The BlueBook

The Medical Guide for our Projects

7th edition 2011
2nd English edition 2011

Bettina Ritz

Co-Authors:
Lisa Sous, Peter Krieg, Wolfgang Schafnitzl

Ärzte für die Dritte Welt
GERMAN DOCTORS

Offenbacher Landstraße 224, D- 60599 Frankfurt/Germany
Phone: +49- (0) 69 - 707 997- 0
Fax: +49 - (0)69 - 707 997- 20
E-mail: aerzte3welt@aerzte3welt.de

Thanks

This book could not have been written without the ideas and inspiration of colleagues and friends. The authors would like to give thanks to all of them. Special thanks go to Dr Marie Coen for her medical input and for the support during our meetings in Hamburg, to Dr Barbara Hünten-Kirsch for help with the chapter on HIV, Dr Heino Hügel for help with the chapter on dermatological problems, Dr Elisabeth Kitzinger for help with the chapter on diabetes mellitus, Dr Gunter Meyer for help with the chapter on epilepsy, Dr Jobst Knief for help with the chapter on antenatal and postnatal care, Dr Sarah Schwertz for help with the chapter on hyper- and hypothyrodism and Dr Marion Reimer for help with the chapter on emergencies and for compiling the list for the emergency kit.

We would also like to give thanks to Dr Barbara Schmidt who is working in England and who was the first to read the book and check for mistakes with spelling and English expressions, Dr Brigitte Huth and Dr Marion Reimer for reading the book before it went to print.

Bettina also wants to give heartfelt thanks to family and friends for their support and continued love and friendship in spite of the phrase “sorry I haven´t got time - I am working on the BlueBook”.

The authors

Preface to the 7th edition

The sixth edition of the BlueBook was published 10 years ago. The version which had originally been written for the project on Mindanao was adapted for the rest of our worldwide projects, and the entire handbook was thoroughly revised. Since that time, numerous physicians on many medical missions, but most of all our patients, have profited from the BlueBook. More than 2,500 doctors have treated patients who are so poor that they could not afford to see a doctor without our help in 5,200 medical missions since 1983. The BlueBook has repeatedly been praised by these German doctors in their mission reports and privately for its extreme usefulness in the field and precise and comprehensible compilation of the most important disease entities, diagnostic methods, and therapies.

A lot has, however, changed or been further developed over the past ten years. New medical knowledge has come to light, and new therapeutic possibilities have become available. Our projects have also progressed – I only need remind you of our comprehensive tuberculosis programs in Calcutta and the Philippines or our continually growing HIV program in Nairobi, which did not even exist in this form ten years ago. The conditions surrounding our projects have, of course, also changed.

All these developments have made the necessity of a revision of the BlueBook increasingly evident over the last few years. It is relatively easy to revise something which is insufficient and achieve a positive result. It is, however, far more difficult to up-date and even improve something which was originally created with the utmost care and has already proven its worth. We are most grateful to the editorial group consisting of Wolfgang Schafnitzl, Peter Krieg, and Lisa Sous and led by Bettina Ritz, who undertook this responsible task and completed it with such an excellent result. They donated many hours of their valuable (leisure) time and expended tremendous effort on high-quality content and detailed linguistic accuracy. They also received great support from the German doctors. We extend our heartfelt thanks to all these authors and supporters.

The new revised edition of the BlueBook should serve as a guideline in respect to the above-mentioned changed working conditions and possibilities available at our various project sites. It should help to provide the best possible standard treatment for our patients. It should also help guarantee the sustainability of the work of the Doctors for Developing Countries. If we want to continue as a humanitarian aid organization for people in the so-called third world, we have to use our limited resources (donations) as efficiently as possible for the benefit of our patients. One fundamental consideration which is often openly stated or at least a constant background reminder in our guidelines in this new edition is that *costly diagnostic tests which have no consequences must be avoided*. I sincerely hope that this fundamental principle will always be taken seriously during our work so that we can continue our projects for a long time and to the utmost benefit of our target groups. The new BlueBook provides a good foundation for this purpose.

In conclusion, I would like to request everyone to continue sending supplementary material, corrections, and suggestions for improvement which we can take into consideration in future revisions.

Frankfurt, February 2011 Dr Harald Kischlat

CONTENTS

1. BINDING MEDICAL GUIDELINES

These guidelines and notes were compiled by a group of 11 of our experts who worked for several months in different projects of the committee.

The guidelines were updated in 2010.

They are binding for our projects.

Our principal aim is providing of humanitarian aid for people who cannot afford medical treatment themselves. Our projects are situated in areas with crowding, poverty and poor educational standard. It is therefore very important for us to reach as many patients as possible, not a small group of patients only.

A. PREPARATION OF CONSULTATION

1. General Facts

Every patient attending our clinics must be seen by the doctor if possible. The health workers should not make decisions without consulting the doctor. Only with great numbers of patients attending triage can be done by an experienced health worker.

The patients have to be aware of our consulting hours.

It is possible to use numbers or stamps for queuing patients – not to limit the number of patients attending but to establish a certain order. We want to avoid that patients are jumping the queue.

If not all the patients can be seen the same day the doctor and the health worker have to screen them for serious illnesses one hour before the end of consultation.

2. Reception

Prior to consultation a health worker writes the complete patient data on the patient card and weighs the patient.

Temperature and immunization status must be checked in both children and infants. The weight must be written on the Road to Health Chart.

3. Documentation

Normally every patient card gets a cover and is to be taken home by the patient. A small fee is to be paid for the first card. We can reduce the price for needy patients or families with many children.

Every lost card must be paid for.

3.1. Road to Health Chart

In every project Road to Health Charts will be used for children under five. An example can be found in the project folder.

It is very important to fill the Road to Health Chart correctly so that the child's progress can be monitored appropriately. That way, problems can be recognized and treated early. The doctor checks the documentation every time the child attends the clinic.

3.2. Patient Card

Adults receive a normal patient card.

Documentation must be done in standardized form according to the SOAP-scheme.

S	symptoms	subjective complaints
O	observations	objective findings
A	assessment	diagnosis
P	plan	investigations, treatment

For better documentation these letters should be used and written down clearly on the patient card with the individual entries. Each doctor should sign the entry with his/her forename.

Permanent diagnosis should be highlighted and, if possible, added to the patient data.

Correct and clear documentation with recording of the permanent diagnosis plays an important role in a successful treatment of patients.

4. Patient Education

Waiting patients must be educated daily by our health workers before or during clinics. Topics should include treatment of simple infections or diarrhoea, hygiene, prevention of parasitic infections, family planning, and immunizations. It is important for the health worker to use teaching aids like posters or flannel charts or other visual aids e.g. sugar, salt, water, and litre bottle to prepare a sugar salt solution for the prevention of dehydration.

The doctor **has** to make sure that teaching takes place on a regular base and should motivate the health workers accordingly.

5. Training of Health Workers

We regard the training of our health workers as highly important. Therefore it should be done at least once a week by doctors and should cover topics relevant for work.

Long term doctors/project coordinators organize a training schedule and discuss the time and topics. Each colleague is asked to participate.

A list of teaching aids like colour slides, PowerPoint presentations or books ("Where there is no doctor") is available in the projects. Topics from own specialities can be introduced. Additional topics can be chosen covering recent problems, but should take into account the diseases of the area we are working in.

6. Working Hours

We work 8 hours 5 days a week. We should not start later than 8.30 am. We have to remind the staff to start on time. There are no afternoons off.

Journeys to and from work are not part of the working hours of our staff. Included is travelling with the "Rolling Clinic". We should finish on time as some members of our staff have quite a long journey home and a family to look after.

7. Social Screening

Social screening is always difficult for us. Very poor people come with borrowed (rather good) clothes to the foreign doctor so that they do not loose face and look poor. Social screening can only be done by our local staff. There are questionnaires in the projects which can be used on a home visit to assess whether the patient is in need.

Social screening is always necessary if there is going to be expensive treatment of acute illnesses, operations or treatment of chronic conditions.

B. MEDICAL ACTIVITY

Every project has a specific range of diseases and available diagnostic and therapeutic facilities. Therefore we find a folder in each project with information applying to the local situation only (together with the binding medical guidelines).

Every doctor is obliged to read the project information and binding guidelines prior to working in the field and to follow them closely.

1. Available Diagnostic Procedures and their Limitations

Making a correct diagnosis is the basis of successful medical treatment. As we are working in resource poor countries we have to rely on good history taking and thorough clinical examination.

We always have to consider the therapeutic consequences especially as there is a wide range of diagnostic procedures and therapeutic options available in most countries we work in.

We should order diagnostic investigations only if the resulting treatment can be paid for by the committee at a reasonable price.

To use our own resources as efficiently as possible we have to observe the following rules:

CT-scans can be ordered, but in limited numbers only. They should preferably be discussed with the coordinator or at least with colleagues in the project. It is always possible to ask the medical coordinator in Frankfurt.

MRI-scans must always be discussed with the committee in Frankfurt. They must have affordable therapeutic consequences.

Ultrasound scans should be used as diagnostic procedures if there is an ultrasound machine in the project. Otherwise it is possible to order an ultrasound scan at a local institution. Films are only necessary if requested specifically by a hospital or a local specialist.

Endoscopies are to be ordered only with severe illness and affordable therapeutic consequences. They must be discussed with the project coordinator.

Echocardiographies should be performed by colleagues if possible. Specialists should only be involved if there are affordable therapeutic consequences.

Laboratory investigations should be used sparingly. Screening investigations are not allowed. Specific investigations e.g. tumor markers, Hb-electrophoresis or CRP are often not necessary.

HIV-tests can be ordered if special counselling before and after the test is available.

Hepatitis serology is often not necessary as there are no therapeutic consequences.

Stool investigations should only be performed in patients with symptoms not responding to therapy.

If possible we must use state-run health services which are free of charge.

2. Treatment of Disease and its Limitations

Our aim is to provide basic medical treatment in resource poor countries. This includes treatment of acute conditions which can be cured within a reasonably short period of time and treatment of certain chronic conditions. Infectious diseases requiring long term treatment are included in special programs.

2.1. Chronic Conditions – Long Term Treatment

We treat chronic disease if the patient is indigent, compliant with the therapy and if patient education is available. Patients who repeatedly do not turn up for their medication in time are not treated by us.

2.1.1. Diabetes Mellitus

Counselling about diet and weight loss are the most important aspects of diabetes therapy in our projects. Patients with diabetes type II can also be treated with tablets. Patients with diabetes type I are only treated if they are well educated about their illness and can be followed up regularly in a diabetic clinic or by a coordinator.

2.1.2. Hypertension

Hypertension should only be treated if repeated readings have shown severely raised blood pressure.

2.1.3. Bronchial Asthma/COPD

Prior to treating obstructive airways disease it is necessary to take a proper history and educate patients thoroughly. Inhalers must not be prescribed unless the patient can use them properly. If possible the patient should attend an asthma clinic.

2.1.4. Thyroid Disease

Hypothyroidism and hyperthyroidism are treated with medication after an appropriate blood test. Patients with goitre compressing the trachea can be referred to a local hospital.

2.2. Tuberculosis

Tuberculosis has a high prevalence in resource poor countries. Spread of the disease and development of resistant bacilli can only be prevented by consequent long term therapy. Therefore most projects have their own tuberculosis program or refer to a state-run program.

2.3. Leprosy

Patients with leprosy need long term treatment. Therefore they are referred to state-run programs for diagnosis and treatment.

2.4. HIV-related Diseases

HIV-related diseases can only by treated symptomatically by us. Antiviral treatment after counselling is only possible in a special HIV-project in Nairobi.

Medication for post-exposure prophylaxis is available for our doctors in high risk areas like Nairobi and Kolkata.

2.5. Malignancies

Operations for tumors with good prognosis can be paid for by the committee. A treatment plan and estimate of the costs must be discussed beforehand with the coordinator in Frankfurt. The committee does not pay for radiotherapy or chemotherapy.

2.6. Poor Eyesight

Eye glasses are only financed by us if the vision is very limited and the patient has problems in daily life or his/her job. The patient should always be asked for a small contribution.

3. Drugs

Our aim is to treat a wide range of diseases appropriately and cost-effectively. We treat patients according to the guidelines of the World Health Organization.

To achieve a continuity of medical care we adhere strictly to the binding drug list (see appendix) and the treatment recommendations in the BlueBook.

Drugs not on this list can only be given for one week in rare cases. The **first time medication** for long term treatment should be supplied for two weeks only. With good adjustment and compliance long term medication can be

dispensed for four weeks. Long term medication in the “Rolling Clinic” must be adjusted according to the schedule.

Prescription of vitamin tablets should be restricted to special indications like all medication. They should not be used as placebo.

Herbal medicine can be a useful addition to drug treatment and should be used where possible. Physiotherapy for chronic pain can be given in the field and should be encouraged by us.

*For routine treatment **only** medicines on the binding drug list are allowed in our projects.*

They can be brought from Germany.

Disposable material like gloves, urine or glucose sticks, venflons, sofratuell or oleotuell are always welcome. It is recommended to speak with the coordinator in the project beforehand.

4. Disposal of Waste

Each doctor should make sure that used needles are cut with the needle cutter and disposed of in unbreakable and puncture-resistant containers. Infectious waste should be burnt.

5. Emergencies

For emergency medical treatment an emergency bag is available for every team. It must be taken out in the field and be checked and looked after by each doctor on a regular base. A checklist is found in every emergency bag.

This bag is for emergencies only. Drugs must not be taken out for every day use.

6. Home Visits

Home visits are a useful tool to get to know the living conditions of our patients. They should **only** be done together with the local staff, in Ocotal and Nairobi only during the day.

7. Cooperation with Hospitals

As a rule we refer patients to state-run hospitals. Here they receive medical treatment free of charge; drugs and diagnostic procedures must be paid for. We can undertake to pay the costs for needy patients but we need an estimate – except in emergencies. A health worker should accompany the patients to guarantee their admission in hospital.

We can refer patients for further diagnostic procedures to state-run outpatient clinics. The committee pays for diagnostic investigations and treatment after thorough checking of the planned procedures.

Because of the expensive treatment patients should be referred to private hospitals only in rare cases. Each admission should be discussed with the project coordinator beforehand.

8. Additional Programs

8.1. Additional Feeds

In our projects there are feeding programs for different groups of patients.

Under- and malnourished children must be admitted to a feeding ward where they get the necessary food and the mothers receive help with feeding and education e.g. about breastfeeding and healthy nutrition.

Undernourished Tb- and HIV-patients can be sent to our feeding program – where available – offering one warm meal daily.

In some of the projects needy families can receive basic food on a regular base. When putting families on the program the doctor should listen to the advice of the local staff.

8.2. Family Planning

In our projects female patients can receive contraception typical for the area. It is always necessary to get the husband to agree to it.

During consultation the local staff should be encouraged to talk about family planning. As foreigners we should avoid giving recommendations.

8.3. Antenatal Care

We have to give special attention to the counselling and careful check-ups of pregnant women. In the projects we have special forms and guidelines which should be observed closely.

8.4. Immunization Programs

Immunizations are vital in improving child health. Therefore it is important to check the immunization status of every child coming for consultation.

With missing documentation or incomplete immunization status we should advise the immunizations recommended by the World Health Organization (BCG, DPT, Polio, measles, hepatitis B). Where possible we should make sure that the children are immunized straight away.

8.5. Partner Projects

Partner projects help with financing treatment of certain diseases (e.g. treatment of Tb in Kolkata). They provide money from third parties without any costs for the committee.

Private initiatives must be discussed with the medical coordinator in Frankfurt. We **must not** organize treatment for patients outside their respective home countries.

2. PSYCHOLOGICAL ASPECTS

Working in our projects we have to bear in mind that living conditions of many of our patients are similar to those in Germany during the 19th century: high birth rates, high infant mortality, low life expectancy, diseases of poverty caused by malnutrition, contaminated drinking water, unsanitary and crowded living conditions.

Therefore we have to take into consideration that e.g.

- the mother complaining about weakness and dizziness may not know how to feed her children after her husband left her.
- the malnourished man with pulmonary tuberculosis complaining about upper epigastric pain may just be hungry.
- the mother whose child died two weeks ago may present with headache.
- the 10-year old girl may have back pain because she has to carry heavy buckets of water to earn her living.
- the mother suffering from insomnia may be afraid of getting pregnant as she had severe bleeding during her last delivery and nearly died of it.

With the sheer number of patients it is often not possible to address these problems. Nevertheless we should

- try and address the underlying problem – patients are grateful for our understanding and empathy.
- avoid giving multivitamins and painkillers just in order to give something.
- counsel regarding hot compresses, massages, sufficient fluid intake.

We do not give antidepressant or antipsychotic medication. If treatment is needed we should refer patients to a native doctor who knows the cultural background and is therefore better qualified to treat patients appropriately.

3. CLINICAL PRESENTATIONS

3.1. Cough

- Physiological method of clearing the airways
- Persistent cough: may be caused by underlying disease or disorder
- Often associated with dyspnoea (*see* chapter *Dyspnoea,* p.23)

? Questions to ask:
- Cough productive (with phlegm) or dry?
- Colour of sputum (purulent, haemoptysis)?
- Duration of symptoms (acute: cough for up to 3 weeks or chronic: cough > 3 weeks)?
- Onset (sudden onset, progressive)?
- Exposure to air pollutants (e.g. smoke of fire)?
- Smoker?
- Any pre-existing disease?
- Concurrent medication (ß-blockers, ACE-inhibitors)?
- Association with other symptoms and signs (weight loss, fever, loss of appetite, dyspnoea, psychological signs)?


Clinical examination:
- Nutritional status (weight, ?anaemia)
- Temperature
- Cardiovascular system (heart, lung, blood pressure)
- Gastrointestinal system (abdomen, spleen, liver)
- Lymph nodes
- Mucus membranes (?cyanosis)

⊙ Investigations as necessary:
- FBC
- AFB
- Peak flow
- CXR

⚖ Differential diagnosis:

- Acute cough:
  - Diseases of the airways:
    - URTI, tracheobronchitis (?viral infection)
    - Sinusitis (?postnasal drip)
    - Whooping cough (?bouts of cough associated with vomiting)
    - Croup (?inspiratory stridor)
    - Aspiration (?sudden onset, often distress)
    - Exposure to air pollutants (?history)
    - Bronchial asthma (?recurrent episodes, nocturnal attacks)
    - Parasitic disease (?loss of appetite, history of worms)
  - Diseases of the lungs:
    - Pneumonia (?fever, dyspnoea, productive sputum)
    - Pleurisy (?pleuritic pain)
    - Pulmonary embolism (?sudden onset, period of immobility, pregnancy)
    - Pneumothorax (?sudden onset, accident)
  - Heart diseases:
    - Acute left ventricular failure (cardiac asthma: ?history of chestpain, crackles on auscultation)
- Chronic cough:
  - Diseases of airways and lungs:
    - Bronchial asthma (?recurrent episodes of cough, nocturnal symptoms)
    - COPD (?smoker)
    - Malignant disease (?anorexia, haemoptysis)
    - Lung disease e.g. bronchiectasis, interstitial lung disease
    - Reactive Airways Dysfunction Syndrome (?exposure to pollutants)
  - Infectious disease:
    - Tuberculosis (?weight loss, night sweats, haemoptysis)
    - Whooping cough (?bouts of cough associated with vomiting)
  - Extrapulmonary diseases:
    - Gastrointestinal reflux (GORD ?burning retrosternal pain)
    - Side effect of medication
    - Chronic left ventricular failure (?history of heart disease, crackles on auscultation, peripheral oedema with RVF)
    - Malignancies e.g. lymphoma (?anorexia)

Note:

*Always think of aspiration of foreign body in young children (< 5 years of age) who present with **sudden** onset of cough (especially if there is distress or no improvement under therapy).*

3.2. Dyspnoea

- Causes: physiological (e.g. with blockage of airways, reduced blood supply with insufficient oxygenation of body and brain) or psychological in nature
- 4 stages depending on the symptoms:

  I. no dyspnoea (no limitation of physical activity)
  II. dyspnoea on strenuous exertion (slight limitation of physical activity)
  III. dyspnoea on slight exertion (marked limitation of physical activity, comfortable at rest)
  IV. dyspnoea at rest (unable to carry out physical activity without discomfort)

- Often associated with cough (see chapter *Cough,* p.21)
- Subjective symptom, therefore it is very important to take a detailed history

? Questions to ask:
- Acute or chronic?
- Sudden onset or slow progression?
- Recurrent episodes?
- Aggravating factors (e.g. worse on lying down, nocturnal dyspnoea)?
- Association with other symptoms or signs (weight loss, fever, cough and sputum, cyanosis, psychological signs)?
- Pre-existing diseases (e.g. pulmonary disease, heart disease, atopic disposition)?


Clinical examination:
- Nutritional status (weight, ?anaemia)

- Temperature
- Cardiovascular system (heart, lung, blood pressure)
- Gastrointestinal system (abdomen, spleen, liver)
- Neurological status
- Lymph nodes
- Mucus membranes (?cyanosis)
- Psychological status

⊙ Investigations as necessary:
- AFB
- FBC
- Peak flow
- CXR

⚖ Differential diagnosis:
- Diseases of airways/lungs:
  - Laryngitis, croup, aspiration (?fever, inspiratory stridor, ?acute with aspiration)
  - Bronchial asthma (?recurrent episodes, nocturnal attacks, acute onset)
  - COPD/emphysema (?exposure to environmental pollutants, smoker)
  - Pneumonia (?fever, sputum)
  - Tuberculosis (?weight loss, haemoptysis, night sweats)
  - Whooping cough (?bouts of cough associated with vomiting)
  - Malignant disease (?anorexia, haemoptysis)
  - Pneumothorax (?sudden onset, pain)
  - Fibrosis/pneumoconiosis (?slow onset, history of farming or working in dusty environment e.g. coal dust, asbestos, silica dust)
  - Pleural effusion (?pleuritic pain, fever)
- Diseases of the cardiovascular system:
  - Congestive cardiac failure: CCF (?pulmonary oedema, peripheral oedema)
  - Myocardial infarction (?severe pain and distress, sudden onset)
  - Arrhythmias, valvular heart disease, myocarditis (?irregular pulse, cardiac murmur, history of severe tonsillitis)
  - Pericarditis (?pain, relieved by sitting forward, pericardial rub, heart failure with pericardial tamponade)
  - Pulmonary embolism (?sudden onset, period of immobility, pregnancy)

- Miscellaneous diseases:
  - Anaemia (?pallor, pregnancy, worms)
  - Pregnancy
  - Fever
  - Obesity
  - Gross ascites (?history of bloody diarrhoea, jaundice)
  - Hyperthyroidism, retrosternal goiter (?exophthalmos, diarrhoea, tachycardia)
  - Inhalation of toxins (?history)
  - Neurological disorder (?weakness, muscle wasting, ataxia)
  - Lack of exercise
- Psychological illness:
  - Hyperventilation (?difficulty sleeping, sadness worse in the morning, difficulty thinking and concentrating, apathy, history of traumatic event in the past e.g. death of child)

3.3. Fatigue

- Very common complaint during consultation
- Often described as lack of energy, weakness, tired all the time
- Mainly psychological in nature, but organic illness must be taken into consideration.
- Subjective symptom – therefore it is very important to take a detailed history.

? Questions to ask:
- Duration of symptoms (recent, prolonged, chronic)?
- Onset (sudden, progressive)?
- Recovery period (short, long)?
- Type of fatigue (physical, mental, sexual)?
- Time of fatigue (morning, evening)?
- Concurrent medication (antidepressants, ß-blocker, antihistamines)?
- Alcohol or drug abuse?
- Association with other symptoms or clinical signs (weight loss, fever, loss of appetite, psychological signs)
- Pregnancy?


Clinical examination:

- Nutritional status (weight, ?signs of anaemia or vitamin deficiency)
- Temperature
- Cardiovascular system (heart, lung, blood pressure)
- Gastrointestinal system (abdomen, spleen, liver)
- Lymph nodes
- Mucus membranes, skin
- Psychological status

⊙ Investigations as necessary:

- Urinalysis
- Creatinine
- Blood sugar
- FBC
- AFB
- CXR

⚖ Differential diagnosis:

- Viral illness (?history of gastroenteritis, severe cold)
- Anaemia (?pallor, malnutrition, pregnancy, menorrhagia)
- Parasite infections (?anaemia, abdominal pain, worms, hepato-splenomegaly)
- Heart failure (?dyspnoea, murmur, crackles on auscultation)
- Asthma/COPD (?dyspnoea, wheezing, nocturnal symptoms)
- Tuberculosis (?cough, haemoptysis)
- Diabetes mellitus (?polyuria, polydipsia)
- Malignant disease (?melaena, haemoptysis, anorexia, fever, recurrent infections, lymphadenopathy)
- Hepatitis (?jaundice)
- Psychological illness (?difficulty sleeping, sadness worse in the morning, difficulty thinking and concentrating, apathy, history of traumatic life event e.g. death of child)
- Neurological disorder (?weakness, muscle wasting, visual defects, ataxia)

Note:

Very often fatigue is a reaction to living under difficult conditions (e.g. heavy work, lack of money, insufficient food) or traumatic events like severe illness or death in the family. Being able to talk to someone who listens can be very helpful.

