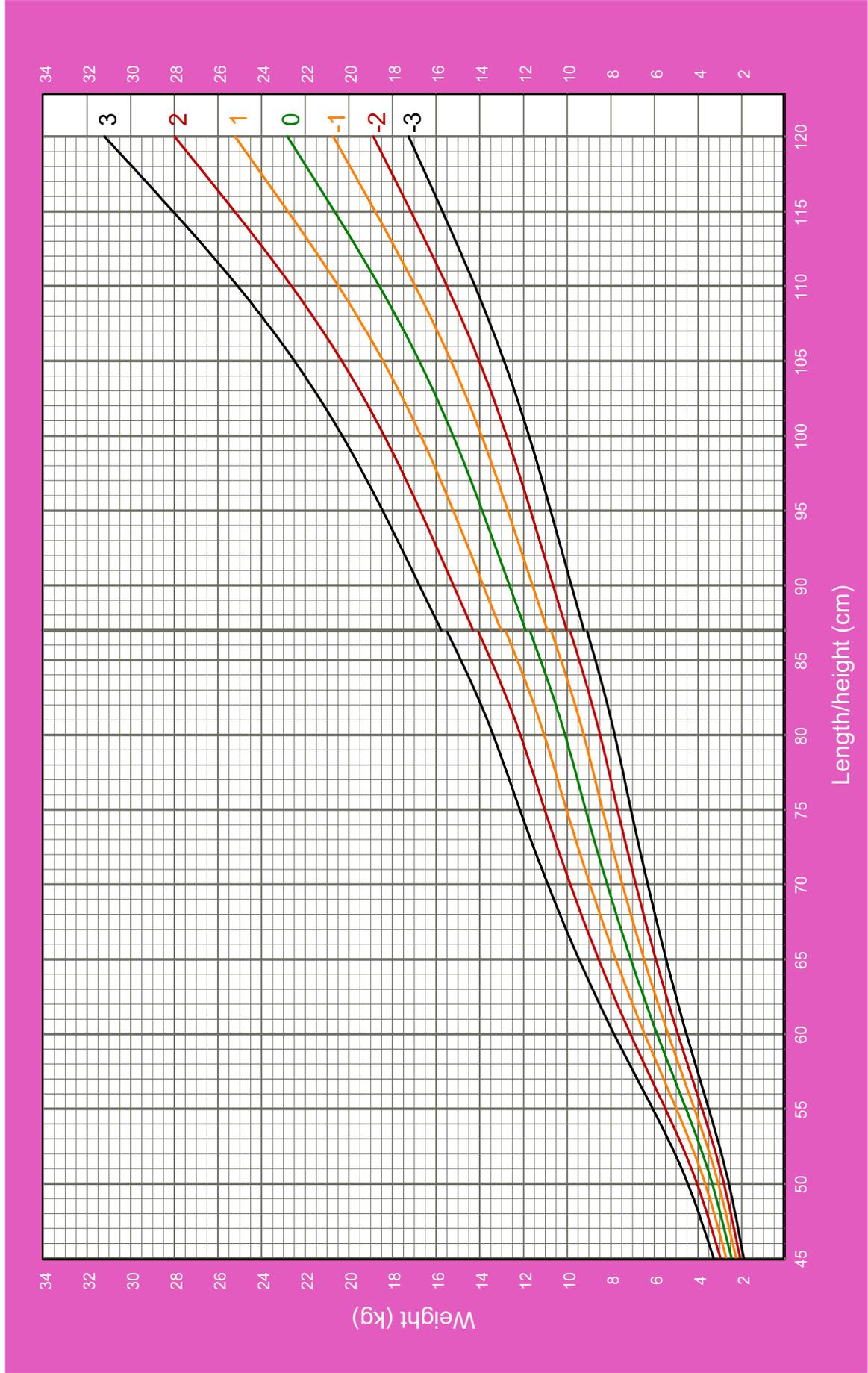
Birth to 5 years (z-scores)