3.4. Fever

- Definition: axillary temperature > 37.0° C in the morning, 38.0° C in the evening; rectal > 37.5° C in the morning, > 38.5° C in the evening
- Common in children, therefore it is very important to take a detailed history.
- Complications of fever in the newborn/infant: convulsions, dehydration, malignant hyperthermia with collapse, coma
- Always consider multiple causes of fever.


Clinical examination:

- Nutritional status (weight, signs of anaemia or vitamin deficiency)
- Temperature
- Ears, throat
- Mucus membranes, skin, teeth
- Cardiovascular system (heart, lung, blood pressure)
- Gastrointestinal system (abdomen, spleen, liver)
- Neurological status
- Lymph nodes

Consider investigations depending on history. They are not routine investigations!

⊙ Investigations as necessary:

- Urinalysis
- Blood sugar
- Blood smear (malaria parasites)
- FBC
- AFB

- Abdominal ultrasound
- CXR

⚖ Differential diagnosis:

- Acute:
  - Malaria (?endemic areas; high fever, chilling, headache)
  - Typhoid fever (high fever, slowly rising; headache, cough, constipation, relative bradycardia, abdominal pain, diarrhoea)
  - Meningitis, meningoencephalitis (?high fever, neck stiffness, neurological signs)
  - Septicaemia (?shock, toxaemia, jaundice)
  - Dengue fever (?haemorrhagical symptoms, rash)
  - Hepatitis (?jaundice, tender liver, dark urine)
  - Look for focal signs, e.g.:
    - Tonsillitis (?lymphadenopathy, exudate on tonsils)
    - Otitis (?fluid behind ear drum)
    - Pneumonia, bronchiolitis (?crackles, wheezes)
    - Dental abscess (?decayed teeth)
    - Measles (?Koplik spots, rash)
    - Cystitis, pyelonephritis (?dysuria, haematuria, proteinuria)
    - Abscess, osteomyelitis (?painful swelling)
    - Rheumatic fever (?joint pain, joint swelling, rash)
- Prolonged fever (more than 2 weeks):
  - Tuberculosis (?low grade fever, haemoptysis, night-sweats)
  - Amoebic liver abscess (?hepatomegaly, nausea, vomiting)
  - Schistosoma mansoni/haematobium/japonicum infections (?bloody diarrhoea, haematuria, hepatosplenomegaly)
  - Malaria (?endemic areas)
  - UTI (?dysuria, haematuria)
  - Filariasis (?lymphangitis of limbs, scrotum)
  - HIV infections (?anorexia, recurrent infections, AIDS-related symptoms)
  - Collagenosis and others
- Fever during the last month of pregnancy always think of:
  - Malaria
  - Pyelonephritis

Note:

With prolonged fever always consider that treatment might not be working (e.g. because of resistant bacteria).
If possible always check urine in children with fever lasting longer than 24 hours!

3.5. Nausea and Vomiting

- Protective reflexes of the body preventing the entry of toxins
- Many organic causes but often psychological component
- Most of the time self-limiting but with risk of dehydration attention should be given early especially to young children and older patients.
- Often associated with diarrhoea (see chapter *Diarrhoea,* p.75)

? Questions to ask:
- Acute or longer lasting?
- Recurrent episodes?
- Time (early morning)?
- Aggravating factors (e.g. worse with or after food)?
- Associated with pain?
- Concurrent medication (NSAIDs, antibiotics, opioids, theophylline, digoxin)?
- History of alcohol or drug abuse?
- Smoking?
- Pregnancy?
- Association with other symptoms and signs (?lethargy, weight loss, haematemesis, melaena, faecal vomit, vertigo, psychological signs)?
- Pre-existing diseases (e.g. diabetes mellitus, migraine, malignancy, gallstones, heart disease, asthma/COPD, renal problems)?

Note:

To assess degree of dehydration in a child it is very important to ask the mother about decrease in urination or thirst and assess the condition (?alert, lethargic), eyes (?sunken), skin turgor (?dry) and fontanelle (in infants, ?sunken).

Clinical examination:

- General condition (?lethargic)
- Mucus membranes, skin (?dry)
- Nutritional status (weight, ?signs of anaemia)
- Temperature
- Cardiovascular system (heart, lung, blood pressure)
- Gastrointestinal system (abdomen, spleen, liver)
- Neurological status (neck, eyes, strength, reflexes)
- Psychological state

⊙ Investigations as necessary:

- Urinalysis
- Creatinine
- Blood sugar
- FBC
- Abdominal ultrasound

⚖ Differential diagnosis:

- Abdominal disorders:
  - Gastroenteritis (viral, parasitic; ?with diarrhoea, ?other people affected)
  - Peptic ulcer disease (?vomiting during eating, nocturnal pain, pain relieved with eating and antacids)
  - Gastroesophageal reflux (?burning retrosternal pain)
  - Acute abdominal emergencies e.g. appendicitis, perforated ulcer, ectopic pregnancy (?fever, severe abdominal pain, occasionally sudden onset, getting worse, rigid abdomen)
  - Intestinal obstruction (?faecal vomit, distended rigid abdomen, hyperactive bowel sounds or loss of bowel sounds)
  - Cholecystitis (?pain right upper abdomen, esp. with fatty food)

- Hepatitis (?jaundice)
- Pancreatitis (?fever, severe central abdominal pain)
- Malignant disease (?anorexia, abdominal mass)

- Central nervous disorders:
  - Migraine (?recurrent episodes, headaches, aura, visual disturbance)
  - Vertigo, labyrinthitis (?symptoms worse on moving, nystagmus)
  - Meningitis, encephalitis (?fever, severe headache, neck-stiffness, rash)
  - Increased intracranial pressure e.g. with malignancy, hydrocephalus (?history, neurological deficits)
- Metabolic disorders:
  - Diabetic ketoacidosis (?history of diabetes, dehydration, hyperventilation, acidosis)
  - Uraemia (?pallor, oedema, hypertension)
- Pregnancy
  - Morning sickness (?missed periods)
  - Hyperemesis gravidarum
- Adverse effects of drugs
- Toxins
  - Food poisoning (?other people affected, associated with diarrhoea)
  - Alcohol abuse (?early morning vomit)
  - Medication, drug abuse (?history)
- Psychiatric causes:
  - Functional dyspepsia (?recurrent multiple unrelated complaints, history of traumatic life events)

3.6. Anaemia

- Decreased level of haemoglobin (below the reference levels for age, sex and pregnancy; e.g. males: < 12 g/100 mL; females < 11 g/100 mL), due to impaired production of red cells, loss of red cells due to bleeding or increased destruction (haemolysis)
- Major causes: malnutrition (iron and/or folate deficiency, mainly in children or women of childbearing age), infections (e.g. malaria, helminth infections, tuberculosis or HIV/AIDS), bleeding (e.g. ulcer)
- Rarer causes: sickle cell disease, thalassaemia, leishmaniasis and others

✎ Diagnosis:

Regarding diagnostic procedures: always think of cost-effectiveness and therapeutic consequences! They should only be performed if previous treatment had been unsuccessful (e.g. for hookworms).

- Look for diagnostic signs e.g. splenomegaly, hepatomegaly (?malaria, kala-azar, schistosomiasis, sickle cell anaemia, thalassaemia), fever (?malaria), haemoptysis (?tuberculosis), haematemesis (?peptic ulcer disease), blood in faeces.
- Laboratory investigations:
  - Haemoglobin, haematocrit
  - Blood film to check red cell morphology, target cells etc.
- Questions to ask to interpret blood results:
  - Is the anaemia hypochromic (e.g. iron deficiency anaemia) or normochromic (check MCHC)?
  - If hypochromic are there target cells (thalassaemia)?
  - If normochromic is the anaemia normocytic or macrocytic (check MCV)?
  - If normocytic could it be due to blood loss or haemolysis (consider thick film for malaria)?
  - If macrocytic is the anaemia megaloblastic (folate or vitamin B_{12} deficiency)?

3.6.1. Iron deficiency anaemia

There are 2 categories of iron in the diet:
- Heme iron: in meat, poultry, fish; easily absorbed
- Nonheme iron: in vegetables e.g. legumes, pumpkin, beans, peas; also in cereals, wheat, barley, oat etc.; not easily absorbed (absorption of iron is enhanced by ascorbic acid and inhibited by tannates in tea and coffee)
- Highest prevalence: children of the age of 6 months to 3 years and women of childbearing age due to menstruation or pregnancy

👁 Clinical manifestations:
- Weakness, fatigue
- Dizziness, tachycardia
- Pallor, headache

- Failure to thrive in children
- Dyspnoea
- In severe cases: congestive cardiac failure
- Occasionally pica (eating of dirt containing iron compounds)

⊙ Laboratory findings:
- Reduced MCV (≤ 70 – 75 fl) and MCHC (microcytic, hypochromic)

Treatment (WHO and INACG guidelines) recommendations:
- Elementary iron:
  - Children: 5 mg/kg od
  - Adults: 120 mg od
  - Duration of treatment: 3 months; children under 2 years: up to 24 months of age
- Inform patients about possible side effects e.g. dark stools, stomach upsets, constipation etc.

⊙ Prophylaxis:
- Pregnant women:
  - Elementary iron: 60 mg od **plus** folic acid 0.8 mcg od until delivery
- Malnourished children:
  - Elementary iron: 2 mg/kg/day **plus** folic acid 5 mg od; **after 1 weeks**:
  - Elementary iron: 2 mg/kg/day for 4 weeks
  - Severely malnourished children: iron supplement should not be given during the first days of treatment

Note:

Dosage must be adjusted to available preparations e.g. ferrous sulphate: elementary iron: 3 : 1.

- Anthelmintic treatment:
  - Albendazole:
    - Children < 2 years: 200 mg single dose
    - Children > 2 years, adults: 400 mg single dose (avoid in the first trimester of pregnancy)

- Mebendazole:
  - Children > 2 years, adults: 100 mg bid for 3 days (avoid in the first trimester of pregnancy)

*Blood transfusion: **must** be restricted to severe anaemia (danger of transmitting diseases such as hepatitis B or C, HIV, malaria, syphilis etc.); use relatives as blood donors if at all possible.*

☂ Prevention:
- Nutritional advice: eat foods rich in iron such as meat, fish, chicken, liver; also dark leafed vegetables like peas, lentils, with fruit rich in ascorbic acid such as papaya, mango, pineapple, sweet potato.
- Avoid drinking tea and coffee or diary products with main meals.
- Advice regarding cleanliness
- Advice regarding spacing of children

3.6.2. Thalassaemia

- Reduced production of globin chains leading to ineffective erythopoesis and haemolysis with subsequent anaemia
- Mainly in the Mediterranean and South East Asia

👁 Clinical manifestations:
- Major form:
  - Starting in infancy
  - Hypochromic microcytic anaemia with target cells
  - Children: failure to thrive
  - Recurrent infections, splenomegaly
  - Early death due to severe anaemia
- Minor form:
  - Usually asymptomatic
  - Mild anaemia, worse during pregnancy

 Treatment:
- Folic acid only:
  - Children < 1 year: 0.5 mg/kg od
  - Children > 1 year, adults: 5 mg od
  - Duration of treatment: up to 4 months

- Avoid treatment with iron (danger of haemosiderosis)
- Major form: problem with transfusion - > life-long treatment, therefore not possible in our projects

3.6.3. Sickle cell anaemia

- Severe haemolytic anaemia due to production of abnormal haemoglobin
- Common in black Africans
- Different degrees of haemolysis according to severity of illness

Clinical manifestations:
- Normocytic anaemia with reticulocytosis, sickle cells and target cells in blood film
- Jaundice
- Often: painful swelling of hands and feet
- Splenomegaly in children
- Later: renal failure, bone necrosis, infections
- Sickle cell crisis:
  - Thrombotic crisis brought on by infection, dehydration etc.
  - Severe pain, often in the bones
  - DD: acute abdomen, pneumonia

Treatment:
- Folic acid:
  - Children < 1 year: 0.5 mg/kg od
  - Children > 1 year, adults: 5 mg/day
  - Duration of treatment: up to 4 months
- Transfusion:
  - Only if absolutely necessary (with signs of decompensation e.g. cardiac failure)
  - Packed red blood cells or blood from relatives if at all possible
- Sickle cell crisis:
  - Analgesics e.g. paracetamol or tramadol

3.6.4. Glucose-6-phospate dehydrogenase (G6PD) deficiency

- High prevalence in African, Asian and eastern European population

- Linked to the x-chromosome: males and homozygous females mainly affected
- Enzyme defect conferring susceptibility to developing haemolytic anaemia with certain food (e.g. fava beans), drugs (e.g. primaquine or sulfonamides) or severe infections
- Also conferring about 50% protection against severe malaria

Clinical manifestations:
- Symptoms depending on the severity of enzyme deficiency
- Symptoms developing rapidly:
  - Haemolytic anaemia
  - Jaundice
  - Dark urine (haemoglobinuria)
  - Pallor
- Neonatal jaundice more severe with G6PD deficiency

Treatment:
- No causative treatment available
- Withdraw offending drug
- Avoid causative agents

Note:

Always remember to do a screening test for glucose-6-phophate dehydrogenase deficiency before starting a patient on primaquine.

3.7. Jaundice

- Yellow discolouration of skin, sclerae and mucosa due to raised bilirubin levels
- Three different origins: pre-hepatic, hepatocellular, post-hepatic
- Common in the tropics
- Often associated with liver disease

? Questions to ask:
- Age of patient (?neonate)?
- Duration of symptoms (?long lasting, recurrent episodes)?
- Concurrent medication (?paracetamol, barbiturates, methyldopa)?
- Alcohol or drug abuse?
- Pregnancy?
- Aggravating factors (e.g. worse after fatty food)?
- Associated with other symptoms or clinical signs (?fever, itching, scratch marks, palmar erythema, spider naevi, pale stools, gynaecomastia, loss of body hair, hepatomegaly, ascites, oedema, muscle wasting)?
- Pre-existing diseases (e.g. gallstones, malignancy, heart disease, asthma/COPD, renal problems)?

Clinical examination:
- General condition (?lethargic)
- Nutritional status (weight, ?signs of anaemia)
- Temperature
- Skin
- Gastrointestinal system (abdomen, spleen, liver)

Investigations as necessary:
- FBC
- LFT
- Abdominal ultrasound
- Blood smear

Differential diagnosis:
- Pre-hepatic jaundice:
  - Haemolytic anaemia (?anaemia, splenomegaly, joint pains)
- Hepatocellular jaundice:
  - Acute viral hepatitis (?fever, nausea, tender hepatomegaly, splenomegaly, arthralgia)
  - Chronic hepatitis (?hepatosplenomegaly, spider naevi, fatigue)
  - Liver cirrhosis (?history of hepatitis, hepatic foetor, liver flap: tremor worse by hand extension, ascites, haematemesis, encephalopathy)
  - Hepatocellular carcinoma
  - Alcoholic liver disease (?history)
  - Schistosomiasis

- Toxic hepatitis due to medication or drugs (?history)

➢ Posthepatic jaundice:
- Biliary obstruction e.g. gallstones (?colicky pain)
- Helminthiasis with ascaris (?worms)
- Infection e.g. cholangitis, pancreatitis, abscess (?fever, ?high blood sugar)

3.8. Seizures

- Usually presenting as grand mal (tonic-clonic movement of all four limbs) with loss of consciousness, occasionally with tongue bite and urinary incontinence
- General population: 8-10% lifetime risk of one seizure, 3% risk of epilepsy
- Acute disturbance of the brain; can be provoked or unprovoked.
- Carefully taken history is very important.

? Questions to ask:
- ➢ Any previous events?
- ➢ Family history?
- ➢ Any post-ictal symptoms?
- ➢ Association with clinical signs e.g. fever?
- ➢ Alcohol or drug abuse?
- ➢ Concurrent medication (theophylline, tramadol)?
- ➢ Any coexisting illness?


Clinical examination:
- ➢ Nutritional status (weight)
- ➢ Temperature
- ➢ Cardiovascular system (heart, lung, blood pressure)
- ➢ Neurological status (pupils, reflexes, power, ?neck stiffness etc.)
- ➢ Gastrointestinal system (abdomen, spleen, liver, uterus)
- ➢ Psychological state

⚖ Differential diagnosis:
- ➢ Febrile convulsion (?child, viral illness)
- ➢ Meningitis/encephalitis (?fever, neck-stiffness; always to be considered in children aged 18 months to 6 years)
- ➢ Hypoglycaemia (?medication, history of diabetes)

- Eclampsia (?pregnancy)
- Epilepsy (?aura, family history)
- Brain injury/tumor/abscess (?neurological deficits)
- Infectious disease (?malaria, tuberculosis, cysticercosis, schistosomiasis etc.)
- Intracranial bleeding (?sudden onset of severe headache, trauma)
- Excessive intake of alcohol or drugs/withdrawal (?history)
- Medication
- Severe psychological stress, sleep deprivation (?history)
- Transient ischaemic attack/cerebro-vascular accident (stroke)
- Cardiac arrhythmias (?irregular pulse, murmur)
- Syncope
- Complex migraine (?history of migraine, ?with symptoms e.g. visual disturbance)
- Metabolic encephalopathy (?suggestion of electrolyte disturbance e.g. hypoglycaemia in rickets)

Note:

Always check the blood sugar in a patient presenting with epileptic fit or loss of consciousness!
Refer patient to hospital urgently if meningitis or eclampsia is suspected!

3.9. Oral Diseases and Dental Problems

- Decayed teeth: common problem of patients attending consultation; mainly request for painkillers
- Dental infections: possible cause of pyrexia of unknown origin, bacterial endocarditis or abscess formation in different organs

Important to remember:

- Check teeth of patient and advise extraction of decayed teeth and root segments if necessary.
- Give simple instructions on healthy nutrition and on dental hygiene e.g. thorough cleaning and massage of the marginal gingival ("area where the gum touches the tooth").

3.9.1. Acute apical abscess

👁 Clinical manifestations:
- Severe pain and swelling around the root of the tooth
- Fluctuation
- Facial swelling
- Complication: retropharyngeal abscess with airways obstruction

 Treatment:
- Refer for incision and drainage.
- Antibiotics: Penicillin V: children: 30-60 mg in 3-4 divided doses, adults: 500 mg qid
- Analgesics: paracetamol or NSAID prn

3.9.2. Extradental manifestations of dental causes

⊙ Headache, pain over the sinuses, in the temporal area:
- Possible cause: nonvital tooth in the upper jaw
- Diagnosis: pain on percussion of affected tooth
- Refer for extraction of tooth.

⊙ Headache, ear ache:
- Possible cause: nonvital tooth in the lower jaw
- Diagnosis: pain on percussion of affected tooth
- Refer for extraction of tooth.

⊙ Stomach pain, difficulties with digestion:
- Can be caused by inability to chew food properly due to loss of teeth.

Treatment:

- Toothless patients should crush the food and move it in the mouth for some time.
- Patients with few teeth should use their teeth properly and take a lot of time with their meals.

3.10. Emergencies

- Due to limited resources emergency treatment should only be done on a basic level.
- Advanced treatment e.g. intubation is not indicated because of poor outcome especially while working in remote areas.
- It is our intention to stabilize the patient with basic means and organize transport to the nearest hospital as soon as possible.

Note:

Make sure that the patient is put in the correct position, kept warm and as calm and free of pain as possible.
Even if rushed it is nevertheless very important to take a proper history!

3.10.1. Loss of consciousness (LOC)

? Questions to ask:

- Time of LOC
- History of pain, fever, trauma
- Past medical history
- History of medication, drug or alcohol abuse


Clinical examination:

- ?Breathing
- ?Pulse palpaple
- Blood pressure (?hypotension)
- Skin (?dry, clammy)
- Temperature (?fever)

- Pupils (?dilated, reacting to light)
- Blood sugar (BM-stix ?hypoglycaemia)
- ?Reaction to pain
- ?Signs of anaemia

⚖ Differential diagnosis:
- Metabolic disorder e.g. hypoglycaemia
- Meningitis, cerebral malaria, cerebral schistosomiasis
- Intoxication, drugs
- Epilepsy, trauma

It is of utmost importance to check the blood sugar in an unconscious patient!

 Treatment:
- Recovery position
- Tilt head back to open the airway.
- Give oxygen if available.
- Monitor pulse and blood pressure closely.
- If possible take BM-stix:
  - Hypoglycaemia, history of diabetes and on diabetic medication give:
    - Adults: 20 mL of 40% glucose slowly IV
    - Children: 5 mL/kg of 10% glucose slowly IV
- Hypertensive crisis:
  - Give 1-2 puffs of GTN-spray SL to lower blood pressure carefully.

3.10.2. Severe chest pain

⚖ Differential diagnosis:
- Myocardial infarction, pulmonary embolism, trauma

👁 Clinical manifestations:
- Distress
- Dyspnoea
- Pallor


Treatment:

- Sit patient up.
- Give oxygen if available.
- GTN-spray 2 puffs stat SL if systolic BP > 100 mmHg
- Put up IV line.
- Aspirin 500 mg stat
- If required:
  - Diazepam 5-10 mg IV
  - Tramadol 2 mg/kg IV **or**
  - Nalbuphine 0.2 mg/kg IV; maximum single dose in nonopioid-tolerant patient: 20 mg; maximum daily dose: 160 mg

3.10.3. Trauma

- Assess injuries of patient.
- Remove from danger area.
- Observe for loss of consciousness (LOC).
- Check pulse and blood pressure.
- Check chest (?signs of pneumothorax e.g. respiratory distress, reduced breath sounds, reduced chest movements, paradoxical breathing).
- Put patient in appropriate position.


Treatment:

- Undress and keep patient warm.
- Position:
  - If conscious and shocked: raise legs.
  - LOC and breathing: recovery position
  - Breathing and conscious: position on back
  - If respiratory problems and conscious: sitting or half-sitting position if tolerated
  - If necessary: stabilize neck.
- Give oxygen if available.
- Monitor pulse and blood pressure closely.
- Bleeding wounds: apply pressure bandage.
- Cover wounds with sterile dressing.
- Splint injured limbs.

- Large IV cannula (16 G in adults); if in shock give Ringer's Lactate solution 1-3 litres IV; if available give gelafundin 30-40 mL/kg IV.
- Give analgesics e.g.
  - Tramadol IV, IO, IM, PO:
    - Children 1-11 years: 1-2 mg/kg up to tid prn
    - Children ≥ 12 years, adults: 2 mg/kg up to tid prn
  - Ketamine IV, IO:
    - Adults, children: 0.25 – 0.5 – 1 mg/kg
  - Nalbuphine IV, IO, IM, SC:
    - Adults, children: 0.2 mg/kg prn; maximum single dose in non-opioid-tolerant patient: 20 mg; maximum daily dose: 160 mg

3.10.4. Aspiration of foreign body

Clinical manifestations:
- Sudden onset of cough, cyanosis
- Stridor (inspiratory, exspiratory)
- Paradoxical breathing

Treatment:
- Check mouth and throat and remove any obvious obstruction.
- Heimlich manoeuvre (abdominal thrust)

Heimlich manoeuvre (abdominal thrust):

- Patient lying on the back: kneel astride the casualty, place heel of one hand on abdomen between umbilicus and xiphoid and cover with the other hand. Press sharply inwards upwards towards the chest up to five times (imitating cough to expel the foreign body).
- If the patient is upright stand behind the patient, place right fist below the xiphoid, cover it with the left hand; pull sharply and quickly inwards and upwards towards the chest.

Modified Heimlich manoeuvre for infants, children:

- Infants, children < 1 year: lay infant on your forearm or thigh on the stomach in head down position; give 5 blows on the back between the shoulder blades with the heel of the hand. If obstruction persists turn child and give 5 chest thrusts in the middle of the breast bone (in infants with 2 fingers, in older children with the heel of the hand). Continue until foreign body is expelled.
- Children > 1 year: give 5 blows to the back of the child sitting, kneeling or lying on the stomach. If obstruction persists continue with abdominal thrust (see adults).

3.10.5. Anaphylaxis/anaphylactic shock

- Severe life-threatening, generalized or systemic hypersensitivity reaction
- Can be associated with insect bites, certain food (e.g. eggs, fish, nuts, esp. peanuts etc.).
- Also associated with medical products, e.g. vaccines, antibiotics, blood products, aspirin etc.
- More likely after parenteral administration of medication

Clinical manifestations:

- Erythema, urticaria
- Hypotension, tachycardia
- Bronchospasm, laryngospasm
- Sudden onset and rapid progression of symptoms

Treatment:

- Stop causative agent straight away.
- Lie patient flat, raise feet; if unconscious: recovery position.
- Give oxygen if available.
- Give **adrenalin 1 in 1000 (1mg/mL) straight away IM (anterolateral thigh)**; also possible, but less effective: SC (do not waste time looking for a vein where IM injection can be successful):
  - Adults: 0.5 mL (500 mcg)
  - Children: 0.01 mg/kg (= 0.01 mL/kg) **or**
    - up to 6 years 0.15 mL (150 mcg)
    - 6-12 years 0.3 mL (300 mcg)
    - > 12 years 0.5 mL (500 mcg)
  - Can be repeated every 5 minutes according to pulse and blood pressure.
- In **rare** cases e.g. severely ill patients when adequate circulation may not be maintained in the periphery adrenaline can also be given IV:
  - **Adrenaline 1 : 10 000 (100 mcg/mL) IV:**
    - Adults: titrate 50 mcg (0.5 mL) boluses according to response
    - Children: titrate 0.01 mg/kg (0.1 mL/kg) boluses according to response.
  - After initial resuscitation give hydrocortisone:
    - Adults: 2 mg/kg IM or slow IV up to qid prn
    - Children 4-8 mg/kg stat. IM or slow IV, then 2 mg/kg up to qid prn
  - Give antihistamines e.g.
    - Diphenhydramine:
      - Adults, children: 1-2 mg/kg slowly IV or IM
      - Can be given up to tid prn
- Monitor pulse and blood pressure closely.

Note:

Treatment with antihistamines cannot replace treatment with adrenaline: they do not relieve bronchoconstriction or shock; they are only effective for urticaria and itching.

3.10.6. Snake bite

- Should be suspected if a patient presents with severe pain, redness and swelling of a limb or unexplained illness with severe pain, bleeding and neurological problems.

 Clinical manifestations:
- Swelling of limb
- Necrosis
- Shock
- Bleeding e.g. from gums
- Neurological symptoms e.g. paralysis, difficulties in swallowing or talking
- Puncture marks may be visible.

 Treatment:
- Lay patient down, affected limb below heart level, apply firm bandage to affected limb from toes or fingers to proximal site of bite; immobilize with splint.
- Put up IV infusion.
- Urgent transport to hospital
- **Do not cut the wound, suck out the venom or apply a tourniquet.**

3.10.7. Rehydration

See chapter *Dehydration,* p.89

 Treatment for child in shock:
- Give Ringer's Lactate solution IV:
  - 20 mL/kg in the first hour, repeat if no improvement
  - 2.-4. hour: 12-15 mL/kg/h
  - From 5. hour: 6-10 mL/kg/h, reassess and speed up if patient deteriorates.

Intraosseous infusion

- Should only be used in an emergency if intravenous access is not available within a short period of time.
- Dosages and action of drugs and intravenous fluids comparable to IV administration
- Puncture site: antero-medial aspect of tibia, at the junction of upper and medial third
- Use intraosseous needle if available.
- In young children: use of large-bore hypodermic needle or butterfly needle possible.
- Important: thorough disinfection of injection site
- Insert needle at 90 ^{o} angle to tibia, stop when decrease of resistance is felt or aspiration of blood is possible.
- Stabilize needle and secure with tape.
- Check whether infusion is running correctly and there is no swelling of skin surrounding the injection side or calf.
- Insert IV-line as soon as possible and discontinue intraosseous infusion.

4. RESPIRATORY PROBLEMS

4.1. Acute Respiratory Infections (ARI)

- Divided into:
  - **upper respiratory tract infections** (URTI, affecting nose, ears, throat, pharynx and larynx) and
  - **lower respiratory tract infections** (LRTI; affecting bronchi, bronchioli or lungs)
- Very common, esp. in infancy and childhood
- Associated with poor housing, poor hygiene, inadequate food and clothing
- Incidence of chronic respiratory diseases: rising due to air pollution in big cities
- High mortality with LRTI (20% of all the deaths in children under 5 years of age)
- High risk: low birth weight children, children under 5 years of age with low immunization status, children and adults with anaemia and malnutrition or concomitant diseases e.g. measles, pulmonary tuberculosis or HIV
- Further risk factors: alcohol, diabetes

Taking a detailed history, examining the patient properly and making a diagnosis (to differentiate between simple viral infection and severe pneumonia) and starting adequate treatment are of utmost importance.

? Questions to ask in children:
- ➢ How is the child (?well, responding, sleepy, drinking or eating well)?
- ➢ Increased respiratory rate?
- ➢ Any wheeze?
- ➢ Chest-wall retractions?

- Always consider otitis media or purulent tonsillitis (see chapter *ENT Problems,* p.194)

⚖ Differential diagnosis:
- ➢ Foreign body (?sudden onset)
- ➢ Tuberculosis
- ➢ Croup
- ➢ Epiglottitis
- ➢ Asthma/COPD

- Parasitic lung infection (lung passage of ascaris, hookworm, strongyloides (?worms, urticaria)

4.1.1. Upper respiratory tract infection (URTI; common cold)

Causative agents:
- Mainly viruses e.g. respiratory syncytial virus (RSV) or adenovirus
- Risk of bacterial superinfection e.g. with Haemophilus influenzae, pneumococci, streptococci or Staphylococcus aureus

Clinical manifestations:
- Cough, runny nose, sore throat
- Occasionally raised temperature
- Risk of infection spreading to lower respiratory tract

Treatment:
- Increase fluid intake.
- Encourage breastfeeding.
- Antibiotics not necessary, but give if superinfected.
- Saline nose drops for blocked nose (0.9% NaCl)
- Paracetamol for pain or pyrexia
  - Children: 30 mg/kg in 3-4 divided doses
  - Adults: 500 mg qid
- Fever: patient should be sponged down with lukewarm water.

4.1.2. Lower respiratory tract infection (LRTI)

4.1.2.1. Bronchitis

Clinical manifestations:
- Fever, barking cough
- Clear frothy sputum; can get purulent with secondary bacterial infection.
- Wheezy chest
- Normal respiratory rate at rest:
  - Infants < 2 months: < 60/min
  - Children 2-11 months: < 50/min

- Children 1-5 years: < 40/min
- Children 6-8 years: < 30/min

If the respiratory rate is higher pneumonia is likely.


Treatment:

- Antibiotics only indicated with yellow/ green sputum, persistent cough or suspected pneumonia (see below); otherwise: see treatment for URTI.

4.1.2.2. Pneumonia


Causative agents:

- Pneumococci, Haemophilus influenzae, staphylococci, also: viruses, Mycoplasma pneumoniae; with AIDS: also Pneumocystis carinii
- Occasionally due to inhaled foreign body (history important – sudden onset?)


Clinical manifestations:

- Fever, tachycardia
- Tachypnoea: respiratory rate: children < 2 months: > 60/min; 2-11 months: > 50/min; 1-2 years: > 40/min; 6-8 years > 30/min
- Dyspnoea, chest-wall retractions, nasal flaring, cyanosis
- In children: difficulty feeding


Treatment:

- Do not wait for x-ray to confirm diagnosis.
- Antibiotics indicated:
  - Amoxicillin:
    - Children: 50 mg/kg in 3 divided doses
    - Adults: 500-1000 mg tid **or**
  - Erythromycin:
    - Children: 50 mg/kg in 3 divided doses
    - Adults: 500 mg qid
  - Duration of treatment: 7 days
- Give oxygen if necessary.
- Increase fluid intake.

- Encourage breastfeeding.
- Fever:
  - Take clothes off; sponge down with lukewarm water.
  - Paracetamol:
    - Children: 30 mg/kg in 3-4 divided doses
    - Adults: 500 mg qid
    - Give with temperature > 39° C.
  - Severe cases: refer to hospital for treatment.
  - Persistent symptoms: refer for sputum examination and/or x-ray to exclude tuberculosis.

There is no indication for codeine or other cough suppressants.

☂ Prevention:
- Advice regarding appropriate clothing
- Advice regarding breastfeeding of children
- Check immunization status of children and immunize as required after recovery.
- Advice regarding food, hygiene

4.3. Acute Laryngo-Tracheobronchitis (Croup)

- Most common cause of upper respiratory obstruction
- Mainly in children from 3 months to 5 years

Causative agents:
- Mainly viruses (influenza, para-influenza, respiratory syncitial virus)

Clinical manifestations:
- Initially mild symptoms, can get progressively worse.
- Symptoms usually worse at night
  - Runny nose
  - Mild fever
  - Pharyngitis
- Mild croup:
  - Hoarse voice
  - Barking cough

- Inspiratory stridor when agitated
- Severe croup:
  - Signs of severe illness: pallor, chest-wall retractions, nasal flaring, increased respiratory rate
  - Stridor at rest
  - Tachypnoea
  - Cyanosis
  - Fatigue

⚖ Differential diagnosis:
- Inhalation of foreign body
- Retropharygeal abscess
- Diphtheria
- Acute epiglottitis

 Treatment:
- Mild croup:
  - Antipyretics e.g. paracetamol
  - Encourage oral fluids
  - Rest
- Severe croup:
  - Keep the child in upright position.
  - Try to keep child calm.
  - Prednisolone PO 1-2 mg/kg od for 3 days
  - If available: nebulizer with adrenaline (0.5 mL/kg of 1 : 1000 solution up to 5 mL; may be repeated every hour if needed; important: careful monitoring)
  - If no improvement admit to hospital for oxygen, observation, intensive treatment.

4.4. Acute Epiglottitis

 Causative agent:
- Haemophilus influenzae

Clinical manifestations:

- Sudden onset
- High fever
- Severe respiratory symptoms (dyspnoea, chest-wall retractions)
- Child sitting up, drooling saliva

Treatment:

Do not try to examine the throat.

- Keep child in upright position.
- Admit to hospital straight away for treatment with antibiotics.
- Intubation or tracheostomy will be needed with incipient airway obstruction.
- If admission is not possible give antibiotics e.g. chloramphenicol 100 mg/kg IM in 3 divided doses.
- If airway obstruction and help not readily available coniotomy can be life-saving.

Coniotomy:

Only to be done in dire emergencies!

- After infiltration with lignocaine 1% cut skin underneath the larynx 1.5-2 cm lengthwise.
- Take large-bore cannula connected to 5 mL syringe.
- Insert at right angle to trachea between the two cartilages.
- Aspirate air, withdraw the needle and ventilate (small volumes, high frequency).

or

- Cut across the cricothyroid ligament.
- Insert shortened gastric tube, suction tube or catheter.

4.5. Obstructive Airways Disease

Always think of differential diagnosis of asthma versus COPD (different response to medication!).

Differential diagnosis of bronchial asthma versus COPD:

	Bronchial Asthma	**COPD**
Age of first diagnosis	Onset in early life (often childhood)	Onset in midlife
Cause	Hyperresponsiveness of airways; not caused by smoking	Exposure to tobacco smoke, fumes
Symptoms	Recurrent attacks; symptoms often at night or early morning	Permanent dyspnoea on exertion
Allergy	Often trigger factor; often allergies, rhinitis and/or eczema present	Rarely trigger factor
Airways Obstruction	Recurrent attacks; fully reversible	Progression of obstruction, not fully reversible
Medication	Responding to inhaled corticosteroids	Only occasionally responding to inhaled corticosteroids

It is of utmost importance that every patient with the diagnosis of asthma or COPD is referred to an asthma clinic (when available in the projects). The diagnosis must be written clearly on the patient chart.

✎ Diagnosis:
- Asthma:
  - In our projects: at present only testing of peak expiratory flow possible, measuring variability of airflow limitation; for children > 5 years and adults

- > Ideally measuring should be done in asthma clinics by trained staff or by patients with good compliance at home (peak flow chart).
- > Measurements should ideally be taken with same peak flow meter, preferably with the patient's own peak flow meter, always taking the best of 3 readings.
- > Diagnosis should be based on patient's previous best peak flow (fully treated or asymptomatic, PEFR usually better in the evenings than in the mornings) or of predicted value for age and sex.
- > Diurnal variability > 20% (10% with twice daily readings) of peak flow measurements {(maximum - minimum PEFR)/ maximum PEF x 100 (%)} **or** improvement of 60 l/min (or ≥ 20% of pre-bronchodilator PEF) after inhalation of a bronchodilator is suggestive of asthma.
- > Poorly controlled asthma: PEFR < 60% of predicted or personal best; diurnal variability often poor

- o Chest x-ray: seldom diagnostic but useful in excluding pulmonary tuberculosis or cardiac failure

- ➢ COPD:
  - o Peak flow measurements: poor diurnal variability and little improvement after inhaled bronchodilator despite symptoms
  - o Chest x-ray: seldom diagnostic but useful in excluding pulmonary tuberculosis or cardiac failure

⚖ Differential diagnosis:

- ➢ Helminths (?history)
- ➢ Pulmonary tuberculosis (history of haemoptysis, anorexia, night sweats)
- ➢ Gastrooesophageal reflux (?burning retrosternal pain)
- ➢ Aspiration of foreign body (?sudden onset)
- ➢ Congestive cardiac failure (?ankle oedema)
- ➢ Vocal cord dysfunction
- ➢ Hyperventilation, panic attacks

4.5.1. Bronchial asthma

- Chronic inflammatory disorder of the airways with intermittent airway obstruction due to bronchospasm, swelling of mucus membranes and hypersecretion of mucus
- Triggered by certain allergens (e.g. furred animals, cockroach allergens, domestic mites, pollens, yeast, fungi), respiratory tract infections, exercise, cold air, smoke or others
- Often other members of the family with asthma or atopic eczema


Clinical manifestations:
  - Intermittent wheezing, tightness, dyspnoea
  - Recurrent cough (esp. in children, after exercise)
  - Nocturnal symptoms (cough, wheeze)
  - Severe attacks: chest-wall retractions (smaller children), severe dyspnoea, cyanosis, silent chest on auscultation
  - Normal respiration in between the attacks
  - Often connected with atopic eczema

Levels of asthma control (after GINA 2010):

Characteristic	**Controlled (All of the following)**	**Partly controlled (Any measure present)**	**Uncontrolled**
Daytime symptoms	None (twice or less/week)	More than twice/week	Three or more features of partly controlled asthma
Limitations of activities	None	Any	
Nocturnal symptoms/awakenings	None	Any	
Need for reliever	None (twice or less/week)	More than twice/week	
Lung function (PEFR)	Normal	< 80% of predicted or personal best (if known)	
Assessment of future risk (risk of exacerbation, instability, rapid decline in lung function, side effects)			

 Treatment:

- Adjust treatment to best possible control.
- If not controlled, consider stepping up to gain control.
- Exacerbation: treat as such.
- Reduction of treatment can be attempted after control has been maintained for at least 3 months.
- Reliever medication: Salbutamol MDI prn (after teaching and with good technique of patient; young children: best given with spacer e.g. plastic cup or plastic bottle with hole in the bottom for inhaler)
- Step 1:
  - Salbutamol metered dose inhaler (MDI): 1-2 puffs as required **or**
  - Salbutamol PO:
    - Children 2-6 years: 0.3-0.6 mg/kg in 3 divided doses **prn** (max. 4 mg tid)
    - Children 6 -12 years: 2 mg **prn** up to qid
    - Children > 12 years, adults: 2-4 mg **prn** up to qid
  - Terbutaline suspension PO: children: 0.2 mg/kg in 3 divided doses **prn**
  - Problems with metered dose inhalers: compliance of patients (more difficult to use – always make sure that patient knows how to use the device!), more expensive than oral medication
- Step 2:
  - Under supervision of an asthma clinic: **add** inhaled steroids (if available; advantage: fewer side effects than oral medication) e.g.:
    - Beclomethasone metered dose inhaler (MDI):
      - Adults: 200 mcg bid
      - Children: 50-100 mcg bid
  - If not available give salbutamol tablets PO:
    - Children 2-6 years: 0.3-0.6 mg/kg in 3 divided doses (max. 4 mg tid)
    - Children 6 -12 years: 2 mg tid-qid
    - Children > 12 years, adults: 2-4 mg tid-qid
  - Terbutaline suspension: children 0.2 mg/kg in 3 divided doses
- Step 3:
  - Increase inhaled steroids:
    - Beclomethasone MDI:
      - Adults: 400 mcg bid
      - Children: 100-200 mcg bid

- With oral medication: **add**
  - Aminophylline:
    - Adults: 100-200 mg tid (10 mg/kg/day); avoid in children

- Step 4:
  - With inhaled steroids **add**:
    - Aminophylline PO:
      - Adults: 100-200mg tid (10 mg/kg/day); avoid in children
  - Otherwise **add**:
    - Prednisolone PO:
      - Adults: lowest possible dose to control symptoms e.g. 5 mg od in the morning
      - Children: 1 mg/kg od in the morning
      - Reduce to lowest possible dose.
    - Exclude tuberculosis before starting the patient on long term steroid treatment.

Acute attack (emergency):

Clinical manifestations:

- Progressive increase of
  - Dyspnoea
  - Cough, wheeze
  - Tightness of chest

Asthma attacks may be life-threatening.

Severity of Asthma exacerbations (after GINA 2010):

Parameter	Mild	Moderate	Severe
Breathless	Walking Can lie down	Talking Infant: difficulty feeding Prefers sitting	At rest Infant: stops feeding Hunched forward
Talks in	Sentences	Phrases	Words
Alertness	May be agitated	Usually agitated	Usually agitated
Respiratory rate	Increased	Increased	Often > 30/min
Wheeze	Moderate, often only and expiratory	Loud	Usually loud
Pulse/min	< 100	100-120	> 120
PEFR After initial bron-chodilator % predicted or % of personal best	> 80%	60-80%	< 60% predicted or personal best (< 100 l/min adults) or response lasts < 2 hrs

Normal respiratory rate in awake children:

< 2 months: < 60/min
2-11 months: < 50/min
1-5 years: < 40/min
6-8 years: < 30/min

Normal pulse rate in children:

2-12 months: < 160/min
1-2 years: < 120/min
2-8 years: < 110/min

- **Respiratory arrest imminent:**
  - Patient drowsy or confused
  - Absence of wheeze

- Bradycardia
- Paradoxical thoraco-abdominal movement


Treatment:

- Salbutamol:
  - Inhaler (as effective as nebulizer):
    - **Start** with 2-4 puffs every 20 minutes for the first hour.
    - **Then**:
      - Mild exacerbations: 2-4 puffs every 3-4 hours
      - Moderate exacerbations: 6-10 puffs every 1-2 hours
    - Best given with spacer e.g. plastic cup or plastic bottle with hole in the bottom for inhaler.
  - Salbutamol via nebulizer (if available):
    - **Start** with:
      - Children ≤ 5 years: 2.5 mg every 20 minutes for the first hour
      - Children > 5 years, adults: 2.5-5 mg every 20 minutes for the first hour
    - **Then** repeat according to response (max. 40 mg daily).
  - Glucocorticosteroids:
    - Prednisolone PO:
      - Children: 1 mg/kg for 5 days, then stop if possible.
      - Adults: 40 mg for 7 days, then stop if possible **or**
    - Hydrocortisone IV:
      - Adults: 2 mg/kg
      - Children: 4-8 mg/kg stat, then 2 mg/kg
      - Can be given up to qid prn.
    - Change to oral medication as soon as possible.
  - If available give oxygen for severe exacerbation.
  - Consider aminophylline:
    - Adults: 1 vial 250 mg slowly IV or PO in ½ glass of water every 8 hours (as effective as IV medication)
    - Avoid in children, esp. < 2 years (danger of convulsions) unless in hospital under supervision.
    - Avoid if patient is already taking aminophylline on a daily basis.
    - Treat underlying bacterial superinfection.

- Monitor patient closely (symptoms and peak flow if possible).
  - Titrate medication to response of patient.
  - Ideal response: peak flow ≥ 80% of predicted or personal best (response lasting > 3 hours)
- Refer to hospital:
  - No longer-lasting response to bronchodilator
  - No improvement after oral glucosteroid treatment within 2-6 hours
  - Patients with suspected hypoventilation, exhaustion, distress or peak flow 30-50% of predicted or personal best
- Review treatment and give action plan to patient.
- Refer to asthma clinic as soon as possible for further assessment; if not possible arrange close follow-up in routine clinic.

4.5.2. Chronic obstructive pulmonary disease (COPD)

- Often under-recognized and under-diagnosed
- One of the leading causes of death worldwide
- Risk factors: tobacco smoke, occupational dusts and chemicals (intense or prolonged exposure), air pollution e.g. from biomass fuel used for cooking and heating in poorly ventilated dwellings (especially women affected)
- Chronic progressive, mostly irreversible disease of bronchi and terminal alveoli

Clinical manifestations:

- Chronic cough
- Chronic sputum production
- Dyspnoea on exertion, getting progressively worse
- Tachypnoea, wheeze
- With progession of disease: signs of left and right ventricular failure (with ankle oedema, increase of jugular pressure), respiratory failure

Diagnosis:

- Spirometry (decrease in FEV_1 and FEV_1/FVC)
- Problem in our projects: only peak flow measurement possible at present (COPD: poor diurnal variability)

Treatment:

- Intermittent or worsening symptoms:
  - Salbutamol metered dose inhaler (MDI): 1-2 puffs as required **or** (if problems with compliance or inhaler technique):
  - Salbutamol PO: adults: 2-4 mg **prn** up to qid
- Persistent symptoms:
  - Salbutamol tablets PO: adults: 2-4 mg tid-qid
  - Long acting ß-agonists not available in our projects (too expensive)
- Ongoing symptoms: **add**:
  - Aminophylline: adults 100-200 mg tid (10 mg/kg/day)
- Repeated exacerbations: **try** (under supervision of an asthma clinic):
  - Beclomethasone metered dose inhaler (MDI): adults: 200 mcg bid
  - Trial period for 3 months – if no improvement or poor inhaler technique: **stop.**
- Acute exacerbation:
  - Prednisolone 30-40 mg PO for 7-10 days, then stop; long term treatment with oral steroids not recommended (no benefit, too many side effects).
- Treat underlying infection with antibiotics e.g. amoxillicin 500 mg tid for 7 days.
- Refer to hospital if severe exacerbation.
- Counsel smokers about necessity to stop smoking.

Important to remember:

- Staff should give demonstrations and – if available illustrated – instructions to every patient with asthma or COPD attending the asthma clinic.
- Doctor should check inhaler technique of every patient treated with an inhaler before continuing the prescription. Refer patients with poor inhaler technique to asthma clinic as soon as possible or stop inhaler and give oral medication (easier to take and therefore more effective than an inhaler not used appropriately).

4.6. Tuberculosis

- Typical disease of poverty with malnutrition, poor housing conditions, overcrowding
- About 95% occur in developing countries together with other diseases e.g. HIV, diabetes mellitus.
- Prevalence: pulmonary tuberculosis: 85%, extrapulmonary tuberculosis: 15%
- Problem: infected people with open tuberculosis (usually adults) are a source of infection for their family and friends (10-14 people per year).
- Often problems with diagnosis if cough is present anyway e.g. due to environmental pollution in Kolkata


Causative agent:
- Mycobacterium tuberculosis


Transmission:
- Bacilli spread in droplets of sputum
- Transported via bloodstream or lymphatics to different organs in the body

4.6.1. Pulmonary tuberculosis

- Most common form of tuberculosis


Clinical manifestations:
- Cough (> 2 weeks, productive)
- Sputum; haemoptysis less common
- Chest pain
- Low grade fever, night sweats
- Loss of weight
- Dyspnoea

Diagnosis:
- Investigations should be done in every patient with a history of cough longer than 2 weeks.

- Direct smear microscopy for acid fast bacilli (AFB, Ziehl-Neelson staining; in children > 10 years and adults):
  1. First spot specimen when patient presents for the first time.
  2. Early morning specimen (give specimen container to the patient for a specimen next morning: all sputum collected in the first 2 hours)
  3. Second spot specimen when the patient returns with the early morning specimen
- Chest x-ray (with strong suggestion of tuberculosis, even in sputum-negative patients):
  - Enlarged hilar lymph glands
  - Upper zone: patchy shadows with or without: cavitation, calcification, diffuse small nodular opacities
  - Complications: pleural effusion (90% of pleural effusions are caused by pulmonary Tb), pneumothorax etc.