Appendix 18. Weight-for-length/height GIRLS

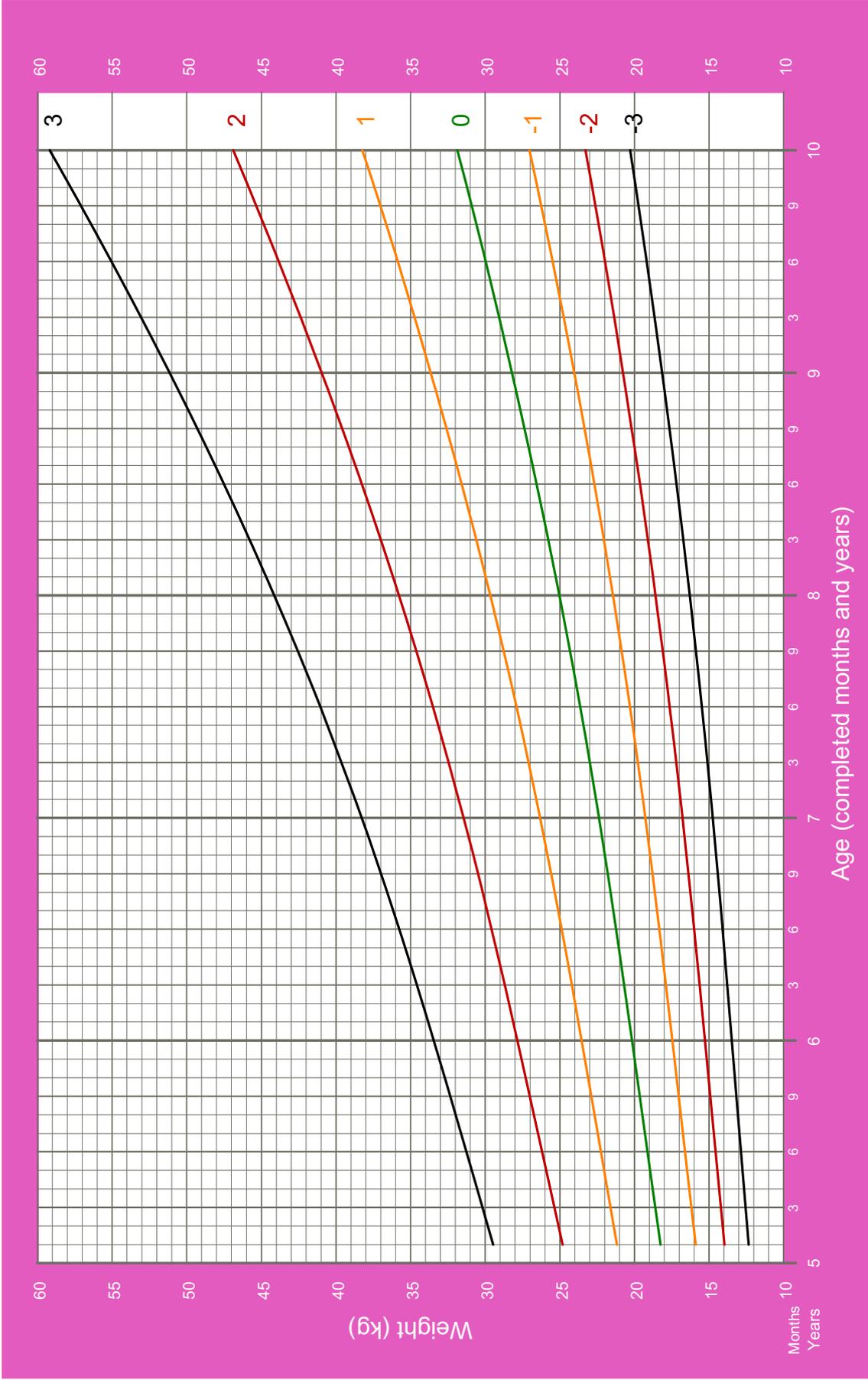


Birth to 5 years (z-scores)



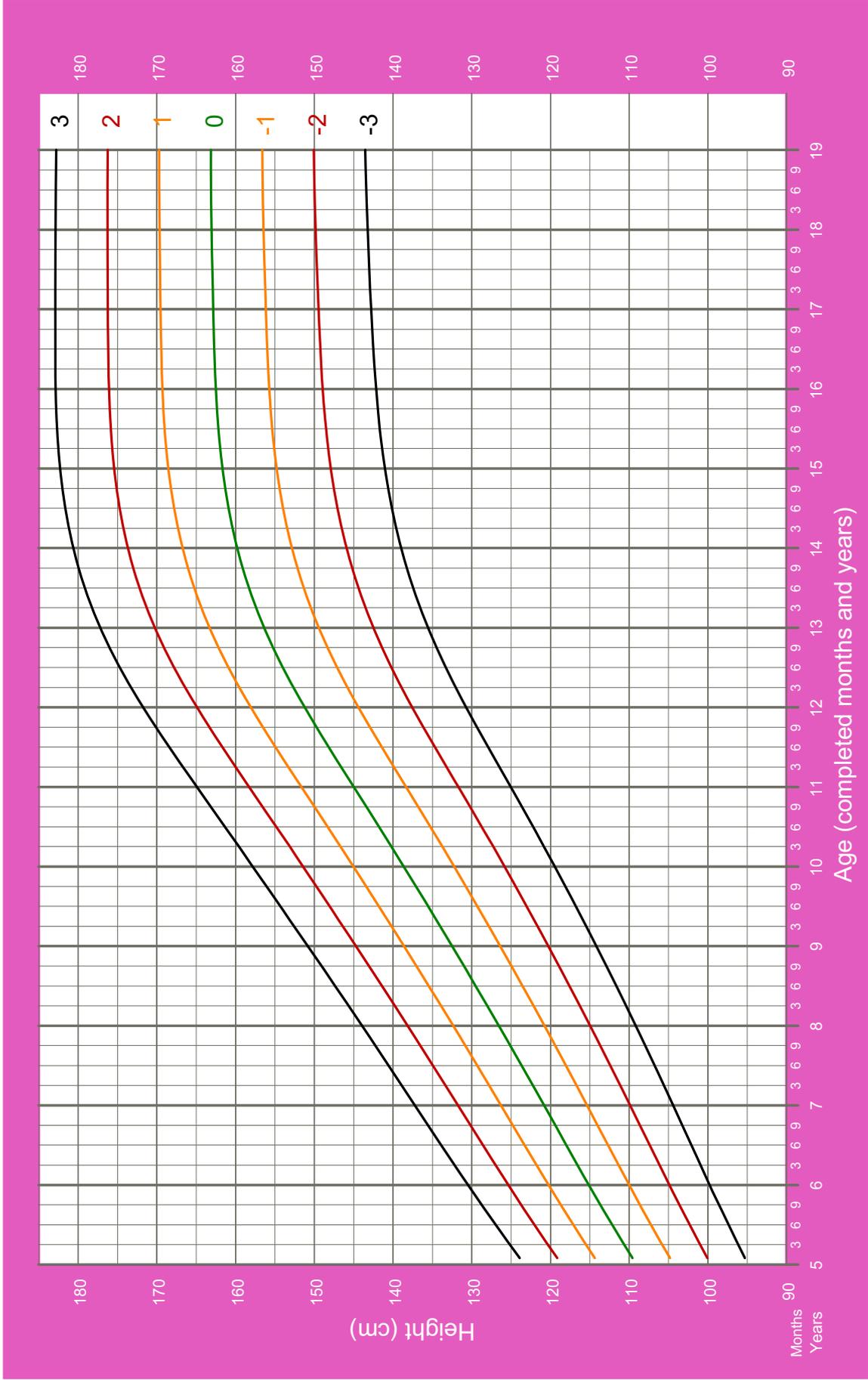
Appendix 18. Weight-for-age GIRLS

5 to 10 years (z-scores)