⚖ Differential diagnosis:
- Pneumonia
- Bronchial asthma/COPD
- Whooping cough (pertussis)
- Lung cancer

4.6.2. Extrapulmonary tuberculosis

- Common in people **with** low resistance e.g. due to AIDS, malnutrition, other concomitant diseases or alcohol abuse
- Any organ of the body involved; mainly cervical lymph nodes, spine, other bones and joints, abdomen, brain

⊙ Tuberculous lymphadenitis (70%):
- Lymph nodes swollen, non-tender
- Mainly cervical lymph nodes affected
- Abscess formation possible, occasionally with sinus formation
- Diagnostic procedure:
  - FNAC (fine-needle aspiration and cytology; Ziehl-Neelson staining) if no improvement after a 10 days' trial of antibiotics (e.g. amoxicillin)

⊙ Tuberculosis of the spine (Pott's disease, caries spine; 20%):
- ➢ Back pain
- ➢ Collapse of vertebrae, leading to gibbus formation
- ➢ Some patients: signs of spinal cord compression, paraplegia of affected limbs
- ➢ Paravertebral, gluteal or inguinal abscesses (cold abscesses)
- ➢ Osteomyelitis, chronic fistulas, non-healing wounds

✎ Diagnosis:
- o X-ray (in case of wound or abscess if no improvement after up to 4 weeks' trial with antibiotics)
- o FNAC of abscess with Ziehl-Neelson staining

⊙ Tuberculosis of the joint (2%):
- ➢ Mainly affecting knees or ankles
- ➢ Effusion, fistula formation, joint destruction

⊙ Abdominal tuberculosis (2%):
- ➢ Peritoneal tuberculosis: ascites without any sign of liver disease
- ➢ Intestinal tuberculosis: chronic abdominal pain, partial bowel obstruction, occasionally acute abdomen

⊙ Tuberculous meningitis (2%):
- ➢ Mainly in children
- ➢ Progressive weakness, nausea, headache, vomiting
- ➢ Low grade fever
- ➢ Neck stiffness (developing slowly)
- ➢ Somnolence, coma
- ➢ With cerebral/intracranial tuberculosis: headaches, late onset epilepsy
- ➢ Diagnosis:
  - o CSF examination (lymphocytosis, elevated protein)
  - o Cerebral tuberculosis: CT-scan

4.6.3. Tuberculosis in children

• Children under 5 years of age: greater risk than adults of developing tuberculosis after an infection

- Often associated with malnutrition, HIV, history of measles and whooping cough, poor nutritional status or smear-positive contact with pulmonary tuberculosis among family or friends

👁 Clinical manifestations:
- Often non-specific symptoms
- Suggestive of tuberculosis:
  - Cough longer than 2 weeks not responding to 10 days' course of antibiotics (e.g. amoxicillin or cotrimoxazole)
  - Continuous or recurrent fever of unknown origin
  - Failure to thrive, loss of weight or failure to gain weight
  - Enlarged non-tender lymph nodes > 1 cm in neck, axilla or groins of unknown origin persisting longer than 4 weeks
  - Gibbus of spine with or without paraplegia

✎ Diagnosis:
- Difficult to diagnose as younger children are not able to produce sputum
- In children > 10 years: direct smear microscopy for acid fast bacilli (AFB, Ziehl-Neelson staining) x 3
- In younger children: chest x-ray (?persistent area of consolidation, miliary pattern of infiltrates, effusion)
- Mantoux test with PPD (purified protein derivate):
  - Read after 72 hours.
  - < 5 mm: negative
  - 5-10 mm: in children < 5 years: result may be due to earlier BCG immunization, therefore unreliable
  - > 10 mm: positive
  - Indicated **only** for small children who are not able to produce sputum
  - Often negative in patients with low resistance (AIDS, measles, malnutrition etc.)
  - Reading should be done by the same person to get reliable results.

Treatment:

- Problem:
  - Lack of patient compliance as symptoms improve or because of side effects treatment is often stopped leading to the development of resistant strains.
  - More successful: DOTS (directly observed therapy short-course) where the course runs over 6 months and the drug intake is controlled by trained staff
- 2 phases for new patient:
  - Intensive phase: isoniazid/rifampicin/pyrazinamide/ethambutol or streptomycin for 2-3 months
  - Continuation phase: isoniazid/rifampicin for 4-6 months (2-3 times/ week)
- Refer to the local tuberculosis program, but remember: ill-functioning programs are worse than no programs at all because of selection of resistant bacteria and longer infective phases (more than 2 years) with risk of infecting close contacts.
- Pregnancy:
  - Avoid streptomycin.
  - Avoid rifampicin during the 1st trimester, but continue with regimen if already started.
  - No problem with INH, pyrazinamide and ethambutol
- Important: contact tracing (esp. for children < 5 years of age) and treatment of infected people

Prevention:

- BCG immunization after birth
- Information regarding cleanliness, hygiene, nutrition

4.6.4. Tuberculosis and AIDS

- The incidence of tuberculosis is increasing with the incidence of HIV infection.
- In Africa: one third of AIDS patients are infected with tuberculosis and 40% of patients with tuberculosis are HIV-positive.

- Tuberculosis during the **early stage of HIV**:
  - Usual clinical manifestations

- PPD/Mantoux test positive
- Chest x-ray: upper lobes affected, cavities
- Rarely adenopathy
- Extrapulmonary Tb in 10-15%

- Tuberculosis during the **late stage of HIV**:
  - PPD/Mantoux test negative
  - Chest x-ray: atypical, lesions in the lower and middle lobe, no cavities
  - Adenopathy common
  - Extrapulmonary Tb in more than 50%

- Duration of treatment: 9 months (instead of 6 months)
- BCG immunization: contraindicated in patients with full picture of HIV infection (controversial guidelines regarding asymptomatic HIV-positive patients)

Important to remember:

- All patients with cough lasting longer than 2 weeks **must** have their sputum checked for acid-fast bacilli.
- Patients with extrapulmonary tuberculosis **must** be investigated for pulmonary tuberculosis (sputum AFB).
- Fine-needle aspiration should be done on all swollen lymph nodes not responding to a 10 days' course of antibiotics.
- Always think of tuberculosis of spine or bones in patients with chronic effusion of joints, fistula formation or progressive destruction of a single large joint.
- Think of abdominal tuberculosis in patients with ascites of unknown origin.
- Treatment for tuberculosis should **only** be started and supervised by trained staff according to a National Tuberculosis Program.

5. GASTROINTESTINAL PROBLEMS

5.1. Gastritis

Causative agents:

- Bacterial (Helicobacter pylori, 80-90%)
- Non-steroidal antiinflammatory drugs (NSAIDs, 7-15%)
- Autoimmune (Vit. B_{12} deficiency, 3-6%)

Clinical manifestations:

- Epigastric pain, nausea, vomiting
- Complications:
  - Bleeding (history of haematemesis or melaena; tachycardia, hypotension)
  - Perforation (severe pain, guarding)

Differential diagnosis:

- In developing countries: mainly intestinal parasites (giardia lamblia, helminths)
- Think of hunger pains!
- Also: reflux oesophagitis, pancreatitis, disease of liver, gallbladder or large bowel, myocardial infarction (posterior wall)

Note:

*In our projects diagnostic procedures e.g. endoscopy are only **indicated in rare cases**; treatment should therefore be given when diagnosis is suspected.*

Treatment:

- Advice to avoid carbonated drinks, hot spicy food, alcohol, cigarettes, acetylsalicylic acid, NSAIDs
- Antacids:
  - Magnesium trisilicate qid prn (1-2 hours after meals and 1 hour before going to bed)

- Side effects: reduced absorption of other drugs; risk of accumulation with renal impairment
- H_2 blocker:
  - Ranitidine: adults: 150 mg bid or 300 mg nocte

Helicobacter pylori:

- Important cause of gastric or duodenal ulcer

- Problems in developing countries:
  - Few data exist about eradication and relapse rate.
  - Diagnostic methods e.g. endoscopic biopsies for histology, serology or breath tests are not available in our setting.
  - Substitution of clarithromycin is difficult, substitution of proton pump inhibitor with H_2 blockers poorly investigated.
  - Risk of drug resistance due to inadequate treatment
  - Poor compliance with multiple drug regimens (adverse effects occur in up to 80%)

Note:

In our projects eradication of Helicobacter pylori can only be considered in indigent patients with a diagnosis of bleeding ulcer or perforation, with recurrent gastric or duodenal ulcer if an operation can be avoided.


Treatment:

- French triple therapy (for 7 days):
  - Amoxicillin 1 g bid **plus**
  - Clarithromycin 500 mg bid **plus**
  - Omeprazole 20 mg bid
- Second choice: Italian triple therapy (for 7 days):
  - Metronidazole 400 mg bid **plus**
  - Clarithromycin 250 mg bid **plus**
  - Omeprazole 20 mg bid

This treatment should be restricted to patients with severe illness because of costly medication and risk of poor compliance.

5.2. Hepatitis

5.2.1. Hepatitis A

- Common in developing countries due to poor housing and living conditions, lack of proper disposal of rubbish and poor standards of sanitation and hygiene
- Transmission: faecal-oral route
- Mainly children affected, asymptomatic in 50-90%; adults: fulminant forms possible

5.2.2. Hepatitis B

- Transmission: parenteral route (blood and blood products, IV-drugs), sexual intercourse (65%), mother-to-child transmission
- Worldwide: prevalence 6%
- HbsAg prevalence: Philippines, Kenya: 5-10%; India, Bangladesh, South America: 1-5%
- In 5-10%: chronic infection
- Self-limiting in 90% of adult patients (children: less than 10%); chronic hepatitis in 5%
- Main cause for development of hepatocellular carcinoma worldwide
- WHO: Hepatitis B vaccination recommended as part of the ”Expanded Program on Immunization”

5.2.3. Hepatitis C

- Transmission: parenteral route (e.g. shared needles in drug users, multiple use of needles for medical purposes), rarely with sexual intercourse
- Worldwide: 3% prevalence
- Mainly asymptomatic forms
- Chronic hepatitis in 50% of patients (20% of patients: cirrhosis of the liver with 1% developing liver cell carcinoma)

5.2.4. Hepatitis D

- Transmission: parenteral route with blood and blood products, sexual intercourse
- Only in patients with hepatitis B or as superinfection in chronic HbsAg carriers

5.2.5. Hepatitis E

- Transmission: faecal-oral route, possible: zoonotic spread (virus found in cows, pigs, goat and other animals)
- Severe illness in pregnant women: mortality: 20% when infection occurs in the third trimester

Common aspects:

Clinical manifestations:
- Common: asymptomatic form or mild jaundice
- Symptomatic:
  - Weakness, fever
  - Nausea, upper abdominal pain, jaundice
  - Dark urine, clay coloured stools
  - Severe forms with liver failure possible with hepatitis A, B or hepatitis E

Differential diagnosis:
- Important because of therapeutic consequences
- Malaria
- Gallstones, cholangitis, blocked bile ducts due to ascaris, schistosomiasis

Diagnosis:
- Not indicated as there are no therapeutic consequences (interferon or ribaverin too expensive in our setting)

Treatment:
- Bed rest
- Supportive treatment e.g. hydration, nutritious diet
- Antipyretics and analgesics are contraindicated in the acute phase due to risk of side effects.

☂ Prevention:
- Every pregnant mother should be tested for HbsAg, either by us or at the official antenatal check up so that babies can be immunized straight after birth when possible.
- Good hygiene (sanitary conditions, safe disposal of faeces)
- Once – only use of sterile needles
- Avoidance of application of IV- or IM-medication where oral medicine is effective

5.3. Diarrhoea

- Each year there are 2.5 million deaths from diarrhoea.

Treat early – delay is dangerous.

- Definition of diarrhoea: 3 or more watery stools/day
- This definition is not useful in children: better ask mother for change of bowel habits (e.g. watery stool, 3 times/day instead of 3 times/week); breast-fed children tend to have loose motions anyway.
- Persistent diarrhoea: duration longer than 14 days

? Questions to ask:
- Fever present?
- Blood in stool?
- Duration of symptoms?
- Any other symptoms (e.g. vomiting, cough, ear ache, convulsions)?
- Preexisting illness (measles recently)?
- Concurrent medication? Immunizations?
- Fluid intake sufficient?
- Malnutrition? (children: Road to Health Chart or MUAC)


Clinical examination:
- Signs and symptoms of dehydration?
  - ?Child restless, lethargic or unconscious
  - Skin turgor (?dry)
  - Nutritional status (?malnutrition)
- Check temperature.

⚖ Differential diagnosis:

Diarrhoea with fever and blood:
- Shigellosis
- Campylobacter enterocolitis
- Salmonella enterocolitis
- E. coli haemorrhagic colitis (EHEC)

Diarrhoea with fever, without blood:
- Salmonella enteritis
- Campylobacter enteritis
- Malaria
- E. coli enteritis (EPEC)
- Typhoid fever
- Extraintestinal causes, esp. in children

Diarrhoea without fever, with blood:
- Amoebic dysentery
- Schistosomiasis
- Trichuris (severe infection)

Diarrhoea without fever, without blood:
- Viral infections e.g. rotavirus in children
- Food poisoning e.g. by Staphylococcus aureus, Clostridium perfringens
- Traveller's diarrhoea (E. coli - ETEC)
- Giardiasis (persistent diarrhoea)
- Cholera

5.3.1. Diarrhoea with fever and blood

5.3.1.1. Shigellosis

- Endemic in most developing countries
- Most common cause of bloody diarrhoea worldwide

Causative agents:

- Mainly shigella dysenteriae, shigella flexneri

Transmission:

- Person-to-person
- Infection acquired by ingestion of contaminated water or food

Clinical manifestations:

- Most common in children under 5 years of age
- Acute onset: fever (common), malaise
- Abdominal cramps
- Bloody mucoid diarrhoea, anorexia
- Complications:
  - Dehydration
  - Convulsions
  - Perforation of bowel
  - Haemolytic uraemic syndrome

Diagnosis:

- Faecal or rectal swabs

Laboratory findings:

- Low sodium
- Low blood glucose

Treatment:

- Rehydration (see chapter *Dehydration,* p.89)
- World-wide resistance to antibiotics, therefore use only in severe cases.
- Treatment should ideally be based on susceptibility data from shigella strains isolated in the area.
- Older antibiotics often won't work, therefore use 5-fluoroquinolones e.g. ciprofloxacin:
  - Adults: 500 mg bid
  - Children: 30-40 mg/kg in 2 divided doses; not officially recommended as yet (risk of cartilage damage) but use if benefit outweighs risk.
  - Duration of treatment: 5 days

- Supportive (for pain, fever):
  - Hyoscine butylbromide:
    - Children 6-12 years: 10 mg tid prn
    - Children > 12 years, adults: 10-20 mg tid prn
  - Paracetamol:
    - Children: 30 mg/kg in 3-4 divided doses prn
    - Adults: 500 mg qid prn

5.3.1.2. Campylobacter enterocolitis


Causative agent:
- Campylobacter jejuni


Transmission:
- Faecal-oral, human-to-human, animal-to-human (e.g. from infected poultry)
- Infection also acquired by ingestion of contaminated food, water


Clinical manifestations:
- Most common under the age of 1 year
- Often watery diarrhoea, abdominal pain, vomiting
- Also (in immuno-compromised patients): severe bloody diarrhoea with fever
- May be followed by reactive arthritis.
- Predisposing factor for development of Guillain-Barré syndrome
- Usually self-limiting (2-7 days)


Treatment:
- Rehydration
- Antibiotic treatment: give only in severe cases; problem: worldwide resistance emerging due to use of macrolides and especially quinolones in the poultry industry.
  - Erythromycin:
    - Children: 50 mg/kg in 3 divided doses
    - Adults: 500 mg qid
  - Ciprofloxacin:
    - Adults: 500 mg bid

- Children: 30-40 mg/kg in 2 divided doses; not officially recommended as yet (risk of cartilage damage) but use as second line agent if benefit outweighs the risk.
- Duration of treatment: 5 days

5.3.2. Diarrhoea with fever, without blood

5.3.2.1. Salmonella enteritis

Causative agent:
- Salmonella species

Transmission:
- Faecal-oral
- Infection acquired by eating contaminated food

Clinical manifestations:
- Incubation period 12-48 hours
- Fever, headache, vomiting
- Diarrhoea first watery, later with blood and mucus (salmonella entero-colitis)
- Abdominal cramps
- Complications:
  - Generalized bacteraemia with typhoid-like symptoms
  - Reactive arthropathy
  - Iridocyclitis

Diagnosis:
- Isolation of bacteria from stool

Treatment:
- Usually self-limiting
- Rehydration
- Antibiotic therapy: problematic due to resistant organisms and risk of prolonging the intestinal carriage of salmonella, therefore use only in severe cases:
  - Amoxicillin:
    - Children: 50 mg/kg in 3 divided doses

- Adults: 500-1000 mg tid
- Cotrimoxazole:
  - Children: 8 mg/kg TMP + 40 mg SMZ in 2 divided doses
  - Adults: 960 mg (160 mg TMP + 800 mg SMZ) bid
- Older antibiotics often won't work, therefore use 5-fluoro-quinolones e.g. ciprofloxacin according to local information:
  - Adults: 500 mg bid
  - Children: 30-40 mg/kg in 2 divided doses; not officially recommended as yet (risk of cartilage damage), but use if benefit outweighs the risk.
- Duration of treatment: 5 days

5.3.2.2. Typhoid fever

- Illness can be endemic worldwide

Causative agent:
- Salmonella typhi

Transmission:
- Human-to-human (asymptomatic carriers)
- Infection by ingestion of contaminated water or food

Clinical manifestations:
- Incubation period 10-20 days
- Duration of untreated illness: about 4 weeks
- 1st week:
  - Non-specific symptoms:
    - Headache
    - Constipation, diarrhoea
    - Cough
    - Remittent fever (increasing day by day, temperature spike in the evening)
    - Relative bradycardia
- Later:
  - Very unwell:
    - Abdominal pain, diarrhoea (like "pea-soup")
    - Hepatosplenomegaly

- Altered mental state, meningitis, deafness
- Rose spots (fade on pressure; difficult to distinguish in dark skin)
- Complications:
  - Perforation or haemorrhage of the bowel
  - Myocarditis, pneumonia,
  - Haemolytic uraemic syndrome
  - Disseminated intravascular coagulation

⚖ Differential diagnosis:
- Malaria
- Dengue fever

✎ Diagnosis:
- Consider endemic areas.
- Clinical manifestations – as there is no reliable test for typhoid fever treat if disease is suspected.
- FBC (leukopenia, leucocytosis)
- Blood culture, stool sample
- Widal test (test for antibodies; not available in every project):
  - Always check for fourfold increase in antibody titres and consider the clinical manifestations!
  - Problems: antibody titres can be high after infections with other salmonellae or after immunization; some patients show no antibodies or no rise in antibody titres.


Treatment:
- Rehydration
- Antibiotics:
  - Treat according to known susceptibility of bacteria in the area.
  - Chloramphenicol:
    - Problem: drug resistance, high relapse rate, risk of carrier status
    - Children: 75 mg/kg in 4 divided doses
    - Adults: 1000 mg tid
    - Duration of treatment: 14 days
  - Amoxicillin:
    - Children: 100 mg/kg in 3 divided doses

- Adults: 500-1000 mg tid
- Duration of treatment: 14 days

- Cotrimoxazole:
  - Children: 8 mg/kg TMP + 40 mg SMZ in 2 divided doses
  - Adults: 960 mg (160 mg TMP + 800 mg SMZ) bid
  - Duration of treatment: 14 days
- 5-fluoroquinolones e.g. ciprofloxacin:
  - Adults: 500 mg bid
  - Children: 30-40 mg/kg in 2 divided doses; not officially recommended as yet (risk of cartilage damage) but use as second line agent if benefit outweighs the risk.
  - Duration of treatment: 5-7 days
  - In areas with possible bacterial resistance give for 14 days.

- Corticosteroids:
  - For patients with severe illness or confusion
  - Dexamethasone IV: 3 mg/kg over 30 minutes, then 1 mg/kg over 6 hours
- Refer to hospital if illness is severe.
- Chronic carriers (1-3%) should be treated if they are at risk of spreading the disease (e.g. food handlers).

5.3.2.3. Extraintestinal infections in children

- Always examine children with fever and diarrhoea thoroughly.
- Check for tonsillitis, otitis media, pneumonia, urinary tract infection, measles, especially if persistent diarrhoea (lasting longer than 14 days).
- Always think of malaria!
- Treatment according to diagnosis and degree of dehydration (see Treatment plans A, B, C, p.90, 91, 92)

5.3.3. Diarrhoea without fever, with blood

5.3.3.1. Amoebiasis

Causative agent:
- Entamoeba histolytica

 Transmission:

- Faecal-oral
- Infection acquired by swallowing cysts in contaminated water.
- Worldwide distribution; mainly in countries with poor sanitation when human faeces are used as fertilizers

 Clinical manifestations:

- Mainly asymptomatic carriers of cysts (90%)
- Amoebic dysentery:
  - Slow onset; diarrhoea with blood and mucus; abdominal cramps; lasting for several weeks
  - Abdominal tenderness
  - Occasionally fever
  - Attacks can recur for years.
- Amoebic liver abscess:
  - Most common form of extraintestinal manifestation
  - Pain and tenderness over the liver
  - Hepatomegaly
  - Intermittent fever with rigors and sweating
  - Cough with lung involvement
  - Dyspnoea with anaemia

 Diagnosis:

- Amoebic dysentery: microscopic examination of stool smear (freshly passed specimen) for trophozoites
- Amoebic liver abscess: ultrasound scan, FBC (leucocytosis, anaemia)

 Treatment:

- Amoebic dysentery:
  - Rehydration
  - Treatment only after ineffective treatment for shigellosis
  - If amoebiasis is suspected give antibiotics straight away (do not wait for faecal analysis).
  - Metronidazole:
    - Children < 12 years: 30 mg/kg PO in 3 divided doses (severe cases: 50 mg/kg)
    - Adults: 500 mg PO tid
    - Duration of treatment: 7 days

- > IV: same dosage
- > Inform patient to avoid alcohol.
- o No treatment necessary for asymptomatic patients with cysts on faecal analysis
- o Tinidazol (infection with resistant amoebae):
  - > Advantage: longer half-life, shorter duration of treatment
  - > Children > 6 years: 50-60 mg/kg od
  - > Adults: 2 g od
  - > Duration of treatment: 5 days

- ➢ Amoebic liver abscess:
  - o Treatment for 10 days sufficient
  - o During treatment: abscess may first increase in size
  - o Even with correct treatment: abscess can take up to 6 months to disappear.
  - o Treatment with diloxanide: not an option for our projects because of high percentage of asymptomatic carriers and high re-infection rate

5.3.4. Diarrhoea without fever, without blood

5.3.4.1. Traveller's diarrhoea

Causative agent:
- ➢ Enterotoxicogenic E. coli (ETEC)

Transmission:
- ➢ Faecal-oral
- ➢ Infection acquired by ingestion of contaminated food or water

Clinical manifestations:
- ➢ Self limiting; conferring longer lasting immunity (therefore visitors are more susceptible than residents)
- ➢ Watery diarrhoea, vomiting, anorexia
- ➢ Dehydration in malnourished children

Treatment:
- ➢ Fluid replacement

- Antibiotics:
  - Resistance widespread
  - For severe illness: ciprofloxacin 500 mg bid for 1-5 days

5.3.4.2. Cholera

Causative agent:
- Vibrio cholerae

Transmission:
- Faecal-oral
- Infection acquired by ingestion of contaminated water or food
- Usually panepidemic; in areas with poor sanitation and hygiene

Clinical manifestations:
- Incubation period 2 hours to 5 days
- Profuse watery stools with mucus (rice water stools) leading to severe dehydration
- Vomiting
- Death due to hypovolaemic shock and renal failure

Treatment:
- Treat if diagnosis is suspected.
- Rehydration as quickly as possible e.g. with Ringer's Lactate solution (see *Dehydration,* p.89)
- Antibiotics:
  - Doxycycline:
    - Adults only: 300 mg single dose
  - Cotrimoxazole:
    - Children 8 mg/kg TMP + 40 mg SMZ in 2 divided doses
    - Adults: 960 mg (160 mg TMP + 800 mg SMZ) bid
    - Duration of treatment: 3 days

5.3.4.3. Giardiasis

Causative agent:
- Giardia intestinalis (Giardia lamblia)

 Transmission:

- Faecal-oral: infection acquired by swallowing cysts in contaminated water or food
- Human-to-human

 Clinical manifestations:

- Often: asymptomatic carrier state
- Diarrhoea, often for weeks, frothy, pale, offensive; with flatus
- Nausea, abdominal cramps
- Weight loss, often with malabsorption
- Failure to thrive in young children
- Secondary lactase deficiency

 Diagnosis:

- Cysts in stool smear
- Trophozoites in freshly passed specimen

 Treatment:

- Rehydration
- Metronidazole:
  - Children < 12 years: 30 mg/kg in 3 divided doses over 3 days (short course) or 15 mg/kg in 3 divided doses for 7 days
  - Adults: 800 mg bid for 3 days (short course) or 200 mg tid for 7 days
  - Inform patients to avoid alcohol.
- Albendazole:
  - Adults: 400 mg od for 5 days
- Tinidazole (infection with resistant parasites):
  - Advantage: longer half-life, short duration of treatment
  - Children ≥ 6 years: 50-60 mg/kg od
  - Adults: 2 g od
  - Duration of treatment: 2 days

Important to remember:

- ***Even if the causative agent is not known (no stool culture available) it is important to have some idea what you are treating!***

- When treating diarrhoea always think of rehydration first (see chapter *Dehydration*, p.89).
- Do not use antibiotics routinely! They are often not necessary in the treatment of diarrhoea, have the risk of adverse reactions and development of resistant bacteria.
- There is wide-spread resistance to amoxicillin and co-trimoxazole, therefore use ciprofloxacin if appropriate in severe diarrhoea. Always check with the project information.
- Do not forget to treat underlying diseases.

- *Bloody diarrhoea in children: with fever think of shigellosis first, without fever: think of amoebiasis first; then consider other causes. If amoebiasis is suspected use metronidazole.*

- *With severe diarrhoea always give zinc 20 mg/day for 14 days to children > 6 months (10 mg/day for infants < 6 months) as it has been shown to reduce the severity and duration of diarrhoea.*

- *Avoid antimotility drugs like loperamide (Imodium®), antisecretory drugs like kaolin or charcoal and antiemetics*: *rehydration is far more important and they are contraindicated for children under 5 years of age anyway.*

- Give advice regarding feeding to correct or prevent malnutrition.
- Give advice regarding prevention of diarrhoea: breastfeeding, good personal hygiene (e.g. washing hands with soap before eating), sanitation (e.g. safe disposal of faeces), safe drinking water, safe handling of food.
- Advice to prevent traveller's diarrhoea: cook it, boil it, peel it or leave it.

- *Do not forget to encourage immunizations e.g. against measles.*

Treatment suggestions:

Diarrhoea with fever and blood:

First think of ***shigellosis***; treatment: ***ciprofloxacin*** + ***ORS.***

Diarrhoea with fever, without blood:

Very important: ***differential diagnosis*** and treat accordingly (including **ORS**).

Diarrhoea with blood, without fever:

First think of ***amoebiasis***; treatment: ***metronidazole*** + ***ORS.***

Diarrhoea without fever, without blood:

First think ***viral infection*** or ***uncomplicated*** *E. coli-infections*: treat with ***ORS.***

5.4. Dehydration

Delay is dangerous!

- Mainly caused by diarrhoea and/ or vomiting
- Main problem in children < 5 years as there is relatively greater fluid loss through the skin
- Treatment with oral rehydration solution: sugar increases the absorption of water; therefore it is important to add sugar to electrolyte solution.
- Zinc, an important micronutrient for a child's health, is lost during diarrhoea. Studies have shown that treatment with zinc shortens the severity and duration of diarrhoea. It is therefore important to give zinc to all children with severe diarrhoea.

 Clinical manifestations (assessment of dehydration; WHO):

Degree of dehy-dration	**Loss of body weight**	**Condition**	**Eyes**	**Thirst**	**Skin pinch**	**Other signs**
None or minimal	< 5%	Alert	Normal	None	Goes back immediately	
Moderate (some)	5-10%	Restless, irritable	Sunken	Drinks eagerly, very thirsty	Goes back slowly	Sunken fontanelle, tachypnea, tachycardia, decreased urine output
Severe	> 10%	Lethargic, unconscious	Sunken	Unable to drink or drinks poorly	Goes back very slowly (≥ 2 seconds)	Hypotension, very dry mouth, anuria, circulatory failure

 Treatment (according to WHO):

None or minimal dehydration (< 5%):

- Outpatient treatment (**Treatment plan A**):

- Give as much fluid as the patient will take.
  - Breastfed children: continue breast feeding; feed frequently and for longer periods; add ORS or plain water.
  - Non-exclusively breastfed children: give ORS, clean water or food-based fluids (e.g. soup, rice water, yoghurt drinks, juice of young coconut).
- Rehydration:
  - Oral rehydration solution (ORS): for children up to 2 years: 50-100 mL after each loose stool; for children 2-10 years: 100-200 mL after each loose stool, children > 10 years: as much as tolerated
  - ORS to be given at home: children up to 2 years: 500 mL/day, children 2-10 years: 1 litre/day, children > 10 years: 2 litres/day
  - If child vomits, wait for 10 minutes then give ORS more slowly e.g. 1 spoonful every 2-3 minutes.
  - Always explain the mother how to prepare and use ORS.
  - Continue treatment until diarrhoea stops.
- Zinc supplement: infants below 6 months: 10 mg/day, children 6 months to 5 years: 20 mg/day; give for 10 to 14 days.
- Nutrition: for older children or adults carry on with food (nutritious, easily digestible e.g. cereal, meat, fish, fresh fruit juice, mashed banana); small amounts in frequent intervals; after illness: one additional meal daily for 2 weeks
- Explain to mother to come back or go to hospital if there is no improvement within three days or deterioration at any time, fever or blood in the stools.

If ORS is not available teach the mother how to prepare a rehydration drink: 1 litre of boiled water, 1 level teaspoon of salt, 8 level teaspoons of sugar.

Moderate (some) dehydration (5-10%):

- Oral rehydration (**Treatment plan B**):
  - Within the **first 4 hours** of treatment give ORS according to weight or age:

Age:	**weight (kg):**	**ORS (mL)**
< 4 months	< 5	200-400
4-11 months	5-8	400-600
12-23 months	8-11	600-800
2-4 years	11-16	800-1200
5-14 years	16-30	1200-2200
> 14 years	> 30	2200-4000

  - Initially (when dehydrated) adults can take up to 750 mL of ORS/hour, children up to 20 mL/kg/hour.
  - Encourage the mother to continue breastfeeding; for non-breastfed infants < 6 months give an additional 100-200 mL of clean water during the first 4 hours.
  - Give ORS in small amounts (use teaspoon for smaller children, cup for bigger children); if vomiting wait for 10 minutes then continue more slowly.
  - If patient wants more water than recommended above give more.
  - If the child's eyelids become oedematous stop ORS, give plain water or breast milk and treat as plan A (no dehydration) after oedema has stopped.
  - Check regularly to see if there are any problems.
- Reassess after 4 hours checking for signs of dehydration and treat accordingly (plan A, B or C):
  - If there is no dehydration (child less irritable, passing urine) start plan A.
  - If there are signs of some dehydration repeat plan B and start to offer food, milk or juice according to plan A.
  - If there are signs of severe dehydration start IVI and treat for plan C.
- Maintenance therapy (in addition to rehydration therapy):
  - Breastfed infants: mothers should continue breastfeeding as much and as long as the child wants.

- Non-breastfed infants: give additional 100-200 mL of plain water during the rehydration period, afterwards give fluids normally taken by the child (e.g. formula feeds, water etc.).
- Older children, adults: give as much fluids, e.g. water, juice, milk etc. as wanted and tolerated.

- Feeding:
  - During first 4 hours of rehydration do not give any food except breast milk.
  - After 4 hours if the child has still some dehydration and ORS is being given start food and give every 3-4 hours.
- If the mother leaves the clinic before the end of the rehydration period:
  - Explain to mother about the treatment and how to much ORS to give to finish initial 4-hour treatment period.
  - Give enough ORS for the completion of rehydration and 3 more days according to treatment plan A.
  - Explain to give ORS until diarrhoea stops, to give more food to prevent malnutrition and to bring the patient to hospital or clinic straight away if there is no improvement or deterioration.
  - All children older than 4-6 months should be given some food before being sent home.
- Give zinc supplements: infants < 6 months: 10 mg/day, children from 6 months to 5 years: 20 mg/day for 10 to 14 days.

Severe dehydration (> 10%):

- IV rehydration (**Treatment plan C**):

- Admit to hospital for IV rehydration (e.g. with Ringer's Lactate solution).
  - Start IVI immediately:
    - Infants (< 12 months): 30 mL/kg in 1 hour (can be repeated once if radial pulse is still very weak or not detectable), then 70 mL/kg in 5 hours
    - Children ≥ 12 months, adults: 30 mL/kg in 30 min (can be repeated once if radial pulse is still very weak or not detectable), then 70 mL/kg in 2 ½ hours
  - Reassess every 15-30 minutes until strong radial pulse is present, then every 1-2 hours; if no improvement give fluids more rapidly.
  - Give ORS (5 mL/kg/hour) as soon as the child will take fluids.

- If the parents refuse to take the child to hospital or transport is not readily available: evaluate patient after 3 hours (older child, adult) or 6 hours (infant < 6 months) using assessment chart (see above) and treat accordingly (treatment plan A, B or C).

6. MALNUTRITION AND MICRONUTRIENT DEFICIENCIES

6.1. Malnutrition

- In developing countries the most common nutritional problems are caused by lack of protein and energy, fats, vitamins, minerals, iron and iodine (due to lack of food, problems with absorption and metabolization).
- Underlying causes: poverty, inappropriate food, poor weaning practice; also infections such as diarrhoea, pulmonary tuberculosis, measles, malaria, worms, or diseases like tuberculosis or HIV
- Differential diagnosis: failure to thrive (think of underlying diseases e.g. heart failure or other chronic illnesses)
- Often the second youngest child affected: after being weaned there is not enough food rich in protein or the baby is reared on diluted contaminated milk (due to poverty of the parents not enough formula milk available, lack of cleanliness).

Clinical manifestations:

	Marasmus	**Kwashiorkor**
Cause	Diet low in proteins and calories	Diet low in proteins but containing carbohydrates
Clinical manifestations	Growth retardation < 60% of normal	Growth failure
	Loss of subcutaneous fat, loss of muscles, severe wasting	Muscle wasting
	Old man's face	Moon face
	No oedema	Pitting oedema of dependent areas, esp. lower legs, feet, ankles
	No mental signs	Psychomotor changes, e.g. apathy
	No hair changes	Hair changes e.g. sparse hair, dyspigmentation
		Hepatomegaly
Laboratory findings	Serum albumin normal	Serum albumin low
Age peak	< 18 months	18-36 months

Note:

- *Oedema can conceal the fact that the child is undernourished and vitally threatened. There is a risk of overlooking malnutrition if only the weight of the child is measured.*
- *A child with oedema of both feet is malnourished (regardless of weight) until proven otherwise.*
- *Oedema must be recorded in the Road to Health Chart!*

- Criteria for assessing the nutritional status:
  - Birth weight
  - Weight-for-age
  - Weight-for-height
  - Mid-Upper Arm Circumference (MUAC)

- Road to Health Chart:
  - Standard for weight-over-age in percentiles:
    - Tool for monitoring growth development and for early detection of children at risk of malnutrition and severe illness
    - Body weight related to that of children of same age
    - 3 percentiles: 97^{th} , 50^{th}, 3^{rd} percentile
    - Body weight in 3^{rd} percentile: 3% of children of the same age weigh less, 97% weigh more
  - Important:
    - Assessment of child development through monitoring of weight progression
  - Danger signs:
    - Children below the 3^{rd} percentile
    - Declining weight curve

- Mid-Upper Arm Circumference:
  - Correlating with weight of children below 5 years of age
  - Rapid assessment tool for screening
  - Checked on middle of hanging upper arm with tape measure
  - Danger signs:
    - MUAC 12.5-13.0 cm: must be monitored closely
    - MUAC 11.5-12.5 cm: moderately undernourished
    - MUAC below 11.5 cm: severely malnourished

Important to remember:

- At **every** consultation children under the age of 5 years **must** be weighed and the results recorded in the Road to Health Chart.
- Any child with weight below the 3rd percentile is probably underweight.
- Declining weight curves are a sign that the child is at risk; weight falling below the 3rd percentile is cause for alarm.
- In undernourished patients the MUAC should be checked too: MUAC below 11.5 cm indicates severe malnutrition.

Treatment:

- Appropriate diet:
  - Food advice
  - Monitoring of weight-for-height in feeding centers, hospital or during consultation hours
- Admission of children with marasmus and kwashiorkor to hospital for intensive therapy
  - Admission criteria:
    - Weight-for-height < 70% of median
    - Bilateral lower limb oedema
    - MUAC < 11.5 cm
    - Presence of infection, seriously ill child
  - Discharge criteria:
    - Weight-for-height ≥ 85% of median
    - Weight increase
    - Improvement of overall condition
    - Disappearance of lower limb oedema
- Treatment of concomitant infections
- Emotional support

Prevention in developing countries (WHO):

- Exclusive breastfeeding during the first 6 months of life
- Slow introduction of solids in addition to breast milk after 6 months
- Breastfeeding in addition to solids during the first 2 years of life
- Own plate for each child, not sharing with siblings or mother
- Support through health worker

6.2. Micronutrient Deficiencies

6.2.1. Vitamin D deficiency (rickets, osteomalacia)

- Common in areas where children and women are not exposed to sufficient sunlight for cultural and social reasons
- Most common in infants (due to vitamin D deficiency of mother and low amounts of vitamin D in breast milk) and young children
- Can also be caused by renal failure, liver cirrhosis, and epilepsy treatment (e.g. carbamazepine, phenytoin, phenobarbital).

6.2.1.1. Rickets

Clinical manifestations:
- Developing within the first 2 years of life
- Often asymptomatic or nonspecific symptoms like tiredness and aches
- Pain in bones, mainly legs
- Muscle weakness, tremor, unsteady gait
- Swollen epiphysis at wrists, ankles and costochondral junction (rickety rosary), flattened chest (pigeon chest), deformities of legs (bow legs), softening of the skull (craniotabes)
- If severe illness: hypocalcaemia leading to muscle spasm (cramps), laryngeal stridor and seizures

Diagnosis:
- History, clinical manifestations
- Only in rare cases: further investigations necessary e.g.:
  - X-ray of wrist: line of osteochondral calcification of radius and ulna broadened, surface cupped and frayed; for confirmation of diagnosis
  - Fasting serum calcium may be low.
  - Serum phosphatase (low), alkaline phosphatase (raised)

Treatment:
- Vitamin D + Calcium:
  - Vigantol® oil (Colcalciferol) PO:
    - 1 mL = 30 drops containing 0.5 mg or 20.000 IU Vit. D3
    - Give 7 drops (6000 IU) od **PO**

- > **Plus** calcium 1000 mg od **PO**
- > Duration of treatment: 6 weeks
- > Reversal of biochemical changes seen after 6 weeks; bones take longer to adjust.

- o Arachitol® IM:
  - > 1 mL = 7.5 mg or 300 000 IU Vit. D3 in oily base
  - > Give 300 000 IU single dose **IM**; repeat dose of vitamin D3 300 000 IU **IM** after 3 months.
  - > **Plus** calcium 1000 mg od **PO** for 4 weeks

- Education regarding exposure to sunlight and food rich in Vit. D e.g. eggs
- Check for underlying causes and treat accordingly.

6.2.1.2. Osteomalacia

Clinical manifestations:
- Mainly in women
- Symptoms often during late pregnancy or after delivery
- Bone pain (ribs, legs), softened bones with risk of fractures
- Unsteady gait
- Hypocalcaemia leading to cramps
- Anaemia

Differential diagnosis:
- Tuberculosis of spine

Diagnosis:
- History (?young Muslim women, medication)
- X-ray: uncalcified osteoid tissue at growing ends of bone, fractures
- Serum phosphatase (low), alkaline phosphatase (raised)
- Investigations according to possible underlying causes

Treatment:
- Arachitol® IM:
  - o Vit D3 300 000 IU Vit. D3 single dose **IM,** repeat dose after 3 months
- **Plus** calcium: 1000 mg od **PO** for 4 weeks
- If severely ill: refer to hospital

☂ Prevention:
- Exposure to sunlight
- Food rich in Vit. D e.g. eggs

6.2.2. Vitamin A deficiency

- Mainly in children and pregnant women of rice-eating families in South Asia, South-East Asia
- Reduced incidence in coastal areas (consumption of red palm oil high in carotenes)
- Most common cause of blindness in childhood in endemic areas
- Often manifestation of underlying deficiency with severe infections e.g. measles

👁 Clinical manifestations:
- Xerophthalmia, including:
  - Night blindness (first evidence)
  - Conjunctival xerosis: conjunctiva dry, wrinkled; Bitot's spots (usually bilateral; looking like foam, can be wiped off)
  - Corneal xerosis: dry cornea, corneal ulcers
  - Keratomalacia: perforation of cornea, prolapse of iris, destruction of the eye


Treatment:
- Vitamin A:
  - Children 6 to 12 months: 100 000 units day 1, 2 and 8
  - Children > 1 year, adults (excluding women of childbearing age, pregnant women): 200 000 units day 1, 2 and 8
- With corneal involvement: chloramphenicol eye drops tid for 7-10 days
- Refer to specialist (EENT) in case of keratitis.
- Treat concomitant diseases.

⊙ Prophylaxis:
- WHO recommendations for high-risk areas (insufficient intake of vitamin A with food):
  - Children 6 to 12 months: 100 000 IU stat, **then**
  - Children > 1 year: 200 000 IU every 6 months

- Pregnant women: 25 000 IU every week **after** 3rd month of pregnancy
- Mothers: 200 000 IU within 1 month of delivery of a child
- Infants < 6 months: 50 000 IU single dose if they are not breastfed or if they are breastfed and the mother did not receive supplemental vitamin A

Important to remember:

- Do not give high dose vitamin A prophylaxis to women of child bearing age (risk of malformations of fetus).
- Give vitamin A to children with measles (see chapter *Measles,* p.128) to reduce risk of blindness and mortality of the disease.

☂ Prevention:
- Education about diet rich in vitamin A such as yellow vegetables and fruits such as carrots, pumpkin, mango, red palm nuts, yellow corn/ maize, sweet potatoes, also dark green leafy vegetables, dairy products, fish liver oils, egg yolk

6.2.3. Iron deficiency

See chapter *Anaemia,* p.32

7. PARASITIC DISEASES

7.1. Helminthiasis

Most common helminths:

- Soil transmitted helminths (nematodes): enterobius vermicularis (pinworm, threadworm), trichuris trichiura (whipworm), ascaris lumbricoides (roundworm), ancylostoma duodenale (hookworm), strongyloides stercoralis
- Trematodes: schistosoma japonicum, mansoni, haematobium
- Cestodes: taenia saginata, taenia solium

7.1.1. Enterobius vermicularis (pinworm, threadworm)

- Common in children
- Often the whole family affected and people living in crowded conditions
- Size: 1 cm; colour: white


Transmission:

- Direct from anal or perianal region to mouth (under fingernails) or by soiled night clothes or bed linen
- Retroinfection possible: eggs hatch on the anal mucosa, larvae migrate up the bowel.


Life cycle:

- Eggs are ingested; worms invade the terminal ileum, caecum and appendix.
- Mature female deposits eggs near the anus.


Clinical manifestations:

- Mainly perianal pruritus (nocturnal, when female migrates to anus)
- Possible:
  - Right iliac fossa pain (DD: appendicitis)
  - Vulvitis (worm migrating up the vulva)
  - Non-specific symptoms like insomnia, loss of appetite, weight loss

✎ Diagnosis:
- Clinical manifestations

Treatment:
- Treat the whole family.
- Mixed infections with other worms possible
- Albendazole:
  - Children < 2 years: 200 mg single dose
  - Children > 2 years, adults: 400 mg single dose; avoid in pregnancy (first trimester).
- Mebendazole:
  - Children > 2 years, adults: 100 mg bid for 3 days
  - Repeat after 2 weeks; avoid in pregnancy (first trimester).

Prevention:
- Education about personal hygiene, short fingernails

7.1.2. Trichuris trichiura (whipworm)

- Most common in small children (dirtier habits; eating of dirt); in areas with warm, humid climate
- Often due to fertilizing fields (e.g. salad) with faeces
- Can be associated with entamoeba histolytica – , ascaris – or hookworm infections or shigellosis.
- Can lead to exacerbation of other parasitic infections.
- Size: 3-4.5 cm; colour: white or pink

Transmission:
- Ingestion of food contaminated with soil containing eggs of trichuris trichiura

Life cycle:
- Infective embryonated eggs are ingested, hatch in the intestine.
- Adult worms live in large bowel feeding on tissue juices.

Clinical manifestations:
- Most infections: asymptomatic
- In heavily infected patients:
  - Diarrhoea with blood; no fever
  - Right iliac fossa pain, epigastric pain, rectal prolapse
  - Iron deficiency anaemia
  - Growth retardation

Diagnosis:
- Eggs in faeces
- Clinical manifestations (rectal prolapse with worms)


Treatment:
- Mebendazole:
  - Children > 2 years, adults: 100 mg bid; avoid in pregnancy (first trimester)
- Albendazole:
  - Children < 2 years: 200 mg od
  - Children > 2 years, adults: 400 mg od; avoid in pregnancy (first trimester)
  - Less effective than mebendazole
- Duration of treatment: 3 days

Prevention:
- Safe disposal of human faeces (use of latrines)
- Advice regarding personal hygiene
- Education regarding careful washing of vegetables and fruit

7.1.3. Ascaris lumbricoides (roundworm)

- Most common in childhood (children > 2 years), less in adulthood
- Mainly in countries with poor sanitation
- Often co-infection with other parasitic diseases
- Size: 20-40 cm; pink or white

Transmission:
- Ingestion of water or food (raw vegetables, fruit) contaminated with eggs of A. lumbricoides
- Occasionally via inhalation of contaminated dust

Life cycle:
- Eggs are passed with faeces, mature in the soil, are ingested with infected food, hatch in the bowel as infective larvae.
- Larvae penetrate the bowel wall, migrate via blood stream to the lungs where they perforate the alveoli to get access to bronchi and trachea; they move up to the epiglottis and are swallowed.
- Mature worms live in the small intestine.

Clinical manifestations:
- Lungs:
  - Cough, wheeze, dyspnoea, pneumonia
  - Eosinophilia (on migration of larvae through the lungs)
  - Settling spontaneously
- Bowel:
  - Recurrent colic, distended abdomen
  - Occasionally signs of obstruction (due to high worm load, volvolus or intussusception) with severe infection
- With migrating worms:
  - Obstructive jaundice, appendicitis, pancreatitis (esp. after fever or anaesthetics)
  - Abscesses (e.g. in liver) or granulomas (peritoneum)
- Infection with ascaris can be a contributing factor to malnutrition and vitamin A deficiency.
- Partial immunity can be acquired.

Diagnosis:
- Eggs in faeces

Treatment:
- Albendazole:
  - Children < 2 years: 200 mg single dose
  - Children > 2 years, adults: 400 mg single dose; avoid in pregnancy (first trimester).

- Mebendazole:
  - Children > 2 years, adults: 100 mg bid; avoid in pregnancy (first trimester)
  - Duration of treatment: 3 days
- With signs of obstruction or acute abdomen: refer to hospital for surgical intervention.
- Pulmonary symptoms (self-limiting):
  - Treat with bronchodilators or oral steroids as required.
  - Anthelminthic therapy should preferably be given after settling of pulmonary symptoms (to avoid problems caused by dying larvae).

☂ Prevention:
- Education regarding hygiene e.g. washing hands before meals
- Advice to boil water before drinking

7.1.4. Ancylostoma duodenale (hookworm)

- High prevalence in Asia, Africa; Necator americanus predominant in Middle and South America, Africa, southern Asia
- Grows well in warm, humid climate (can also exist in Europe, e.g. in mines).
- Usually affected: adults e.g. farmers who defecate on the fields; also children affected in areas with poor sanitation (no latrines), esp. when walking with barefoot
- Size: about 1 cm; white, grey or red (from ingested blood)


Transmission:
- Penetration of larva through intact skin or
- Ingestion of food contaminated with eggs

♻ Life cycle:
- Eggs are passed with faeces, hatch in the damp soil.
- End stage infective larvae penetrate intact skin and migrate via bloodstream to the lungs; here they break through the alveoli, move up the bronchi and trachea to the oesophagus where they are swallowed.
- In the small intestine they change into adult worms and attach to the mucosa sucking blood.