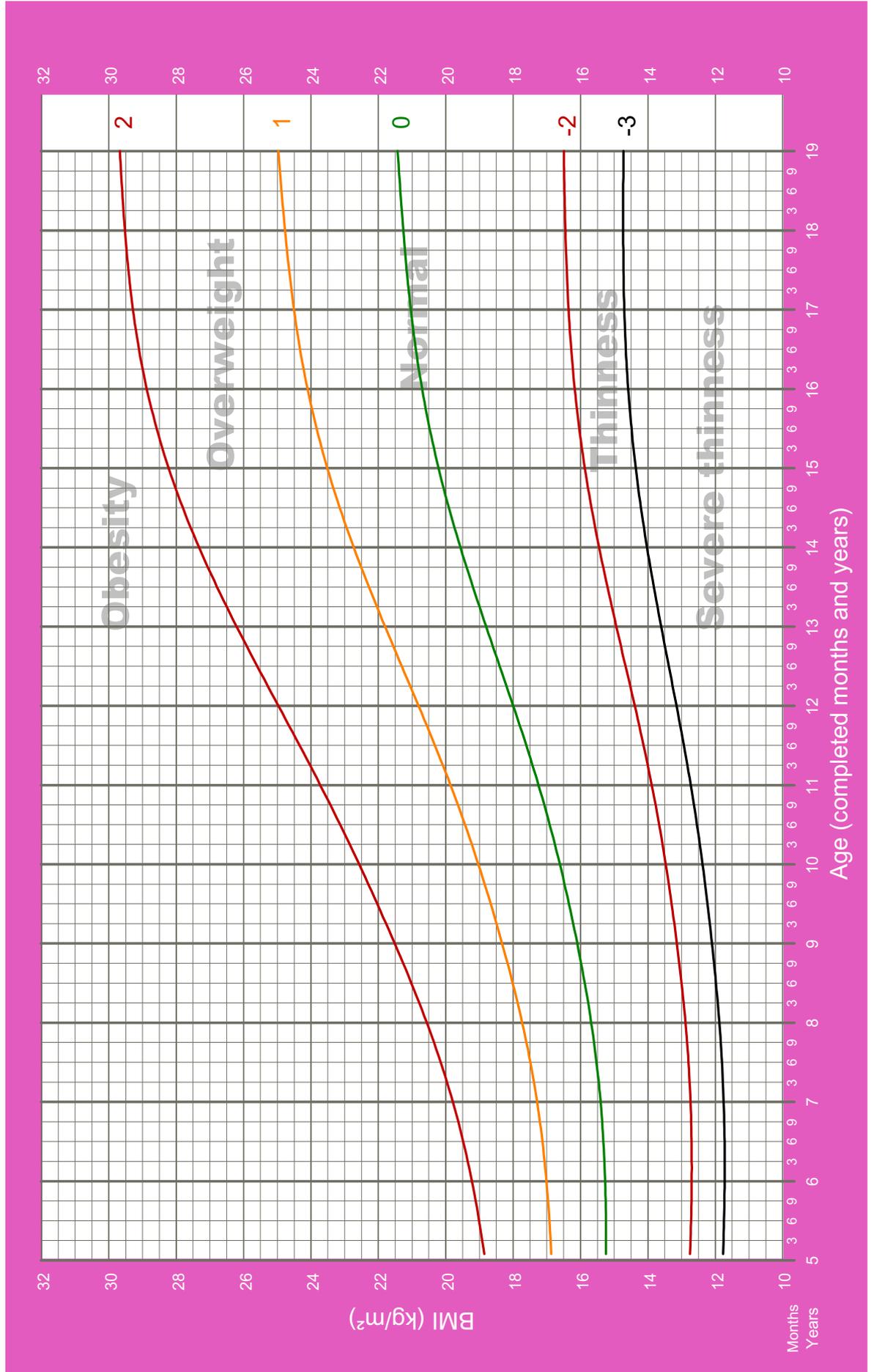
Appendix 18. Height-for-age GIRLS

5 to 19 years (z-scores)



Appendix 18. BMI-for-age GIRLS

5 to 19 years (z-scores)



Appendix 20. Oxygen weaning SOP

SOP title		Oxygen weaning-SOP-Clinical-V1	
Version No.		V1	
DATE OF ISSUE		30 October 2019 (has been in practical use since 2011)	
ORIGINAL AUTHOR		Kathy Burgoine	
REVIEWED BY		Htet Ko Ko Aung	
AUTHORISED BY & DATE		Cindy Chu, 17 Mar 2020	
LOCATION OF MASTER DOCUMENT		T:\Medical\Clinical SOPs	
Document Review History			
Version	Reviewed By & Date	Changes made	Date of Issue
1	C Chu, 30 Oct 2019 (update)	Weaning guidelines from 2011 were put into this SOP template	30 Oct 2019
1	HKKA 16 Mar 2020	A follow up review of the SOP resulted in no changes	17 Mar 2020

SOP TITLE

Process for weaning and stopping supplemental oxygen in the field clinics

PURPOSE AND SCOPE

This SOP covers how oxygen should be removed from patients who require supplemental oxygen during hospitalisation.

WHICH PATIENTS?

- Not neonate
- No COPD
- No congenital heart disease (especially cyanotic) – discuss with doctor
- No chronic hypoxia

EQUIPMENT (see Figure 1 for oxygen delivery methods)

- Non-rebreather mask
- Face mask
- Nasal cannula
- Connecting tubes
- Oxygen tank – check oxygen pressure

WEANING OXYGEN

Decrease oxygen when clinical condition better, RR improved, and oxygen saturations $\geq 95\%$. Decrease step by step and check saturation between each step:

- 5 litres with mask, THEN
- 4 litres with mask, THEN
- 3 litres with mask, THEN
- 2 litres with nasal cannula, THEN
- 1 litre with nasal cannula, THEN
- ½ litre with nasal cannula, THEN
- stop

NOTE: Oxygen weaning may depend on the individual patient, their disease, age, pregnancy status, and baseline oxygen saturation. The plan below is a general guide. If there is a different management plan, be sure that everyone on the clinical team (doctor, medic, nurse, health care worker and patient) is aware.