Clinical manifestations:

- Pruritus at entry-site with vesicles and pustules (ground itch)
- Asthma, bronchitis: cough, wheeze, fever, eosinophilia (with lung passage of worms)
- Hypochromic, microcytic anaemia (esp. A. duodenale):
  - Pallor, tiredness, dyspnoea, oedema (due to loss of protein, cardiac failure)
  - Esp. if severe infection and/or insufficient iron intake
- Epigastric pain, occasionally melaena
- Failure to thrive

Diagnosis:

- Iron deficiency anaemia (exclude other causes of iron loss)
- Eggs in faeces (may be negative in the early stages of the infection)

Treatment:

- Albendazole:
  - Children < 2 years: 200 mg single dose
  - Children > 2 years, adults: 400 mg single dose; avoid in pregnancy (first trimester)
- Mebendazole:
  - Children > 2 years, adults: 100 mg bid; avoid in pregnancy (first trimester)
  - Duration of treatment: 3 days
- Elementary iron (adjust dosage according to available preparation e.g. ferrous sulphate : elementary iron 3 : 1)
  - Children: 5 mg/kg od
  - Adults: 120 mg od
  - Duration of treatment: 3 months
  - Inform about dark stools, stomach upsets etc. (side effects of therapy).
- Folic acid:
  - Children < 1 year: 0.5 mg/kg od
  - Children > 1 year, adults: 5 mg od
  - Duration of treatment: 1 month
- Advice regarding iron-rich food

☂ Prevention:
- Advice to wear sandals or shoes
- Advice regarding hygiene, cleanliness and sanitation

7.1.5. Strongyloides stercoralis (threadworm)

- Mainly in warm humid areas, but also in mines in colder climate
- Immunity develops after primary infection.
- Size: 2 mm

♻ Life cycle:
- Adult worms in bowel produce eggs which hatch in the bowel (internal sexual cycle) into non-infective larvae; these are passed with the faeces.
- In damp soil they develop into adults and reproduce (external sexual cycle).
- Infective larvae can develop; they penetrate the skin, travel via blood stream to the lungs and break through the alveoli to gain access to bronchi and trachea; they are swallowed and pass into the small bowel where they develop into adult worms.

Transmission:
- Penetration of larvae living in contaminated soil
- Autoinfection: non-infective larvae develop into infective larvae in the bowel; they can re-infect the host by penetration of bowel or perianal skin.

👁 Clinical manifestations:
- Dermal symptoms:
  - Pruritus and rash at site of penetration
  - Itchy weal (linear, on trunk, of short duration) with larvae moving under the skin (larva currens)
  - Urticaria due to allergy in sensitized persons
- Respiratory symptoms:
  - Cough and wheeze
  - Dyspnoea, haemoptysis
- Abdominal symptoms:
  - Watery diarrhoea
  - Abdominal pain (often vague)

- Chronic infection possible (with autoinfection):
  - Usually asymptomatic
  - Occasionally recurrent episodes of fever
  - Sometimes mild pneumonitis resembling recurrent bacterial pneumonia
  - Possible: severe respiratory illness e.g. obstructive pulmonary disease (worse with steroids), acute respiratory failure
- Severe infection (hyperinfection syndrome):
  - Immunocompromised patients or patients receiving steroids: Larvae invade different organs of the body e.g. bowel wall, lymph glands, liver, brain with resulting severe diarrhoea, malabsorption, paralytic ileus, septicaemia, encephalitis, meningitis.

✎ Diagnosis:
- Larvae or adult worms in faeces
- In disseminated strongyloides: larvae in sputum and different body fluids e.g. peritoneal fluid
- FBC: eosinophilia

Treatment:
- Albendazole:
  - Children < 2 years: 200 mg bid
  - Children > 2 years, adults: 400 mg bid; avoid in pregnancy (first trimester)
  - Duration of treatment: 3 days
  - Repeat treatment after 2 weeks.
- Ivermectin:
  - Children > 15 kg, adults: 200 mcg/kg single dose
  - Repeat treatment after 2 weeks.
- In disseminated disease (hyperinfection syndrome):
  - Children > 15 kg, adults: ivermectin 200 mcg/kg od
  - Duration of treatment: 5 days
  - Repeat stool investigation after treatment.
  - Patients with severe illness, pregnant women: refer to hospital.

7.1.6. Taenia saginata, taenia solium (tapeworm)

- Problem in areas with poor sanitation and where people traditionally eat undercooked or raw meat
- Size: 5-10 m

Transmission:
- Taenia saginata: ingestion of raw or undercooked beef
- Taenia solium: ingestion of raw or undercooked pork; cysticercosis can develop after eating food contaminated with eggs or eating with fingers contaminated with infected faeces.

Life cycle:
- Larvae encapsulated in meat (cysticerci) are eaten.
- Cysts turn into worms with heads attaching themselves to mucosa.
- Proglottids (segments: up to 2000, containing fertilized eggs) grow; they are highly motile, detach themselves and are shed with the faeces.
- Eggs are swallowed by cattle, develop into invasive larvae and break through the intestinal wall into the circulation; from there they are carried to the muscle where they encapsulate into cysticerci.

Clinical manifestations:
- Taenia saginata:
  - Nondescript symptoms (”hunger pains”)
  - Rarely intestinal obstruction
- Taenia solium:
  - Cysticercosis:
    - Encystation of larvae in muscles, skin (subcutaneous tissue), eye or brain with resulting calcification
    - Extraneuronal cysticercosis: often asymptomatic
    - Cerebral cysticercosis: epilepsy or signs of raised intracranial pressure

Diagnosis:
- Proglottids or eggs in stool
- Cysticercosis: calcifications visible on x-ray

Treatment:

- Taeniasis:
  - Praziquantel:
    - Children, adults: 5-10 mg/kg single dose
  - Niclosamide:
    - Children 11-34 kg: 1 g (2 tab) single dose
    - Children > 34 kg: 1.5 g (3 tab) single dose
    - Adults: 2 g (4 tab) single dose
    - Tablets have to be chewed.
- Cysticercosis:
  - Anthelmintic therapy not always necessary
  - Refer to hospital for assessment and possible treatment.

7.1.7. Schistosomiasis

Causative agents:

- Schistosoma japonicum (Philippines)
- Schistosoma haematobium (Africa)
- Schistosoma mansoni (Africa)

Transmission:

- Contact with water containing cercarial larvae (e.g. through washing, swimming, working in rice fields)

Life cycle:

- Eggs are passed with faeces or urine.
- Miracidium hatches and invades water snail as intermediate host where it undergoes asexual replication.
- Cercariae are released and penetrate human skin, undergo changes and reach the liver where they mature into adult flukes.
- Eggs pass into host tissues and are excreted.

Clinical manifestations:

- Early reaction (swimmers' itch, shortly after infection):
  - Puritic papular rash with erythema, oedema, eosinophilia
  - Rare in endemic areas
  - Resolves spontaneously after 10 days.

- Initial stage (4 weeks after penetration; immune complex disease):
  - Katayama fever:
    - Mainly in children or young adults
    - Can be severe with fever, urticaria, diarrhoea, hepatosplenomegaly, cough and wheeze, cachexia.
    - Spontaneous recovery
    - In S. japonicum: patients often have non specific symptoms.
- Established infection (caused by granulomas due to retained eggs):
  - S. japonicum, mansoni:
    - Liver fibrosis with hepatosplenomegaly and portal hypertension, ascites and bleeding from oesophageal varices
    - Pseudopolyposis of colon with ulceration and bleeding
    - Involvement of peritoneum (tumors) and skin (rash)
    - Cerebral granulomas with symptoms of raised intracranial pressure, development of epilepsy or focal neurological symptoms
  - S. haematobium:
    - Eggs in the bladder lead to granulomatous lesions (pseudopapillomata) with haematuria
    - Complications: obstruction of ureters and obstructive uropathy with hydronephrosis, hydroureter, kidney failure, calcification of the bladder with chronic dribbling, bladder carcinoma, kidney stones
    - Ectopic lesions can occur in lung, liver, CNS.

✎ Diagnosis:
- History
- Kato-katz-test (stained smear from stool; negative result does not exclude infection)
- Dipstick: blood in urine
- Rectal biopsy; eggs in urine
- Ultrasound (to check liver, kidneys, bladder)
- CT- scan (if suspected central nervous or spinal cord involvement)


Treatment:
- Katayama fever:
  - NSAIDs, e.g. ibuprofen:
    - Children > 7 kg: 30 mg/kg in 3 divided doses
    - Adults: 400-800 mg tid

- Prednisolone:
  - If severe hypersensitivity reaction
  - Children: 1 mg/kg od
  - Adults: 40 mg od
  - Duration of treatment: 5 days
- Praziquantel: start 6-10 weeks after initial presentation (ineffective in early infection).

➢ S. japonicum:
- Praziquantel:
  - Children, adults: 60 mg/kg in 2-3 divided doses at least three hours apart
  - Can be given in pregnant and lactating women, preferably **not** in the first trimester of pregnancy.

➢ S. haematobium, mansoni:
- Praziquantel:
  - Children, adults: 40 mg/kg in 1-2 divided doses for 1 day
  - Can be given in pregnant and lactating women, preferably **not** in the first trimester of pregnancy.
- Neurological disease:
  - Praziquantel **and** glucocorticoids to counteract inflammatory response due to treatment of praziquantel and to avoid deterioration of neurological symptoms

☂ Prevention:
➢ Advice regarding hygiene and safe disposal of urine and faeces

Important to remember:

- Epigastric pain is often caused by helminths.
- Adults can have worms too.
- Children younger than 1 year have a very small risk of infection with worms. It is therefore not necessary to deworm them on a regular base.
- Stool investigations for worms or eggs should only be performed in patients with treatment failure (exception: immunocompromised patients with suspected strongyloides infection).
- Treat all patients who may have worms even if reinfection can not be prevented. Just reducing the worm load can improve the outcome for patients.

- Treatment can be repeated every 4-6 months.
- If possible treat the whole family.
- Pregnant women: do not give any treatment in the first trimester; later in severe cases: give mebendazole or albendazole.
- Always give advice regarding cleanliness, e.g. washing hands before eating or preparing food, protecting food from flies, sanitation and use of latrines.
- Fingernails of children should be cut short to prevent dirt and worm eggs accumulating underneath.
- Give advice not to eat raw or undercooked meat or fish.

7.2. Filariasis

Causative agents:

- Filariae (nematodes), e.g.:
  - Wuchereria bancrofti (tropics), Brugia malayi (East and South East Asia, South India)
  - Onchocerca volvolus (South America, West Africa)

Transmission:

- Wuchereria bancrofti, Brugia malayi: mosquito species (anopheline mosquito, culex, aedes; night-biting)
- Onchocerca volvolus: simulium species (day-biting)

Life cycle:

- Third stage larvae (infective forms) are transmitted through bites, migrate to lymphatics, skin or deep tissues and develop into adults.
- Females produce microfiliae which reach blood or skin.
- They are taken up by the vector, develop into infective larvae.
- Wolbachia (rickettsia): symbiotic; important for embryogenesis of filariae

Clinical manifestations:

- Lymphatic filariasis (Wuchereria bancrofti, Brugia malayi):
  - Often asymptomatic in endemic areas

- Acute:
  - Recurrent bouts of fever, lymphangitis and lymphadenitis with redness and pain over lymphatic vessels and enlarged, tender lymph nodes
  - Epididymo-orchitis
  - Tropical pulmonary eosinophilia with cough and wheezing
- Chronic:
  - Hydrocele
  - Chyluria (rare in B. malayi infections)
  - Lymphoedema of legs: asymmetrical, non-pitting (elephantiasis)

- Onchocerciasis (river blindness; rarely encountered in our projects; infection with onchocerca volvolus):
  - Skin (microfiliae in the skin): pruritus, papular rash with secondary infection, premature ageing of skin
  - Eye: keratitis, iritis with redness, irritation and photophobia, corneal sclerosis leading to blurring of vision and blindness

✎ Diagnosis:

- Lymphatic filariasis:
  - Microfiliae in the blood (nocturnal blood sample required because of marked nocturnal periodicity of infection)
  - Serological test (antigen test)
- Onchocerciasis:
  - Skin snips
  - Eye examination (split lamp)

Treatment:

- Symptomatic:
  - Anti-inflammatory drugs e.g. acetylsalicylic acid 600 mg tid-qid (adults, children > 12 years) **and/or**
  - Antihistamines e.g. diphenhydramine:
    - Children: 1-2 mg/kg tid prn
    - Adults: 50 mg tid prn

- Therapeutic:
  - Lymphatic filariasis:

- Mass chemotherapy (national program in endemic areas, once a year):
  - Diethylcarbamazine (DEC): children, adults: 6 mg/kg single dose (side effects: initially headache, dizziness, malaise, vomiting due to dying parasites; also localized reactions e.g. lymphadenitis; treatment contraindicated in onchocerciasis due to risk of severe allergic reactions)

    plus
  - Albendazole (children > 2 years, adults): 400 mg single dose
- Individual patient:
  - Doxycycline 100 mg bid for 4 weeks (treatment of wolbachia; contraindicated in pregnant women, children < 12 years); problem: long duration of treatment and resulting lack of compliance

    followed by
  - Ivermectin (if available): children, adults: 200 mcg/kg single dose

    or
  - Diethylcarbamazine 6 mg/kg single dose
  - Both drugs are given to eradicate microfilariae.
  - Advice regarding:
    - Cleanliness: washing with soap and water, cutting of toenails
    - Elevation of affected limb at night
    - Immediate treatment of infected wounds or abrasions

- Onchocerchiasis:
  - Mass chemotherapy (national program in endemic areas, once a year):
    - Ivermectin: children, adults: 200 mcg/kg single dose
  - Individual patient:
    - Ivermectin: if available; children, adults: 200 mcg/kg single dose, repeat after 6-12 months if symptoms recur.

7.3. Leishmaniasis

Causative agents:
- Leishmania species: transmitted by the bite of female Phlebotomus sandflies (biting at dawn and dusk and during the night)
- Reservoir: animals e.g. foxes, dogs etc.

⊙ Distribution:
- Cutaneous leishmaniasis (oriental sore):
  - Old world: Mediterranean, Middle East, North Africa, Bangladesh to East India
  - New world: Northern South America, Central America
- Visceral leishmaniasis (kala-azar): Mediterranean Basin, East Africa, India, Bangladesh, Brazil

Clinical manifestations:
- Depending on the patient's cell-mediated immunity
- Cutaneous leishmaniasis:
  - Old world:
    - Single or multiple itchy nodules ("oriental sore") on inoculation site (face, neck, arms, legs)
    - Later with central crust and ulcer (with raised edges), healing spontaneously after weeks or months and leaving a depressed hypopigmented scar
    - Wet forms develop rapidly, with lesions along the draining lymphatics.
    - Usually lifelong immunity, but recurrence possible in patients with impaired immunity
  - New World:
    - Often bleeding ulcers; chiclero's ulcer (in men collecting latex in the forests): located on the pinna of the ear, with chronic infection and invasion of cartilage leading to destruction of pinna
    - Lymphatic and lymph node involvement common
- Mucocutaneous leishmaniasis:
  - New World:
    - Metastatic lesions develop up to 10 years after the appearance of an ulcer on the skin.

- > Initial lesion: nodule, usually in the nose
- > First sign: nasal obstruction or epistaxis, leading to destruction of nasal septum, uvula, pharynx and larynx
- > Occasionally protruberant nose and mouth due to hypertrophy (espundia = sponge)

- Visceral leishmaniasis (kala-azar):
  - Fever, hepatomegaly, splenomegaly
  - Lymphadenopathy, pancytopenia
  - Severe weight loss; can cause cachexia.
  - In India: hyperpigmentation of skin, esp. of face, hands, body ("kala-azar" = black sickness)
  - Intercurrent infections, bleeding
  - If untreated death in 80-90% of patients
  - Opportunistic infection: 70% of patients also infected with HIV

✎ Diagnosis:
- Cutaneous leishmaniasis: split skin smear (Giemsa staining)
- Visceral leishmaniasis:
  - Serology e.g. ELIZA
  - Isolation of parasites from spleen, bone marrow or lymph nodes

Treatment:
- Cutaneous leishmaniasis, Old world:
  - Paromomycin ointment
- Cutaneous leishmaniasis (New world), mucocutaneous and visceral leishmaniasis:
  - Refer to hospital for assessment and further treatment, e.g. with sodium stibogluconate, amphothericin B or miltefosin.

Think of leishmaniasis if a patient presents with a persistent ulcer on face, neck or arms.

7.4. Malaria

- Most important of all tropical diseases
- High morbidity and mortality
- Distribution: tropical and subtropical areas

Causative agents:

- Plasmodium falciparum: malaria tropica, predominantly Sub-Saharan Africa
- Plasmodium vivax, Plasmodium ovale: tertian malaria
- Plasmodium malariae: quartan malaria

Transmission:

- Bite of infected female anopheline mosquito (sporozoites in the saliva of the mosquito)
- Mother-to-child transmission (transplacentally)
- Transmission through blood transfusion

Life cycle:

- Multiplication: schizogony (asexual multiplication) in humans, gametogony (sexual multiplication) in female anopheles mosquito
- Schizogony (asexual multiplication):
  - With bite of mosquito sporozoites are injected in the blood stream.
  - Tissue schizogony:
    - 30 minutes post infection they enter liver cells, divide into pre-erythocytic schizont, containing merozoites.
    - Possible: dormant stage of sporozoite in liver (= hypnozoite; plasmodium vivax, ovale), awaking at a set time
    - When mature, schizont releases merozoites into the blood stream (after 5-12 days).
  - Blood schizogony:
    - Merozoites enter red cells, develop into trophozoites, then into schizonts which rupture releasing merozoites in the blood stream.
    - P. falciparum, vivax, ovale: blood schizogony completed in 48h
    - P. malariae: blood schizogony completed in 72 h
    - P. vivax, ovale, malariae: schizogony in the circulating blood
    - P. falciparum: schizogony in capillaries deep in the body – therefore rarely seen in the peripheral blood; also: cytoadherence of parasitized erythrocytes to endothelial surfaces leading to large numbers of parasites in deep tissues

Release of parasites to the blood stream coincides with bouts of fever but there is often no periodicity.

- Gametogony (sexual multiplication):
  - Merozoites develop into gametocytes (male and female) inside the red cells.
  - If swallowed by a mosquito they develop further into micro- and macrogametes; these unite and, after several stages, produce sporozoites which migrate to the salivary glands of the mosquito.

👁 Clinical manifestations:
- Incubation period:
  - P. falciparum: 7-30 days
  - P. vivax, ovale: about 2 weeks, but can take several months up to several years (due to hypnozoites)
  - P. malariae: about 2-4 weeks
- Fever: recurrent (often no periodicity such as every 2nd or 3rd day), with rigors, hot stage and sweating stage
- Anaemia (haemolytic); severe in P. falciparum
- Splenomegaly
- Jaundice
- Vomiting, diarrhoea (DD: gastroenteritis)
- Cerebral malaria with delirium, disorientation, convulsions, stupor, coma
- Renal failure, occasionally with oliguria, haemoglobinuria (Blackwater fever: due to intravascular haemolysis)
- Pulmonary oedema
- Hypoglycaemia: esp. at risk: children, pregnant women
- Disseminated intravascular coagulation
- Severe disease mainly due to infection with P. falciparum
- Recrudescence (recurrent attacks in untreated malaria due to persistent blood forms):
  - P. falciparum: recurrent attacks over one year, then no further attacks
  - P. malariae: recurrent episodes for up to 30 years
  - P. vivax, ovale: relapsing fever over several years (true relapse due to hypnozoites in the liver)
- Malaria in pregnancy:
  - Higher rate of miscarriage and stillbirths due to placental insufficiency

- Risk of maternal death with severe malaria due to hypoglycaemia and pulmonary oedema (increased risk of developing severe malaria during pregnancy, esp. during the first pregnancy)
- Increased risk of anaemia
- Babies: low birth weight
- Occasionally congenital malaria

➢ Malaria in children:
- High risk: children < 5 years
- Fever, malaise
- Anorexia, diarrhoea, vomiting
- Coma, convulsions
- Lactic acidosis, hypoglycaemia
- Severe anaemia

⊙ Immunity:
➢ Mainly in P. falciparum infections
➢ Due to development of IgG cell-mediated immunity and antitoxic immunity
➢ Frequent re-exposure to infection is required (therefore higher risk of acquiring an infection after longer exposure-free interval).

✎ Diagnosis:
➢ Thick film with Giemsa stain – to be taken at least three times at intervals; may be negative (even with severe disease) because of sequestration of parasites in the deep capillaries

Note:

A positive film does not necessarily prove that the symptoms of the patient are due to malaria (parasitaemia even in asymptomatic patients in endemic areas); consider other diseases as well, e.g. typhoid fever.

➢ Rapid diagnostic test (RTD):
- Test for detection of specific antigens of plasmodium falciparum, vivax or ovale
- Sensitivitiy 40-95% (with > 100 parasites per µl blood; comparable to experienced microscopist)

- Problems: test not resistant to heat; false negative results; result remains positive for up to 3 weeks, even after successful treatment.
- No replacement for thick film
- Use before starting stand-by treatment.

Always treat patients with suspected malaria even with negative RTD as there is a possibility of a false negative result.

 Treatment:

It is of utmost importance to check the current national guidelines and local drug resistance when treating patients for malaria.

- Supportive treatment:
  - Sponge with tepid water.
  - Rehydration (*see* chapter *Dehydration,* p.89)
  - Monitor renal output, blood glucose and haemoglobin and treat accordingly.
  - Treat convulsions or other complications.
- Specific treatment:
  - Chloroquine:
    - Should **only** be used in areas with partial or no resistance to plasmodium falciparum or in patients with quartan or tertian malaria.
    - Important: correct dose (narrow therapeutic margin)!
    - Adults:
      - 600 mg PO stat (4 tab at 150 mg)
      - 300 mg at 6 hours
      - 300 mg on day 2 and 3
    - Children:
      - 10 mg/kg PO stat
      - 5 mg/kg at 6 hours
      - 5 mg/kg on day 2 and 3
      - If vomiting: same dose can be given IM, but avoid in children < 6 years or < 15 kg
    - Drug resistance to chloroquine: 3 types according to WHO:
      - R 1: disappearance of parasite under treatment within 7 days, but relapse

  - R 2: noticeable fall without disappearance of the parasite
  - R 3: no reduction of parasite level in spite of treatment
- Quinine (with chloroquine resistance):
  - Adults:
    - Loading dose: 20 mg/kg IV, then 10 mg/kg tid IV or IM (IM: 1 mL = 300 mg; IV: 1 mL = 60 mg; IVI: give in 5% glucose to counteract hypoglycaemia due to quinine)
    - Change to oral medication as soon as possible: 600 mg tid (2 tab at 300 mg) and **add***:* doxycycline 100 mg bid.
  - Children:
    - Loading dose 20 mg/kg, then 10 mg/kg tid IV or IM (give IV medication in 5% glucose)
    - Change to oral medication as soon as possible: 30 mg/kg in 3 divided doses.
    - Duration of treatment: 7 days minimum
- Mefloquine (with **relapse**: rising trophozoites, rising temperature; no vomiting):
  - Adults:
    - 750 mg PO (3 tab at 250 mg) stat
    - 500 mg after 6 hours
    - If body weight > 60 kg: 250 mg after another 6 hours
  - Children (≥ 6 months, > 5 kg):
    - 15 mg/kg PO (max. 750 mg) stat
    - 10 mg/kg after 6-12 hours (max. 500 mg)
  - If no clinical improvement within 48-72 hours use alternative therapy for retreatment.
  - Avoid in pregnant patients and patients with neuropsychiatric disorders (e.g. depression, convulsions).
- Primaquine**:**
  - In India and the Philippines
  - For eradication of hypnozoites
  - If diagnosis of tertian malaria is confirmed, **low risk of reinfections** and good compliance of patient
  - Adults: 15 mg PO od
  - Children: 0.25 mg/kg PO od
  - Duration of treatment: 15 days
  - Important: test for glucose-6-phosphate-dehydrogenase deficiency before starting treatment to avoid risk of haemolytic anaemia

- Artemisinine:
  - Only in combination with other drugs e.g.
  - Artemether 20 mg + Lumefantrin 120 mg (Riamet ® or Coartem®)
    - Adults, children ≥ 16 years, ≥ 35 kg):
      - 4 tab PO stat, then at 8 hours, 24 hours, 36 hours, 48 hours, 60 hours (total 24 tablets over 60 hours)
    - Children (2 months to < 16 years, WHO recommendations):
      - 5-14 kg: 1 tab PO stat, then at 8 hours, 24 hours, 36 hours, 48 hours, 60 hours (total 6 tablets over 60 hours)
      - 15-24 kg: 2 tab PO stat, then at 8 hours, 24 hours, 36 hours, 48 hours, 60 hours (total 12 tablets over 60 hours)
      - 25-34 kg: 3 tab PO stat, then at 8 hours, 24 hours, 36 hours, 48 hours, 60 hours (total 18 tablets over 60 hours)
  - Treatment in pregnancy:
    - If malaria is suspected refer to hospital immediately.
    - WHO treatment recommendations:
      - First trimester: quinine **plus** clindamycin PO for 7 days
      - Second and third trimester: artesunate (first line treatment; can be given PO or IV), artemether (second line treatment; can be given PO or IM)
      - Avoid mefloquine (study in Thailand: higher rate of stillbirths)
      - Contraindicated: primaquine, doxycycline

☂ Prevention:
- Advice regarding protective clothing, esp. in the evening (**light** long clothes)
- Use impregnated mosquito nets and/or curtains if available.