CHECK OXYGEN SATURATIONS

- Every 5 min x 3, THEN
 - Every 15 min x 3, THEN
 - Every 30 min x 2, THEN
 - Every 1 hour x 2, THEN
 - Routine vital signs (or follow treatment plan)
-
- *If oxygen saturations remain $\geq 94\%$ at 60 minutes, continue to decrease oxygen or stop weaning. This depends on the treatment plan.*
 - *If oxygen saturations drop $<90\%$ INCREASE the oxygen, check saturations, and when $\geq 94\%$ stop weaning.*
 - *If the patient becomes blue or oxygen saturations drop $<90\%$ at any time, restart oxygen*

COMMUNICATION

- A medic can make the decision to wean oxygen.
- The medic should include the oxygen weaning activities during medical rounds.
- All staff who are caring for the patient should be aware of the treatment plan.
- Complications are reported from the medic to the physician.

REFERENCES

BBG Guidelines, edition 2016
Obstetric Guidelines, edition 2018
Malaria Guidelines, edition 2018

Figure 1. Oxygen delivery methods

FiO₂ and delivery device

Device	Reservoir capacity	O ₂ flow (L)	Approximate FiO ₂
Nasal Cannula	50 ml	1	0.21-0.24
		2	0.24-0.28
		3	0.28-0.34
		4	0.34-0.38
		5	0.38-0.42
		6	0.42-0.46
Oxygen face mask	150-250 ml	5 to 10	0.40 - 0.46
Mask with reservoir bag	750-1250 ml		
Partial non-rebreather		5 to 7	0.35-0.75
Non-rebreather		5 to 10	0.40-1.0

SHOKLO MALARIA RESEARCH UNIT

Guideline for Prevention of Mother to Child Transmission

8th edition



Preliminary Introduction

PMTCT activity at SMRU is based on teamwork between OB and TB/HIV departments and involves medical assessment, counselling and referral to Myanmar OG and NAP at Myawaddy hospital for sustainable ART to patients.

In case of emergency, SMRU team can start and support ART short term. As soon as possible after the emergency SMRU team needs to refer to Myanmar program for long-term treatment for mother and baby.

Contents

- 1) Prevention of Mother to Child Transmission (PMTCT)
- 2) First visit – after diagnosis of HIV/before delivery, done by SMRU Doctor and preparation of ART plan
- 3) Emergency situation
- 4) Treatment regime for pregnant women and breastfeeding mother
- 5) Delivery
- 6) Other related actions
 - a) Family Planning & Couple counselling
 - b) Infant Prophylaxis
 - c) Infant follow-up
 - d) Infant feeding options
 - e) Vaccination
 - f) Cotrimoxazole prophylaxis
 - g) Viral testing & HIV antibody testing
 - h) PMTCT box

Appendix 1: Flow Chart for PMCT Intervention during delivery-----9

Appendix 2: TB Active Case detection form-----10

Appendix 3: TB screening procedure for PMTCT-----11

Glossary

ALT:	Alanine Aminotransferase
ANC:	Antenatal Care
AROM:	Artificial rupture of membranes
ART:	Antiretroviral Therapy
AST:	Aspartate Aminotransferase
AZT:	Zidovudine
CD4:	Cluster of Differentiation 4
EFV:	Efavirenz
EPI:	Expanded Program on Immunization
FTC	Emtricitabine
G6PD:	Glucose 6 Phosphate Deficiency
Hb:	Hemoglobin
HBs Ag:	Hepatitis B Antigen
HCV Ab:	Hepatitis C Antibody
Hct:	Hematocrit
HIV:	Human Immunodeficiency Virus
MCH:	Maternal and Child Health
NAP	National AIDS Program
NVP:	Nevirapine
OIs:	Opportunistic Infections
PMTCT:	Prevention of Mother to Child Transmission
RDT:	Rapid Diagnostic Test
TDF:	Tenofovir
TPHA:	Treponema pallidum Hemagglutination Assay
VDRL:	Venereal Disease Research Laboratory
3TC:	Lamivudine

1) Prevention of Mother to Child Transmission (PMTCT)

a) PMTCT Counsellors at the ANC do Pre and Posttest counselling.

PMTCT : All pregnant women should be tested for HIV at first visit (OB guideline),

Screening test: If a woman has a positive HIV screening test, counsellors should inform the OB doctor and prepare confirmation testing and close follow up (eg. 1 week). Please take extra care to get a reliable address/phone number or other contact information for any patients with a positive HIV screening test to help with safe follow-up.

Confirmation test: If confirmation test is positive for HIV, the counsellor who is doing the counselling should inform both OB Doctor, TB Doctor and Midwife team. TB/HIV doctors will plan to see the patient for TB and OIs screening .

HIV diagnosis should be in the file of patient so medics, midwives, nurses and doctors can know about it when they take care of the patient.

2) First visit – after diagnosis of HIV/before delivery, done by SMRU Doctor and preparation of ART plan

- History taking and Physical examination for CLINICAL STAGING (See BBG p.120-121)
- Check for PREVIOUS ART EXPOSURE
- Assessment and treatment for OIs including TB (See Appendix 2)
- initiate COTRIMOXAZOLE PRIMARY PROPHYLAXIS 960mg OD (for WHO stage I and II with CD4 <350, stage III and IV regardless of CD4)
- based on first visit, Doctor decides if need to do BASELINE INVESTIGATIONS (Doctor prescription)
 - CD4
 - CBC, CRP
 - ALT, AST, Total bilirubin, creatinine, Phosphorous, BUN
 - HBs Ag, Anti-HCV, RPR and TPIC (if not recently done in ANC)
 - G6PD test
 - Serum Cryptococcus Ag – if CD4<100
 - TB screening with TB screening questionnaires and tests if needed (sputum tests include GeneXpert, and CXR).
- ART plan: the counsellor and doctors should plan with the woman the best way to get her ART:
 - First Choice: To refer to Myawaddy NAP to initiate ART (**challenging in organization but more sustainable for women**),
 - In Emergency: To follow up at SMRU clinic for ART (if challenge to start ART at Myawaddy **BUT not sustainable option for woman long-term**)
 - For MSL women, we may consider Hlaingbwe referral
- Referral plan if Referral to Myawaddy:

- The ANC Counselor informs to Myawaddy SMRU liaison officer for referral to MWDY NAP and OG.
- The doctor fills the standardized required Forms:
 - SMRU developed PMTCT form
 - Cross-Border referral form for referral to MWDY
- If there is an unusual situation, SMRU Doctor should contact with the Dr in charge at Myawaddy NAP.
- SMRU referral ANC staff at Myawaddy will organize and communicate for appointment date.

3) Emergency situation

A positive screening test in a patient close to delivery is an emergency. If the patient is close to delivery – medic/counselor should inform to OB doctor urgently. OB doctor will contact to TB/HIV doctor **and ART will be started as soon as possible (try to start before delivery).**

If there is a medical emergency situation for a PMTCT patient and you need to refer to Myawaddy hospital, the Doctor requests to be informed about the case before you send.

4) Treatment regimen

Although woman will be followed at Myawaddy, ART plan should be known from ANC team including all counsellors.

When to start ART in pregnant woman

ART should be initiated in all pregnant and breast-feeding women living with HIV:

As soon as diagnosed - Any WHO clinical stage - At any CD4 cell count

ART should be continued lifelong.

Starting ART is urgent if EGA is >20 weeks: do as quickly as possible.

First Line Treatment regime for pregnant women and breastfeeding mothers

Preferred Regimen	TDF + 3TC (or FTC) + EFV	AZT = Zidovudine (NRTI) 3TC = Lamivudine (NRTI)
Alternative (If preferred regimen is not tolerated)	AZT + 3TC + EFV or NVP OR TDF + 3TC (or FTC) + NVP	EFV = Efavirenz (NNRTI) TDF = Tenofovir (NRTI) NVP = Nevirapine (NNRTI) FTC = Emtricitabine (NRTI)

Anemia is a side effect of AZT. If woman are followed at Myawaddy, the side effect monitoring will be done by Myawaddy, but ANC should be aware of potential side effects

- Check for clinical signs and symptoms of anemia at every visit during the first 12 weeks.
- Laboratory monitoring (Hb/HCT): at baseline, 4 wks and 12 wks.
- If Hb < 8 g/dl (Hct – 25%) at baseline or during monitoring, choose/switch to alternative regime and investigate/treat anemia

5) Delivery

The delivery plan for women who are getting ART at Myawaddy should be delivery at Myawaddy to make sure the baby can get into care and receive ART as well.

In case of emergency delivery at SMRU ANC, all OB team including Doctor and Midwife should be informed, know about PMTCT guideline and PMTCT Box to give adequate treatment at admission and after delivery.

- As with all patients:
 - use universal precautions (Gloves, gowns, masks, eye protection)
 - clean all blood spills with virkon or chlorine solution (if virkon not available)
 - Remind patient and family to clean up blood clots or splashes in bathroom or halls
- Vaginal delivery is preferred for patients on antiretrovirals at least 4 weeks. Less than 4 weeks may still have high viral load.
- Arrange for ANC booking Myawaddy Hospital. SMRU should help plan with the woman to help her get there safely. She may need to wait at the patient house in Myawaddy ahead of time.
- If late to start ART (<4 weeks before delivery) C/S BEFORE LABOR may reduce the risk of transmission to the baby.
 - If the woman already has active labor or ruptured membranes – there is no benefit to C/S. Do not risk delivery on the way by transferring at this point.
- **In labor:**
 - only use invasive procedures (AROM, Vacuum, episiotomy) if needed for safe delivery (document the reason)
 - In a 2nd stage with intact membranes, controlled AROM can be considered to decrease risk of amniotic fluid splash to MW face.
- There is no data on risk or benefit of membrane sweeping – likely safe in patients with at least 2- 4 weeks ART
- **Postpartum**
 - controlling blood loss is a priority for patient and staff safety
 - Some HIV and TB medications interact with methergyn and could cause increased side effects or decreased effectiveness – use Synto, Misoprostol and Tranexamic acid first

- Clean blood and amniotic fluid off the baby – **make sure to carefully wipe skin with alcohol wipe before Hep B vaccine or Vitamin K injection.** Bathe infant in warm water with soap after birth to decrease risk of healthcare worker exposure.

6) Other related Actions

a) Family planning & couple counselling

- When a woman is HIV positive, a counsellor should give couple counselling (with support/supervision from counsellor supervisor) and offer partner testing. If HIV positive, TB screening should be done for the partner by TB doctor. If no TB is diagnosed, he should be advised to go to Myawaddy NAP for further care and TB team can facilitate for MWD appointment

- Family planning is very important for HIV positive women. Help the woman choose an appropriate method of family planning. Try to include her partner in the discussions. Check the family planning method and compliance at each visit.

For women who want another baby, it is best to delay the next pregnancy until:

- 6-12 months on ART so viral load is undetectable
- Inter-pregnancy interval of at least 2-3 years
- Taking folic acid 3 months before conception

If the next pregnancy would be high risk eg: on ART <6-12 months, less than 2 years since last delivery:

- Long-acting, reversible methods of contraception are recommended (e.g. IUD or implant)
- Note: EFV decreases implant hormone levels, increasing contraceptive failure somewhat, **but implant remains one of the most effective methods even with EFV**
- Depo-provera is an option, but the schedule for injections should be clear; irregular use increases the failure rate (3 monthly injections are hard to remember).