8. INFECTIOUS DISEASES

8.1. Dengue Fever Syndromes

Causative agent:
- RNA-virus, 4 serotypes

Transmission:
- Human to human by bites of Aedes aegypti mosquito which flies during the day

8.1.1. Dengue fever

- Widespread in Asia, esp. South-East Asia, Western Pacific; also Central and South America
- Dramatic increase in transmission worldwide
- Mainly children affected as most adults are immune to locally existing serotypes
- Long lasting immunity develops to the infecting serotype, short lived immunity to the other serotypes.

Clinical manifestations:
- Symptoms more severe in older children and adults
- Incubation period 5-8 days
- High fever, occasionally biphasic
- Relative bradycardia
- Severe headache, pain behind the eyes, photophobia
- Myalgia (severe: break bone fever), arthralgia
- Anorexia
- Rash: maculo-papular, erythematous; generalized, later: petechial with scattered pale patches over arms, hands, legs, feet (“white islands in a red sea”)
- Generalized lymphadenopathy
- Haemorrhagic complications possible e.g. epistaxis, bleeding from gums, haematuria

Diagnosis:
- Leucopenia

- Occasionally thrombocytopenia

Treatment:
- Symptomatic with painkillers e.g. paracetamol
- Avoid aspirin (risk of bleeding)

8.1.2. Dengue haemorrhagic fever (DHF), dengue shock syndrome (DSS)

- In infants and children under the age of 16 years, after previous infection with different serotype causing dengue fever
- Pathophysiological changes: increased vascular permeability leading to leakage of plasma and haemoconcentration

Clinical manifestations:
- High fever, acute onset, continuous for 2-7 days
- Anorexia, abdominal pain, vomiting
- Haemorrhagic manifestations: petechiae, ecchymosis, bleeding from nose and gums, haematemesis, melaena
- Hepatomegaly
- Dengue shock syndrome: critical stage at end of febrile period:
  - Cold clammy skin, restlessness
  - Signs of shock (rapid weak pulse, hypotension, narrow pulse pressure)
  - Possible: oedema, pleural effusion, ascites

Diagnosis:
- Thrombocytopenia (thrombocytes < 100 000/mm^3)
- Haemoconcentration: rise in haematocrit by 20% above average for age and sex

Treatment:
- Supportive treatment e.g. antipyretics (avoid aspirin)
- Increase fluid intake.
- Refer to hospital for fluid replacement:
  - If shock start IVI with Ringer's Lactate solution or normal saline at 10-20mL/kg over 20 minutes; repeat prn once or twice until vital

signs (pulse, blood pressure) and haematocrit improve, then reduce.
- Check blood sugar (?hypoglycaemia); if hypoglycaemia give dextrose 10% 5 mL/kg.
- Avoid excessive fluid replacement.
- Treatment usually necessary for 24-48 hours

8.2. Leprosy

Causative agent:
- Mycobacterium leprae (Hansen bacillus)

Transmission:
- Human-to-human (probably droplet infection or infection from ulcers)

Clinical manifestations:
- Initial infection often asymptomatic, occasionally resolving spontaneously
- Lepromatous leprosy (people with low resistance, widespread bacillary infiltration):
  - Diffuse infiltration with thickening of skin; maculo-papular lesions, can be hypopigmented or erythematous
  - Nerve thickening leading to bilateral and symmetrical sensory and motor dysfunction with paraesthesia, hyperaesthesia, hyperalgesia, also muscle wasting leading to paralysis
  - Nasal infiltration with discharge and ulceration
  - Infiltration of eyes (iritis, corneal changes leading to blindness), testes (atrophy), lymph nodes (swelling, ulceration)
- Tuberculoid leprosy (people with good resistance, few bacilli, localized):
  - Skin: few lesions (macules), hypopigmented or red, sharply demarcated, with sensory loss; destruction of hair follicles
  - Nerve thickening with early sensory loss; palpable thickening e.g. of ulnar, median or peroneal nerve; asymmetrical

✎ Diagnosis:
- Clinical manifestations: palpable thickening of nerves (e.g. sulcus of elbow), sensory loss
- Slit-scrape smear of skin
- Lepromin test (for classification and prognostic purposes; negative in lepromatous leprosy)

 Treatment:
- Refer to hospital or local treatment program.

8.3. Measles (Morbilli)

- One of the most common childhood infectious exanthems
- A major killer in childhood: higher mortality rate in developing countries, esp. when associated with malnutrition and vitamin A deficiency (”do not count your children until the measles have passed”)

 Causative agent:
- Paramyxovirus

 Transmission:
- Spread by droplets

 Clinical manifestations:
- Incubation period: 7-10 days
- Infectious period: from the 8th day of the incubation period until 5 days after onset of rash
- Severe illness
- Catarrhal phase with fever, runny nose, conjunctivitis, cough and Koplik’s spots (red spots with bluish-white center on buccal mucosa) for 2-3 days
- Rash (maculo-papular) for 4-5 days (difficult to recognize in dark skin)
- Complications:
  - Respiratory:
    - Bronchopneumonia (risk of activating underlying tuberculosis)

- ENT:
  - Otitis media
  - Laryngitis (often with stridor)
- Gastrointestinal:
  - Diarrhoea with risk of dehydration and malnutrition
  - Stomatitis, also with thrush and herpes leading to problems eating or sucking
- Ophthalmological:
  - Conjunctivitis with risk of corneal ulceration and keratomalacia leading to blindness, esp. in patients with vitamin A deficiency
- Persistent pyrexia with severe rash (black measles) and desquamation
- Rarely encephalitis (with residual brain damage)

Treatment:

- Treat fever with tepid sponging and paracetamol.
- Keep eyes wet and clean; antibiotic eye ointment (e.g. tetracycline 1% eye ointment).
- Give vitamin A:
  - Patients without sign of vitamin A deficiency:
    - Children < 6 months: 50 000 IU day 1 and 2
    - Children 6 to 12 months: 100 000 IU day 1 and 2
    - Children > 1 year, adults (unless women of childbearing age): 200 000 IU day 1 and 2
  - Patients with sign of vitamin A deficiency (e.g. Bitot's spots, corneal ulceration, keratomalacia):
    - Children < 6 months: 50 000 IU day 1, 2 and 8
    - Children 6 to 12 months: 100 000 IU day 1, 2 and 8
    - Children > 1 year, adults (unless women of childbearing age): 200 000 IU day 1,2 and 8
- Keep well hydrated and nourished.
  - Continue breastfeeding.
  - In case of diarrhoea: give
    - ORS (see chapter *Dehydration,* p.89)
    - Zinc supplements:
      - Children < 6 months: 10 mg od
      - Children 6 months to 5 years: 20 mg od
      - Duration of treatment: 14 days

- Antibiotics (high doses, esp. for patients with high risk of complications or death e.g. severely malnourished children, patients with HIV-infection):
  - Erythromycin:
    - Children: 50 mg/kg in 3 divided doses
    - Adults: 500 mg tid-qid **or**
  - Amoxicillin:
    - Children: 80 mg/kg in 3 divided doses
    - Adults: 1000 mg tid
  - Duration of treatment: 5 days
- Follow-up:
  - If cough: think of tuberculosis
  - Regular weight control and check-ups (Road to Health Chart); advice regarding extra meals
  - Give vitamin A if not yet done.

☂ Prevention:
- Immunization: from the age of 9 months to 12 years and up to the 3rd day post incubation (during the first 6 to 9 months the baby is protected by maternal antibodies; therefore immunization may not be effective)

Important to remember:

- It is of utmost importance to check the immunization status regarding measles and immunize if not yet done.
- Treatment with vitamin A can significantly reduce morbidity (esp. the risk of blindness) and mortality in children with measles.

8.4. Meningitis

- Often epidemic in developing countries with meningococci type A and C as causative agents
- Outbreaks esp. during dry season, mainly in Sub-Saharan Africa (Burkina Faso to Tanzania)

- More often in people living in poor conditions (low income, poor housing), esp. in children in slums

Causative agents:
- Bacterial: mainly meningococcus, pneumococcus (often with other focus e.g. pneumonia), Haemophilus influenzae; rarely: E. coli, staphylococcus, Group B streptococcus, salmonella, listeria; also: Mycobacterium tuberculosis
  - In newborns mainly: Group B streptococcus, enterococcus, listeria, E. coli, klebsiella
  - Children > 2 months: meningococcus, pneumococcus, Haemophilus influenzae B
  - Adults: meningococcus, pneumococcus; with impaired immunity: pathogens similar to those in newborns
- Viral: ECHO-virus, coxsackie, mumps, polio, herpes

Clinical manifestations:
- Depending on causative agent
- Bacterial:
  - Pyrexia (sudden onset)
  - Headache, backache, nausea
  - Neck stiffness: Brudzinski and Kernig's signs positive (lying patient involuntarily flexes the knees when the neck is flexed or when the legs are raised vertically with knees in extension)
  - Babies and small children: often nonspecific signs e.g. inability to drink, drowsiness, convulsions; bulging fontanelle
  - Old people, alcoholics: initially often fever, confusion
  - Tuberculous meningitis: gradual onset, headache, drowsiness; later: convulsions, cranial nerve involvement e.g. diplopia, ptosis
- Viral:
  - Acute onset
  - Occasionally signs of underlying disease e.g. parotitis, paralysis with poliomyelitis
- Complications:
  - Waterhouse-Friedrichsen's-Syndrome:
    - Fulminant meningococcal septicaemia with purpuric rash due to haemorrhages in skin and mucosa, renal failure (haemorrhage into the adrenal cortex), shock
    - Often fatal despite treatment

- Surviving patients may have long-term neurological problems e.g. deafness, spasticity, mental retardation, epilepsy, speech impairment.

⚖ Differential diagnosis:

- Cerebral malaria
- Typhoid fever
- Consider underlying cause of meningitis e.g. sinusitis, otitis media, head injury, endocarditis, pneumonia.

✎ Diagnosis:

If meningitis is suspected start treatment straight away prior to hospital referral for further investigations and treatment.

- Lumbar puncture; if available ask for gram staining and direct microscopy of cells
- Cell count in the cerebrospinal fluid (CSF)

 Treatment:

Give first dose prior to hospital transfer.

- Infants < 2 months:
  - Ampicillin **IM/IV**: 50 mg/kg qid **plus**
  - Gentamycin **IM/IV**:
    - First week of life: 3 mg/kg od with low birth weight; 5 mg/kg od with normal birth weight
    - After second week of life: 7.5 mg/kg od
- Children > 2 months:
  - Oily chloramphenicol **IM**: 25 mg/kg qid **plus**
  - Ampicillin **IV/IM**: 50 mg/kg qid
    Or, if available:
  - Ceftriaxone **IV/IM**: 100 mg/kg od
- Adults:
  - Oily chloramphenicol **IM**: 100 mg/kg od (up to 3 g; if necessary half of the dose in each side); avoid in pregnant women
    Or, if available:
  - Ceftriaxone **IV/IM:** 2 g od

- Pregnant or breastfeeding women:
  - Ampicillin **IV/IM:** 2 g qid
    Or, if available:
  - Ceftriaxone **IV/IM:** 2 g od
- Duration of treatment depends on pathogen and underlying disease:
  - Meningococcus: 7-10 days
  - Pneumococcus, haemophilus: 10-14 days,
  - Listeria: 4-6 weeks

The earlier meningitis is treated the better is the prognosis.

☂ Prevention:
- Vaccine for meningococcal meningitis available (vaccine anti A, C, W or Y; protection: 3 years); if there is an increase in patients with meningitis in an endemic area mass vaccination should be started as soon as possible.

8.5. Pertussis (Whooping Cough)

- Can occur at any age.
- High mortality, esp. in infants (no protection from maternal antibodies)


Causative agent:
- Bordetella pertussis, spread by droplets


Clinical manifestations:
- Incubation period: 6-20 days
- Catarrhal phase with nasopharyngeal discharge and nonspecific cough for 1-2 weeks
- Whooping phase with paroxysmal cough (with subsequent vomiting) and tenacious sputum for 6-8 weeks
- Persistent cough only in about 50% of patients
- Infants less than 3 months may develop sneezing fits and apnoeic periods leading to cyanosis
- Infectious period from 2 days before onset of cough; for 3 weeks
- Complications:
  - Malnutrition due to loss of appetite and recurrent vomiting

- Epistaxis, haemoptysis, subconjunctival haemorrhage
- Bronchopneumonia
- Encephalitis

Treatment:
- Antibiotics (children):
  - Erythromycin 50 mg/kg in 3 divided doses for 2 weeks
- Best if given in the catarrhal phase: can shorten the infective period and can avoid complications e.g. pneumonia.
- Maintain good fluid intake and encourage good nutrition.

Prevention:
- Immunization

8.6. Rabies

- High risk in developing countries due to high prevalence of disease in stray animals
- Concerning our projects: mainly a problem in Kolkata, Bangladesh and the Philippines

Causative agent:
- Rhabdovirus

Transmission:
- Saliva of infected animal, mainly bites of dogs but also cats, bats, wild animals etc.
- Inoculation possible before developing signs of illness (14 days for cats, dogs)

⊙ Different types of exposure (WHO 2009):
- Category I (no exposure):
  - Touching or feeding of animals
  - Licks on intact skin
- Category II:
  - Minor scratches or abrasions without bleeding
  - Nibbling of uncovered skin

- Category III:
  - Single or multiple transdermal bites or scratches
  - Licks on broken skin
  - Contamination of mucous membrane with saliva from licks
  - Exposure to bat bites or scratches

Clinical manifestations:
- Incubation period: 2 weeks to several months (up to 1 year)
- Rapid onset with fever, anxiety, pain and paraesthesia at the side of bite; insomnia
- Painful spasms of throat muscles, hydrophobia
- Later: widespread paralysis, respiratory arrest
- With the onset of clinical symptoms: death inevitable (due to meningoencephalitis with neuronal destruction)

Treatment:
- Symptomatic disease:
  - Refer to hospital or state-run animal bite center.
- Treatment of wound:
  - Wash and flush bite and scratch wounds immediately with soap and plenty of water (for about 15 minutes).
  - Apply antiseptic (e.g. Povidone iodine solution).
  - **Postpone** suturing if possible
  - Tetanus prophylaxis
- Vaccination depends on type and condition of animal at time of bite and after 10 days.

Avoid contact with patient's saliva – it is potentially infective.

Prevention:
- Vaccination
- Post-exposure vaccination (WHO 2010):
  - People without immunization or with incomplete previous immunization:
    - Category I:
      - No vaccination necessary

- > Category II:
  - – **Immediate** rabies vaccination: one dose IM on day 0, 3, 7, 14, 30 (adults: in deltoid muscle, children < 2 years. anterolateral area of thigh); alternative: two doses IM on day 0 (deltoid muscle, right and left arm), 1 dose on day 7 and 1 dose on day 21 (regimen 2-1-1)
  - – Immunocompromised patients: give additional immunoglobulin (see treatment for category III exposure).
- > **Avoid** gluteal muscle (poor response!).
- > Category III:
  - – **Immediate** rabies vaccine one dose IM (adults: in deltoid muscle, children < 2 years: anterolateral area of thigh) on day 0, 3, 7, 14, 30; alternative: two doses IM on day 0 (deltoid muscle, right and left arm), one dose on day 7 and one dose on day 21 (regimen 2-1-1)

    plus
  - – **Immunoglobulin** (preferably human rabies immunoglobulin HRIG 20 IU/kg, but often short supply; otherwise equine rabies immunoglobulin ERIG 40 IU/kg; small risk of hypersensitivity reactions) as much as possible infiltrated around the wound, the rest to be given IM at a site distant from vaccine administration (e.g. into anterior thigh).

- o Give immunoglobulin preferably at, or as soon as possible after the initiation of post-exposure vaccination. It is not indicated beyond the seventh day (by then active antibody response to vaccination has probably ocurred).
- o Immunized patients after exposure:
  - > Rabies vaccine: as soon as possible one dose IM day 0 and 3
  - > Immunocompromised patients (e.g. HIV-patients): give full post-exposure prophylaxis.

Prophylaxis of rabies after exposure:

Nature of exposure	**Prophylaxis**
Category I: Touching or feeding of animals Licks on intact skin	None
Category II: Minor scratches or abrasions without bleeding Nibbling of uncovered skin	Start vaccination immediately; stop vaccination if animal is healthy after 10 days or proven to be free of rabies by appropriate laboratory investigations.
Category III: Single or multiple transdermal bites or scratches Licks on broken skin Contamination of mucous membrane with saliva from licks Exposure to bat bites or scratches	Give immunoglobulin and start vaccination immediately (see previous page); stop vaccination if animal is healthy after 10 days or proven to be free of rabies by appropriate laboratory investigations.

Important to remember:

- Even immunized people need post-exposure booster vaccination.
- With treatment of wounds: do not forget tetanus prophylaxis or antibiotics e.g. cefuroxime or erythromycin.
- According to the latest guidelines of the WHO (2010) patients who present for evaluation and rabies post-exposure prophylaxis *even months* after having been bitten should be dealt with in the same manner as if the contact occurred recently.

9. DISEASES OF THE URINARY TRACT

9.1. Urinary Tract Infection

Causative agent:
- E. coli

Clinical manifestations:
- More common in women
- Dysuria, lower abdominal pain
- Frequent urination
- Cloudy malodorous urine, occasionally haematuria
- Fever: often in children, rarely in adults
- Complications:
  - With ascending infection or spreading via bloodstream: fever, chilling, lower abdominal pain, back or lumbar pain, cloudy urine, often with blood
  - With recurrent infections: think of schistosomiasis, genitourinary tuberculosis, lithiasis, gonorrhea.
  - In children: often presenting with fever, vomiting or failure to thrive

Diagnosis:
- Dipstix: leucocytes positive, blood positive, nitrate positive
- Beware of false positive results with dipstix examination, esp. with leucocytes in women, therefore clinical picture must be taken into consideration.

Treatment:
- Increase fluid intake.
- Paracetamol or aspirin for pyrexia
- Acute uncomplicated cystitis:
  - Adults:
    - Cotrimoxazole 960 mg (160 mg TMP + 800 mg SMZ) bid **or**
    - Fluoroquinolone e.g. ciprofloxacin 250 mg bid; avoid in pregnancy.
  - Duration of treatment: 3 days
  - Pregnant women:
    - Amoxicillin 500 mg tid for 7 days

- Acute complicated cystitis, acute pyelonephritis:
  - Adults:
    - Cotrimoxazole 960 mg (160 mg TMP + 800 mg SMZ) bid **or**
    - Fluoroquinolone e.g. ciprofloxacin 500 mg bid
  - Children > 2 months:
    - Cotrimoxazole 8 mg/kg TMP + 40 mg SMZ in 2 divided doses **or**
    - Cefuroxime 30 mg/kg in 2 divided doses
  - Duration of treatment: 7 days
  - Infants < 2 months:
    - Refer to hospital (risk of renal complications).
  - Pregnant women:
    - Referral to hospital
- With recurrent infections:
  - Ciprofloxacin:
    - Adults: 500 mg bid; avoid in pregnancy.
    - Children: 30-40 mg/kg in 2 divided doses; not officially recommended for children as yet but use if benefit outweighs the risk.
  - Duration of treatment: 14 days
  - Pregnant women: amoxicillin 500-1000 mg tid for 10 days

9.2. Acute Glomerulonephritis

- After otherwise benign streptococcal infection (pharyngitis, impetigo)
- Auto-immune inflammation of the glomeruli, occurring after 1-5 weeks
- Mainly in children over 3 years of age and adults

Clinical manifestations:
- Proteinuria, haematuria
- Hypertension, occasionally with encephalopathy
- Oedema

Treatment:
- Bed rest during the acute stage
- Low salt diet

- Antibiotics for underlying streptococcal infection:
  - Children:
    - Penicillin V 50 mg/kg in 3-4 divided doses **or**
    - Erythromycin 50 mg/kg in 3 divided doses
  - Adults:
    - Penicillin V 500 mg qid **or**
    - Erythromycin 500 mg qid
  - Duration of treatment: 10 days
- Furosemide (with oedema):
  - Children: 1 mg/kg single dose; if required can be given in up to tid.
  - Adults: 40 mg up to tid
  - Adapt dose according to clinical response.
- Treat hypertension.

9.3. Nephrotic Syndrome

- Increasing prevalence due to increasing number of patients with diabetes mellitus and hypertension

Causes:
- Glomerulonephritis
- Diabetes mellitus
- Quartan malaria
- Plasmocytoma
- Amyloidosis

Clinical manifestations:
- Severe proteinuria (> 3 g/24 h)
- Hypoalbuminaemia (< 30 g/l)
- Oedema
- Hyperlipidaemia
- Later: hypertension
- Uncomplicated cases: often good prognosis with improvement after steroid treatment or spontaneous resolution

Diagnosis:
- History (?underlying disease)
- Urine dipstick (protein +++)
- Serum creatinine, electrolytes

- FBC, blood glucose
- 24- hour urine collection for 24- hour protein
- Renal ultrasound
- With suspected underlying malaria: blood smear for malaria parasites

Treatment:

- Rest
- First manifestation:
  - If possible refer to hospital for further investigations and treatment e.g. diuretics, ACE-inhibitors, prednisolone (for minimal change glomerulonephritis) and diet advice.
- Therapeutic options in adults:
  - Diuretics:
    - In severe cases: Furosemide: 40 mg up to 3 times/day
  - ACE-inhibitors e.g.
    - Enalapril: 10-20 mg od
    - Ramipril: 2.5-5 mg od
  - Diet:
    - Low protein diet (protein restriction to 0.8-1 g/day; high protein diet leading to deterioration of renal function)
    - Not necessary in patients with mild renal failure (glomerular filtration rate > 25 mL/min)
    - Patients with advanced renal failure: only supervision of diet necessary as they take little protein anyway due to poor appetite
    - Low salt diet and restricted water intake (with higher urine production more fluids can be given)
- Therapeutic options in children:
  - Furosemide
  - Prednisolone: can be useful in children, esp. with minimal change glomerulonephritis, but should be started by specialist; tuberculosis must be ruled out before patient is started on long term steroids.