If Family is complete:

- Tubal ligation (sterilization) may be offered if available, with willing informed consent of the woman and consideration of her partner's wishes, and influence.
- Make sure that the woman does not feel forced/pressured to have a sterilization. HIV infection alone is not an indication for sterilization. Women with HIV are able to become pregnant and deliver healthy HIV-negative children.

b) Infant prophylaxis

Will also be given by Myawaddy NAP, but need to keep PMTCT box in case of emergency and unplanned delivery at SMRU.

Simplified infant prophylaxis dosing recommendation –

AZT (twice daily) and NVP (once daily) **for 6 weeks** regardless of breast-fed or formula-fed

Check the baby haematocrit and give the first dose as soon as possible after birth.

Infant age	Daily dosing of NVP	Daily dosing of AZT
Birth to 6 weeks		
• Birth wt 2000-2499 g ^a	10mg once daily (1ml of syrup once daily)	10mg twice daily (1ml of syrup twice daily)
• Birth wt >2500 g	15mg once daily (1.5ml of syrup once daily)	15mg twice daily (1.5ml of syrup twice daily)
>6 weeks to 12 weeks^b		
	20 mg once daily (2 ml of syrup once daily or half a 50 mg tablet once daily)	No dose established for prophylaxis; use treatment dose 60 mg twice daily or 6 ml of syrup twice daily or a 60 mg tablet twice daily

^a For infants weighing <2000 g and older than 35 weeks of gestational age, the suggested doses are: NVP 2 mg/kg per dose once daily and AZT 4 mg/kg per dose twice daily. Premature infants younger than 35 weeks of gestational age should be dosed using expert guidance.

^b Prophylaxis up to 12 weeks of age should be considered in special situations in which the infant is identified as HIV exposed after birth and is breastfeeding.

c) Infant follow up

The child should be seen ASAP after delivery, 2 weeks, 4 weeks and 6 weeks of age. Follow up should continue to 18 months.

Each visit should include

- Nutrition growth monitoring (Breastfeeding, weaning, complementary food)
- Developmental assessment
- Physical examination for AZT /Nevirapine side effects and presumptive signs and symptoms of HIV infection
- Hematocrit (Hct) testing at birth, 2, 4 and 6 weeks or if clinically indicated.
- Prevent anaemia: prophylaxis ½ folic acid tablet per week and ferrous sulphate syrup 0.3 ml once daily
- Treat anaemia: folic acid ½ tablet once daily, ferrous sulphate syrup 0.6 ml three times daily
- Follow the general recommendation of SMRU paediatric guideline if anemia develops.

d) Infant feeding options

Encourage breast feeding in all HIV positive mothers.

Mixed feeding (breastfeeding and bottle feeding together) it increases the risk of childhood infections and the risk of HIV transmission.

To avoid stress and confusion for the woman, always ask her what she has been told about feeding, and by whom (eg. SMRU staff, MWDY staff, Thai hospital staff). Ask about what feeding method she wants. Use this information when giving counselling for breast feeding.

Example counselling: “You were told by XXX that it is dangerous to breast feed your baby. That used to be our policy too, but we now know that it is safer for most women with HIV to breast feed than to bottle feed their babies. If you keep taking the medicine regularly you are unlikely to give your baby the virus by breastfeeding, and your breastmilk will protect her from other infections. Powder milk is expensive and can be dangerous if not prepared correctly. Which do you want to do?”

-At Myawaddy Hospital (according to national guidelines), if ART started under NAP in early pregnancy, and good adherence, Woman can have Normal delivery and can breastfeed.

-If late stage of pregnancy and poor adherence, they will do caesarean section and recommend bottle feeding

For breastfeeding mothers

- Within one hour of delivery: check for correct latching (enough areola in the mouth) to prevent cracked and sore nipples.
- Mother to check the baby’s mouth regularly for sores.
- Assess mother’s nutritional status. Check BMI. Give diet counselling or Asia Mix if necessary.
- No bottles, teats or pacifiers.

Exclusive breastfeeding during the first 6 months of life means that the baby gets only breast milk (no formula, tea, water, cereal, traditional medicines), oral polio vaccine and cotrimoxazole prophylaxis. Medications prescribed at the health centre or hospital to treat inter-current medical problems are also allowed.

Exclusive formula feeding means baby gets only formula (no breast milks). Before 6 months of age, the infant does not need any food other than milk to grow.

After 6 months, complementary foods are necessary for the infant’s growth and should be introduced even though the breastfeeding or formula mother is continued.

For some exceptional cases formula milk is an acceptable alternative to breast milk.

Conditions needed to safely formula feed ¹

- a) Safe water and sanitation are assured at the household level and in the community, **and**,
- b) The mother, or other caregiver can reliably provide sufficient infant formula milk to support normal growth and development of the infant, **and**,
- c) The mother or caregiver can prepare it cleanly and frequently enough so that it is safe and carries a low risk of diarrhoea and malnutrition, **and**,
- d) The mother or caregiver can, in the first six months, exclusively give infant formula milk, **and**,

- e) The family is supportive of this practice, **and**,
- f) The mother or caregiver can access health care that offers comprehensive child health services

Weaning (eg. stopping breast milk) is recommended at 12 months. Weaning does not have to be fast. Remember that the baby is still protected via the mother's ART (assuming that the HIV viral load is very low). If another source of milk is not available, breastfeeding can be continued. If the baby tests positive for HIV, breastfeeding can continue for up to two years and beyond.

e) Vaccination

Vaccination of HIV exposed infants should be given as usual. BCG and Measles should be avoided in symptomatic infants.

f) Cotrimoxazole prophylaxis

Cotrimoxazole must be started at six weeks of age (even if PCR is not available or negative) and continued until HIV infection is excluded. If tested HIV negative 6 weeks after stopping of breast feeding, cotrimoxazole prophylaxis can be stopped.

Cotrimoxazole prophylaxis dosing table

Strength of liquid (mg/5 ml) or oral tab	3-5.9 kg	6-9.9 kg	10-13.9 kg	14-19.9 kg	20- 24.9 kg	25-34.9 kg
Suspension 200/40mg per 5 ml	2.5ml	5ml	5ml	10ml	10ml	-
Tablet 400/80mg	-	0.5	0.5	1	1	2

g) HIV testing for the infant: PCR, and HIV antibody (Not compulsory, based on the project availability, and Myawaddy FUP)

All infants should be offered a viral PCR test at 6 weeks after birth to ascertain HIV infection during pregnancy and birth. This can be done at the same visit when the patient starts cotrimoxazole prophylaxis. The reason is to diagnose HIV earlier in infants and start ART as early as possible.

If PCR not done by MWDY or SMRU, the baby should be followed closely for any clinical signs of HIV or AIDS. ARV prophylaxis **can be stopped** at 6 weeks in asymptomatic babies even if they were not tested, but cotrimoxazole **should be given**.

Rapid diagnostic tests for HIV testing can be used at **one year of age and/or 6 weeks after stopping breast feeding** to rule out HIV infection in asymptomatic HIV exposed infants.

All children must have their final HIV status confirmed at **18-months** of age with rapid diagnostic HIV testing (HIV RDT testing).

PMTCT Box

PMCT box should be kept in delivery room at all times.

Contents:

- PMTCT flow chart
- Baby ART:
 - Nevirapine syrup – 1 bottle
 - Zidovudine syrup – 1 bottle
- Mother ART:
 - TDF, 3TC and Efavirenz 600 mg (as combination or separate) 7 doses
 - OR
 - AZT+3TC and Efavirenz 600 mg (as combination or separate) 7 doses

Midwife team must check and update the box monthly to make sure that all medicines are in good expiration dates.

If you use any medicine in the box, contact the pharmacy as soon as possible to restock.

References:

1. GUIDELINES FOR THE CLINICAL MANAGEMENT OF HIV INFECTION IN MYANMAR-Fifth EDITION, 2017
2. Management of PMTCT and Infant Feeding in MSF-H, October 2011
3. MSF HIV/TB guideline, 2015
4. Consolidated guidelines on the use of Antiretroviral drugs for treating and preventing HIV infection, recommendations for public health approach, second edition, 2016
5. Consolidated guidelines on the use of Antiretroviral drugs for treating and preventing HIV infection, June 2013
6. Consolidated guidelines on the use of Antiretroviral drugs for treating and preventing HIV infection, November 2015
7. Field guideline of HIV treatment for Adults and adolescents and Prevention of Mother to Child Transmission, June 2011
8. Labor and delivery management of women with human immunodeficiency virus infection. ACOG Committee Opinion No. 751. American College of Obstetricians and Gynecologists. *Obstet Gynecol* 2018;132:e131–37.

Appendix 2: TB Active Case Detection Form

Personal data

Name:| _____ | Age:| _____ | D.O.B | _____ | |__|Male |__| female Ethnic |__|Bur |__|Karen
 Address:| _____ | If Patient is <15 year: Parent Name: | _____ |(Father) | _____ |(Mother)
 Phone No:| _____ |ACD Type |__| Contact |__| Healthcare Worker |__|Special case |__|Other _____

Screening Questionnaire

- A. TB Suspected symptoms တီဘီရောဂါလက္ခဏာများ**
- | | | |
|--|--------------------------|--------------------------|
| | No | Yes |
| 1. Cough any duration ဝမ်းနိုးဆိုးချခင်း | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Cough with blood (within last 12 months) ဝမ်းနိုးဆိုးလွင့်သြေးပါချခင်း(တန့်တန့်ကြွေး) | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Persistent fever > 2 weeks ပြာကြာကျိပ်ပီးမ်းချခင်း | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Weight loss (last 3 months) ကိုယ့်လေးချိန်ချခင်း(၃လအကြား) | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Night sweat ညဖုကုခြမ်းကြကုချခင်း | <input type="checkbox"/> | <input type="checkbox"/> |

If "Yes" to any of above questions, send for diagnosis. အထက်ပါလက္ခဏာတစ်ခုခုရှိလျှင်ရောဂါစစ်ဆေးရန်ပို့ပါ။

B. TB Contact Case No, မရှိပါ
 တီဘီရောဂါသည့်ဝင်းထိတွေ့ ဖွဲ့စည်းချခင်း Yes, send to TB clinic. ရှိလျှင်တီဘီဆေးခန်းသို့ ပို့လမ်းပါ

Name of the Source Case Relation
 လူနာအမည် တော့စပုံ့
 Type of TB: TB registry number
 တီဘီရောဂါအမျိုးအစား တီဘီလူနာနံပါတ်

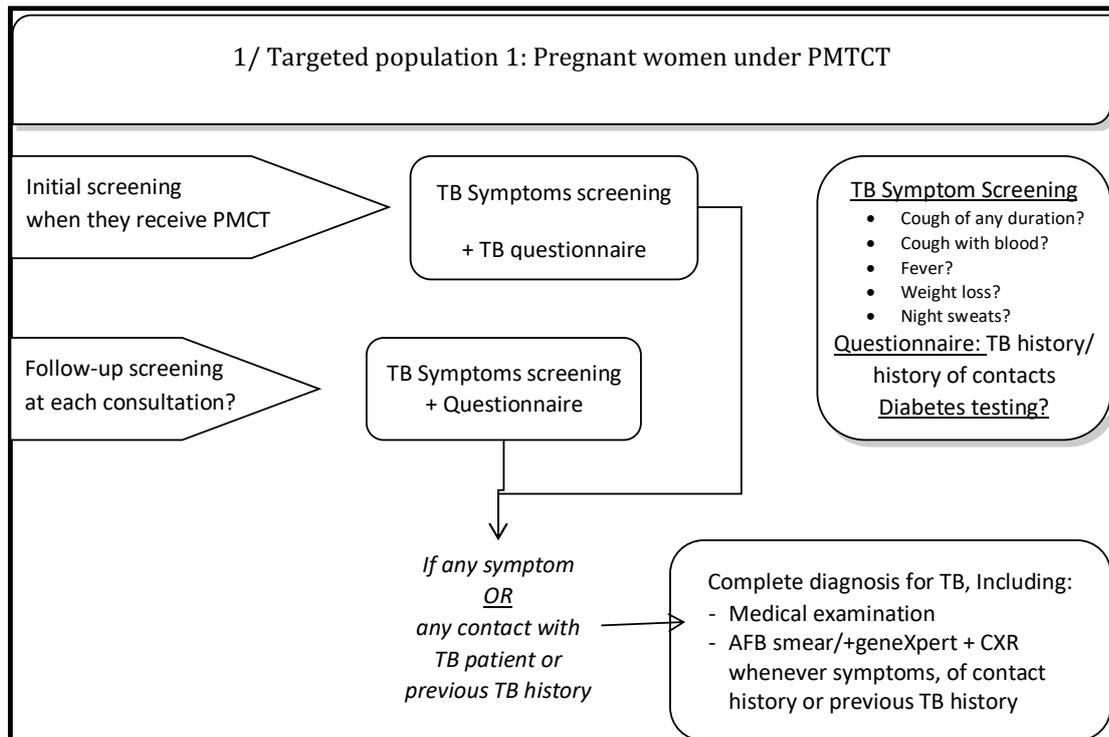
C. History of TB treatment
 တီဘီဆေးကုသမရဘဲ
 No previous TB treatment Yes, send to TB clinic
 တီဘီဆေးကုသမရဘူးပါ တီဘီဆေးကုသမရဘူးပါ (တီဘီဆေးခန်းသို့ ပို့လမ်းရန်)

When	Where	Type of TB	Duration	Outcome
ဘယ်နှစ်က	ဘယ်မှာ	တီဘီရောဂါအမျိုးအစား	ကုသမရဘဲဘယ်နှစ်	ကုသမရဘဲ

Referred to Medic / Doctor for further diagnostic services
Medic/ဆရာဝန်သို့ ပို့ဆောင်ရန်ပေးချခင်း
 No မရှိပါ Yes ပေးချခင်း
 Interviewer: Date:

Tuberculosis Screening in PMTCT

Screening algorithm for ALL infected pregnant women who receive PMTCT: use at initial screening and at all follow up consultation with TB screening questionnaire.



If attending ANC OPD, any coughing patient should be asked to wait in a separate area and wear a mask. If you suspect TB, wear an N95 mask when seeing the patient and let other staff know you suspect TB so they can protect themselves.

- Screening for Active TB disease with bacteria called Mycobacterium tuberculosis
- Can spread to other people through aerosols (droplets of sputum in the air), more likely to spread if sputum is positive
- Screening PMTCT should look for symptoms and history of previous contact with TB patient or previous TB history
- Symptoms include cough (any duration), fever, coughing blood (hemoptysis), and weight loss (or in pregnancy, failure to gain weight), night sweats
- TB can infect many different organs (eg. kidney, brain): **think of TB** for any patient with prolonged fevers, prolonged cough, poor weight gain/weight loss, abnormal lung sounds, tired and depressed

Questions to ask when checking for TB risk:

- How long has the person had a cough? Any night sweats?
- Is the cough productive of sputum? Has the person lost weight?
- Has the person had treatment recently for pneumonia?

- Any close contact with TB? Is the person HIV positive?
- Has the patient already treated with TB
- Does the patient have diabetes?

If any of symptoms, or history of contacts or previous TB, complete questionnaire and get sputum sample. Ask patients to return for results and follow up.

Diagnosis:

- Discuss all suspect TB patients with OB doctor (or TB doctor if available). Any highly suspicious, complicated, or confirmed positive cases, OB doctor will discuss with/refer to TB doctor
- Do full physical exam: lymph nodes? Abnormal lung sounds? Very thin? Liver? Spleen?
- Use specific TB lab request form, and request two sputum samples from patients for sputum tests for AFB: one “spot” test the same day, one early morning sputum sample.
- For PMTCT, on lab request form for TB, always request geneXpert with sputum test
- Other tests that may be used, especially if PMTCT+ or strongly suspect TB but negative sputum: CXR, TST, other fluids for AFB (eg. urine, ascites, CSF, Lymph node aspirate), ultrasound (FASH scan)
- TB diagnosis needs to be confirmed by TB doctors and treatment initiated by them

Treatment:

- TB treatment will be started under responsibility of TB doctors and place for treatment will be case by case discussion.
- TB patients need to take long (6-24 month) courses of anti-TB antibiotics, and should be managed by staff familiar with TB. If you suspect TB contact the OB or TB doctor.

ANC:

- If sputum positive, arrange for ANC visit after the other women have gone home (eg. 14:00) to decrease risk to other patients
- High risk for anemia, IUGR, stillbirth, PTL
- Do US for growth and BPP/Doppler if FH is low or decreased FM
- Coordinate with TB team – if they already did CBC/HCT this week, no need to repeat.

Delivery:

- If Pulmonary TB (sputum positive or negative):
 - All staff need to wear N95 mask at delivery. Avoid air conditioner in high risk of transmission situations.
 - Keep woman away from other patients (discuss with TB team/OB doctor if there is difficulty providing safe delivery for the TB patient or other patients because of space)
 - Clean floor and walls of delivery with chlorine solution after delivery
 - Discuss with TB team: baby may need INH prophylaxis for 3-6 months
 - Breastfeeding usually encouraged (discuss with TB team if mother severely unwell, drug resistant TB etc.), but mother should wear a mask, and stay separate from baby when not breastfeeding until she is sputum negative.
 - If need to separate mother and baby, try to print a picture of the baby for the mother to have, and organize every day meeting with infection control measure.

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