10. SEXUALLY TRANSMITTED DISEASES/HIV

10.1. Sexually Transmitted Diseases (STD)

- People particularly at risk of contracting sexually transmitted diseases: commercial sex workers, their clients, bar workers, military, truck drivers, sailors, policemen

⊙ Important in taking a history:
- Privacy (if possible)
- Avoidance of moralistic attitude
- Questions to ask:
  - Nature and duration of symptoms
  - Drugs already taken
  - Sexual history
  - Previous medical history
  - Female patients: menstrual/obstetric history
- Information about HIV important

Difficult: differential diagnosis, esp. without being able to investigate appropriately (no microscope, no speculum)

10.1.1. Gonorrhoea

Causative agent:
- Neisseria gonorrhoeae

Clinical manifestations:
- Males:
  - Urethritis with dysuria
  - Thick yellow discharge
  - With ascending infection: fever, prostatitis, epididymitis (unilateral)
  - Urethral stricture
- Females:
  - Fewer symptoms
  - Urethritis, dysuria, vaginal discharge
  - With ascending infection to uterus, fallopian tubes: endometritis, salpingitis; also pelvic inflammatory disease (PID) with fever and

abdominal pain; later: increased risk of ectopic pregnancy, infertility

- Disseminated gonorrhoea:
  - Arthritis
  - Dermatitis, purulent conjunctivitis
  - Endocarditis
- Ophthalmia neonatorum:
  - In newborns of mothers infected with gonorrhoea
  - Bilateral purulent conjunctivitis
  - Perforation and scarring of cornea, leading to blindness

Treatment:

- Gonorrhoea in adults:
  - See *syndromic approach* p.149, p.152
- Ophthalmia neonatorum:
  - Treatment:
    - Ceftriaxone: 50 mg/kg IM single dose (maximum 125 mg)
    - Give also to infants born to mothers with gonococcal infections.
    - All newborn infants with conjunctivitis: **add**
      - Erythromycin syrup 50 mg/kg in 4 divided doses
      - Duration of treatment: 14 days
      - Treatment for N. gonorrhoeae and C. trachomatis
    - No need to give additional eye drops
  - Severe cases: refer to hospital for IV penicillin.
  - Prevention:
    - Tetracycline eye 1% ointment to both eyes

10.1.2. Chlamydial infection

- Often co-infection with gonorrhoea, but longer incubation period
- Both sexes affected

Causative agent:

- Chlamydia trachomatis

Clinical manifestations:
- Often asymptomatic
- Symptoms similar to gonorrhoea
- Males: urethritis
- Females: vaginal infection; ascending infection leading to pelvic inflammatory disease with risk of ectopic pregnancy or infertility
- Infection of the newborn: conjunctivitis, pneumonia

Treatment:
- Chlamydial infection in adults:
  - See *syndromic approach* p.152
- Infection of the newborn (suspected chlamydial infection):
  - Erythromycin syrup 50 mg/kg PO in 4 divided doses for 14 days **and**
  - Ceftriaxone: 50 mg/kg IM single dose (maximum 125 mg; see treatment *ophthalmia neonatorum* p. 143)

10.1.3. Syphilis

- High seroprevalence in developing countries, esp. in Africa (50%), South America (10%), Asia (5-10%)
- Primary chancre: often not recognized; resolves spontaneously

Causative agent:
- Treponema pallidum (spirochaetes)

10.1.3.1. Primary syphilis

Clinical manifestations:
- Incubation period: 2-3 weeks; infective stage of disease
- Painless, indurated moist papule with clean base and raised edge (primary chancre)
- Mainly on the glans, foreskin, shaft of penis
- Diagnosis often missed in women (most common on the cervix, occasionally on the labia)
- Inguinal lymphadenopathy (hard, painless)
- After 4-6 weeks: painless ulcer, resolving over several weeks

✎ Diagnosis:
- Dark field microscopy: spirochaetes
- Serology negative

10.1.3.2. Secondary syphilis

👁 Clinical manifestations:
- Infective stage; 2-3 months after infection
- Non-itching macular, papular or pustular rash, often desquamating; esp. on palms, soles; occasionally whitish areas on mucosa of mouth, vagina, penis
- Generalized lymphadenopathy
- Condylomata lata in moist areas of the body
- Systemic illness with fever and malaise
- Alopecia
- Rarely meningism, optic neuritis
- Resolving after several weeks (in one third of cases; afterwards: latent stage; one third of patients: tertiary syphilis)

✎ Diagnosis:
- TPHA (T. pallidum haemagglutination): specific test, used for screening
- FTA (fluorescent treponemal antibodies): for confirmation of diagnosis
- VDRL (veneral disease reference laboratory): nonspecific; used to monitor response to treatment

10.1.3.3. Tertiary syphilis

👁 Clinical manifestations:
- Gumma: granulomatous lesions with local tissue destruction mainly affecting skin, bones, mucous membranes (manifestation after 3-10 years)
- Cardiovascular disease (about 10%) with aneurysm of the ascending aorta, aortic valve disease, coronary ostial occlusion (30-40 years after infection)
- Disease of the central nervous system (about 6%) with ataxia, progressive paralysis, dementia (20-30 years after infection)

10.1.3.4. Congenital syphilis

- Congenitally infected children of mothers with primary or secondary syphilis
- Higher rate of stillbirth or neonatal death


Clinical manifestations:
- Rash with desquamation, esp. palms, soles
- Persistent nasal discharge
- Anaemia, hepatosplenomegaly
- Periostitis of long bones with pseudoparalysis
- Later in life (> 6 years): Hutchinson's trias: keratitis, dental abnormalities, sensory deafness


Treatment:
- Syphilis in adults:
  - See *syndromic approach* p.150
- Congenital syphilis:
  - Refer to hospital for treatment with antibiotics.
  - Investigate and treat mother and her sexual partner.

10.1.4. Chancroid (soft sore)

- Most common cause of genital ulceration in Africa increasing the risk of HIV infection
- Incubation period 2-6 days


Causative agent:
- Haemophilus ducreyi


Clinical manifestations:
- Painful soft ulcer, bleeding on contact; often multiple
- Painful inguinal lymphadenopathy, occasionally with fistula formation or local destruction
- Resolves spontaneously within 1 year.

⚖ Differential diagnosis:
- Primary syphilis
- Herpes simplex
- Lymphogranuloma venereum

 Treatment:
- See *syndromic approach* p.150

10.1.5. Lymphogranuloma venereum (LGV)

 Causative agent:
- Chlamydia trachomatis

 Clinical manifestations:
- Initially small painless genital ulcer, often unrecognized, resolving spontaneously
- Second phase: painful lymphangitis, lymphadenitis with inguinal lymphadenopathy (buboes)
- Fever, malaise
- Chronic infection leading to genital elephantiasis, abscess formation, fistula, rectal and sigmoidal stenosis

 Treatment:
- See *syndromic approach* p.150

10.1.6. Trichomoniasis

 Causative agent:
- Trichomonas vaginalis

 Clinical manifestations:
- Males normally asymptomatic, but infectious
- Females:
  - Yellow-green frothy discharge, getting less in the later stages of the disease
  - Urethritis with dysuria
  - Pain in vulva, vagina

Treatment:
- See *syndromic approach* p.150

10.1.7. Vulvovaginal candidiasis

Causative agent:
- Candida albicans

Clinical manifestations:
- Pruritus of vulva, vagina
- Vaginal discharge (whitish)

Treatment:
- See *syndromic approach* p.150

10.1.8. Genital herpes

Causative agent:
- Herpes simplex virus type 2 (HSV 2)

Clinical manifestations:
- Vesicles, later ulcers, crusting over and resolving
- On external genitalia, urethra, cervix
- Pain (occasionally severe, causing constipation and retention of urine), dysuria
- Tender lymphadenopathy
- Primary attack lasting for up to 3 weeks
- Subsequent attacks (occasionally up to 12/year) resolving faster
- High neonatal mortality if child is infected with herpes from mother

Treatment:
- See *syndromic approach* p.150

Treatment:
- In our projects according to the **syndromic approach**

- Check for **6 cardinal symptoms**:
  - Urethral discharge
  - Vaginal discharge
  - Genital ulcer
  - Lower abdominal pain
  - Inguinal bubo (painful swelling of lymph nodes)
  - Scrotal swelling

- Advantages of syndromic approach:
  - Treatment is possible straight away without waiting for results.
  - Treatment of co-infections
  - Simple diagnostic methods have low sensitivity anyway.

Always remember when treating patients:

***4 C's**: **C**ounselling, **C**ompliance, **C**ondoms, **C**ontact-treatment*

Always use drugs available in the respective project.

Urethral discharge (male):

⚖ Differential diagnosis:
- Gonorrhoea
- Chlamydial infection

Treatment:

Ciprofloxacin 500 mg single dose

Plus

Doxycycline 100 mg bid for 7 days

or

Azithromycin 1 g single dose

or

Amoxicillin 500 mg tid for 7 days

or

Erythromycin 500 mg qid for 7 days

- Persistent or recurrent symptoms of urethritis:
  - Possibly due to drug resistance, poor compliance, re-infection
  - In some cases: Trichomonas vaginalis infection:
    - Try metronidazole 500 mg PO bid for 7 days.
  - Persistent symptoms: refer to hospital.

Vaginal discharge:

⚖ Differential diagnosis:

- Candida albicans
- Bacterial vaginosis (Gardnerella vaginalis + Mycoplasma hominis)

Treatment:

Metronidazole 2 g single dose (can also be given in pregnancy if benefits outweigh the risk)

Plus

Clotrimazole vaginal pessary 500 mg single dose or 200 mg for 3 days

Genital ulcers:

⚖ Differential diagnosis:

- Syphilis
- Chancroid (Haemophilus ducreyi)
- Granuloma inguinale
- Lymphogranuloma venereum (LGV)
- Genital herpes

Note:

If patients present with genital ulcer it is very important to establish a working diagnosis and treat according to main symptoms.
If there is no improvement after 7 days refer for investigations.

 Treatment:

- Suspected primary or secondary syphilis:
  - Benzathine Benzyl Penicillin 2.4 million units (2 x 1.2 million units) IM single dose **or**
  - With allergy against penicillin and **not** pregnant:
    - Doxycycline 100 mg PO bid for 2 weeks
  - With allergy against penicillin and pregnant:
    - Erythromycin 500 mg PO qid for 2 weeks
- Suspected late syphilis (more than 2 years of infection):
  - Benzathine Benzyl Penicillin 2.4 million units IM once weekly for 3 weeks **or**
  - With allergy against penicillin and **not** pregnant:
    - Doxycycline 100 mg PO bid for 30 days
  - With allergy against penicillin and pregnant:
    - Erythromycin 500 mg PO qid for 30 days

Plus

- Suspected chancroid:

  Ciprofloxacin 500 mg bid for 3 days

  or

  Erythromycin 500 mg qid for 7 days

  or

  Azithromycin 1 g single dose

- Suspected granuloma inguinale **add instead**:

  Azithromycin 1 g single dose

  or

  Doxycycline 100 mg bid

  or

  Erythromycin 500 mg qid

  Continue treatment until lesions are completely epithelized.

- If no improvement **suspect** genital herpes and **give**:

  Acyclovir 400 mg tid for 7 days

Lower abdominal pain (female):

⚖ Differential diagnosis:
- Emergencies (if rebound tenderness or guarding: refer to hospital):
  - Appendicitis
  - Ectopic pregnancy
  - Pelvic abscess
- STD e.g.
  - Gonorrhoea
  - Chlamydial infection
  - Infection with anaerobic bacteria

⊙ Gynaecological referral of patients with:
- Pregnancy
- Delayed last menstrual period
- Recent delivery or abortion
- Menorrhagia
- Fever

 Treatment for suspected STD:

Ciprofloxacin 500 mg single dose

Plus

Doxycycline 100 mg bid for 2 weeks

Plus

Metronidazole 400 mg bid for 2 weeks

Review after 3 days; without improvement: refer to hospital.

Scrotal swelling:

⚖ Differential diagnosis:

- Under 35 years of age, sexually active: STD e.g.
  - Gonorrhoea
  - Chlamydial infection (with discharge)
- Over 35 years of age:
  - Other infection of testis or epididymis e.g. due to E. coli, Klebsiella, Pseudomonas, TB etc.
- Prepubertal:
  - Infection with E. coli, Pseudomonas
  - Mumps
- Testicular torsion: sudden onset of scrotal pain (refer for surgery-emergency!)
- Trauma
- Tumor

Treatment:

- Suspected STD: treat for gonorrhoea:

  Ciprofloxacin 500 mg single dose

  Plus

  Doxycycline 100 mg bid for 7 days

  or

  Azithromycin 1 g single dose

Inguinal bubo:

(Swollen inguinal or femoral lymph nodes, possibly fluctuant)

⚖ Differential diagnosis:

- Lymphogranuloma venereum (LGV)
- Chancroid
- Non-STD (local infection of lower limbs, tuberculosis)

 Treatment:

Ciprofloxacin 500 mg bid for 3 days

or

Doxycycline 100 mg bid for 2 weeks

or

Erythromycin 500 mg qid for 2 weeks

10.2. HIV

- AIDS Epidemic Update 2009: global epidemic still stable at high level, but number of people living with HIV/AIDS (PLWHA) increasing with ongoing number of new infections and more widely available antiretroviral therapy
- At present:
  - Worldwide: 33.4 million people living with HIV, 2.7 million new infections (48% young people aged 15-24 years) and 2.0 million HIV-related deaths; 2.0 million children younger than 15 years were infected.
  - Sub-Saharan Africa: most heavily affected (67% of people living with HIV; 72% of all HIV-related deaths); Kenya: estimated 1.5 to 2 million people living with HIV
  - Asia: 4.7 million people living with HIV, 330 000 deaths from HIV-related illnesses; people living with HIV (estimates 2008): India: 2.4 million, Philippines: 8300, Bangladesh: 12 000
  - Latin America: 2.0 million people living with HIV (Nicaragua 7700; estimate 2007), 77 000 deaths from HIV-related illnesses
- 25 million deaths up to 2007
- Numbers often estimates due to difficulties in reporting rates in some countries
- Additional problems of stigma and discrimination encountered by people living with HIV
- HIV epidemic leading to reduced life expectancy, increased household poverty and reduced economic growth in the most heavily affected countries

⊙ Special problems in developing countries:
- Sub-Saharan Africa: HIV transmission mainly during heterosexual intercourse; other regions: mainly infection of certain risk groups (commercial sex workers, intravenous drug users, men having sex with men)
- Equal numbers of men and women affected, but number infected women has increased in many regions
- Risk of mother-to-child transmission high (without intervention: 25-48%)
- Often blood products not checked for HIV or problems with window period
- Treatment often not affordable


Causative agent:
- HI-virus (retrovirus)


Transmission:
- Highest viral concentration in blood, semen, vaginal secretion; esp. in the first weeks after acute infection or with symptomatic disease
- **No** transmission in everyday life; **no** spread by droplets of sputum
- Mainly transmitted by sexual contact (heterosexual, homosexual)
  - 0.1-0.5% risk of infection with unprotected intercourse
  - Risk of infection enhanced by
    - *Presence of sexually transmitted diseases: 2-9 fold increased risk of transmission (STD with and without an ulcer)*
    - Use of desiccating vaginal agents e.g. herbs
- Mother-to-child transmission during pregnancy, delivery or breast-feeding
- Blood products (~95% risk of infection): problem with window period (no antibodies found with recent infection)
- Contaminated syringes: in less than 5% cause of transmission; less relevant in developing countries

Clinical manifestations:
- Several stages:
  - Primary infection or acute retroviral illness:
    - Not all patients affected
    - 2-4 weeks after exposure, self-limiting

- > Fever, malaise, headache, lymphadenopathy
- > Diarrhoea, nausea, skin rashes
- > Seroconversion after 3 months

- o Asymptomatic HIV-infection:
  - > Viral replication, but clinical latency
  - > Gradual decline of T-helper cells
  - > Lasting for up to 10 years before break-down of immune system
  - > Period may be shorter in developing countries.
- o Symptomatic HIV-infection/AIDS:
  - > Destruction of immune system due to increasing destruction of T-helper cells
  - > Weight loss, weakness, lymphadenopathy
  - > Additional opportunistic infections and neoplasms (increasingly common and severe)
  - > Strong correlation with tuberculosis (10% risk per year for people living with HIV)
  - > Untreated leading to death (one third of all deaths due to tuberculosis)

- ➢ WHO Clinical Staging of HIV/AIDS for Adults and Adolescents:
  - o Stage 1:
    - > Asymptomatic
    - > Persistent generalized lymphadenopathy
  - o Stage 2:
    - > Moderate weight loss (< 10% of body weight)
    - > Minor mucocutaneous manifestations (seborrhoeic dermatitis, prurigo, fungal infection, recurrent oral ulcerations, angular cheilitis), herpes zoster, past or recurrent within last 2 years
    - > Recurrent upper respiratory tract infections (bacterial sinusitis, bronchitis, otitis media, pharyngitis)
  - o Stage 3**:**
    - > Severe weight loss (> 10% of body weight)
    - > Unexplained chronic diarrhoea > 1 month
    - > Unexplained prolonged fever > 1 month
    - > Oral candidiasis
    - > Oral hairy leucoplakia (OHL)
    - > Pulmonary tuberculosis (PTB) in past year
    - > Severe bacterial infections (e.g. pneumonia, pyomyositis, empyema, bone or joint infections)

- Stage 4**:**
  - HIV wasting syndrome
  - Pneumocystis jiroveci pneumonia (PCP)
  - Recurrent severe bacterial pneumonia (at least 2 episodes within 1 year)
  - Cryptococcal meningitis and extrapulmonary cryptococcosis
  - Cerebral toxoplasmosis
  - Chronic orolabial, genital or ano-rectal herpes simplex infection for > 1 month
  - Kaposi's sarcoma (KS)
  - HIV encephalopathy
  - Extrapulmonary TB (EPTB)
  - Crytosporidiosis with diarrhoea > 1 month
  - Isosporiasis
  - Disseminated non-tuberculous mycobacterial infection
  - Cytomegalovirus (CMV) retinitis or disease of the organs (other than liver, spleen or lymph nodes)
  - Progressive multifocal leucencephalopathy (PML)
  - Any disseminated endemic mycosis (e.g. histoplasmosis)
  - Candidiasis of oesophagus or airways
  - Non-typhoid salmonella (NTS) septicaemia
  - Cerebral lymphoma or B-cell non-Hodgkin lymphoma (NHL)
  - Invasive cervical cancer
  - Visceral leishmaniasis
- Different clinical stages for children

✎ Diagnosis:
- At present testing only done in our project in Nairobi
- Tests:
  - Rapid test (Determine Immunoassay)
  - With positive test: confirmation with 2nd rapid test (Bioline)
- Problems:
  - No antibodies in the early stages (diagnostic window)
  - Maternal antibodies are present in an infant for up to 20 months without the child being infected
- Further blood tests:
  - CD4 count
  - Full blood count (anaemia, neutropenia, thrombocytopenia)

Treatment:

- In most projects: patients with suspected HIV need to be referred to specialized hospitals.
- HIV-treatment by "German Doctors for Developing Countries" only in the HIV-project in Nairobi:
  - Counselling and testing:
    - VCT: voluntary counselling and testing: for asymptomatic patients
    - DCT: diagnostic counselling and testing: for symptomatic patients with possible HIV infection
    - RCT: routine counselling and testing for pregnant women
  - Continuous, comprehensive outpatient care for people living with HIV/AIDS on different levels (medical, psychological, social and nursing)
- Example: **Baraka Treatment and Care Program**:
  - Medical treatment (follow-up program) for all patients (independent of HIV-stage):
    - Cotrimoxazole for prevention of opportunistic infections
    - Multivitamins
    - Deworming
    - Review every 1-3 months
    - CD4 count every 6 months
  - Support group for HIV-positive patients, e.g.
    - Regular meetings
    - Memory Books
  - Feeding program
  - Home based care for bed-ridden patients
  - Prevention of mother-to-child-transmission (PMTCT):
    - HIV-positive mothers:
      - Regular CD4 counts
      - Antiretroviral therapy according to national guidelines
    - Infant intervention:
      - Antiretroviral therapy including nevirapine according to national guidelines
      - Cotrimoxazole
      - Feeding program after birth (formula milk; mothers advised regarding hygiene)

- Highly Active Antiretroviral Therapy (**HAART**) according to national guidelines:
  - For patients with CD4 < 350 (stage 1,2,3) or stage 4 (irrespective of CD4) **and** proven compliance
  - Before starting medication:
    - Blood tests e.g. FBC, CD4 count, LFTs
    - Assigning patient to community health worker and "treatment buddy" supervising intake of medication
  - Combination of at least 3 antiviral drugs e.g. Stavudine (D4T) or AZT + Lamivudine (3TC) + Nevirapine
  - Regular follow-ups with blood tests, attendance of support group

- Treatment of opportunistic infections if possible, otherwise referral
- Post-Exposure-Prophylaxis (PEP) after exposure to blood or certain body fluids of patient with possible HIV-infection:
  - Risk of transmission: 0.3% after percutaneous exposure to HIV-infected blood (possibly higher after exposure with large-bore needle or high viral load)
  - Indication for HIV-PEP:
    - **Recommended** after:
      - Percutaneous injury with injection needle or other hollow needle (high risk body fluids like blood, bloody body fluids, CSF)
      - Superficial injury (e.g. with surgical needle) if index patient probably has high viral load, otherwise PEP should be offered
      - Contact with high-risk body fluids to mucous membranes or non-intact skin
    - **Not** recommended after:
      - Percutaneous contact with other body fluids (e.g. urine, saliva)
      - Contact of intact skin with blood
      - Contact of skin or mucous membrane with body fluids like urine or saliva
  - Immediate treatment:
    - Percutaneous injury: encourage bleeding, then rinse thoroughly with alcohol-based antiseptic
    - Contamination of non-intact skin: rinse thoroughly with > 80% ethanol-based preparation (e.g. Frecaderm) + PVP-iodine

- > Contamination of eye or mouth: rinse thoroughly with isotonic watery PVP-iodine solution (eye: 2.5%, mouth: PVP-iodine 1:1 diluted)
- > If antiseptic solutions not available: use water for immediate rinsing of contaminated area

- o Medication:
  - > Start as soon as possible within 72 hours – preferably within 2 hours
  - > Prophylaxis with
    - – Combivir ® (lamivudine + zidovudin) 1 tablet bid **+** Viracept ® (nelfinavir) 2 tablets bid **or** Combivir ® 1 tablet bid **+** Kaletra ® (lopinavir + ritonavir) 3 tablets bid
    - – Duration of treatment: 4 weeks
    - – Blood tests: HIV-test (including index patient), hepatitis serology; repeat after 6 weeks, 3 months and 6 months
- o Documentation of injury

☂ Prevention:
- ➢ Education of patients regarding avoidance of high risk behaviour and use of condoms (best done by trained staff)
- ➢ Prevention of mother-to-child-transmission through education and medication
- ➢ Treatment of sexually transmitted diseases
- ➢ Reduction of blood transfusions in anaemic patients to the absolute minimum:
  - o Transfusions should only be given in life-threatening events. Even for chronic anaemia with haemoglobin < 5 g/dl treatment with ferrous sulphate and folate is sufficient.
  - o Important: treatment and prevention of underlying conditions such as hookworm infections, malaria, schistosomiasis, malnutrition, pregnancy; avoid repeated Hb-checks!

Important to remember:

- No treatment of HIV/AIDS should be done without structured pre-test and post-test- counselling.
- It is of utmost importance to minimize risk of HIV-transmission when handling possibly contaminated body fluids!
- Always wear safety equipment e.g. gloves and goggles or gowns if necessary.
- Always dispose of sharps safely.
- In case of injury: do not forget documentation of event.

11. ANTENATAL/POSTNATAL CARE

- In developing countries antenatal care aims to minimize complications which threaten life and health of pregnant women.
- In Africa: 700 maternal deaths due to pregnancy and delivery per 100 000 life births.
- In Bangladesh 40% of teenage pregnancies have complications (e.g. pregnancy-induced hypertension, eclampsia), in industrialized nations 1%.
- In developing countries nearly all women are anaemic before getting pregnant; in 50% of pregnant women the haemoglobin is less than 8.5 g%.
- In some projects we have antenatal programs with standardized checks which have to be performed by the doctors; in other projects we refer to official programs.

11.1. Antenatal Checks

⊙ Time of antenatal check-up:
  - WHO recommendations:
    - With uncomplicated pregnancies: 4 check-ups during pregnancy (8- weekly intervals):
      - 9-13. week (to estimate date of delivery)
      - 18-22. week
      - 28-32. week
      - On the estimated date of delivery

⊙ History:
  - Past/present medical history: ?diseases leading to complications during pregnancy
  - Gynaecological/obstetric history: ?problems during previous pregnancies and deliveries (assessment of risk)

⊙ Estimation of date of delivery:
  - 1st day of last period **plus** 7 days **minus** 3 months

⊙ Abdominal palpation:
  - Try to find out how the baby is lying.
  - Women with breech presentation or transverse lie have to be sent to hospital for delivery.

- Weight check:
  - Usual weight gain during pregnancy: 8-10 kg
  - Risk of insufficient weight gain due to malnutrition and poverty
  - Sudden weight gain due to generalized oedema: sign of complications (eclampsia)!

- Fetal movements:
  - Only 40% of fetal movements ("kicks") felt by mother
  - Primipara: first fetal movements felt at 20 weeks' gestation
  - Multipara: first fetal movements felt at 18 weeks' gestation
  - Reduction of fetal kicks below 5 per day: start Daily Fetal Movement Count (DFMC):
    - Mother counts fetal kicks starting at the same time every morning recording starting time and end of counting; count stops after 10 kicks.
    - Short version: mother counts fetal kicks over 3 hours, then multiplies number by 4.
    - Normal pregnancy: more than 10 kicks in 12 hours
    - Pathological (sign of placental insufficiency): less than 10 fetal movements in 12 hours; refer to gynaecologist

- Urinalysis (dipstick):
  - Proteinuria:
    - Pre-eclampsia: > 0.3 g/24 hours in urine (dipstick: ++)
    - Severe pre-eclampsia: > 0.5 g/24 hours in urine (dipstick: +++)
  - Bacteriuria:
    - Higher risk of cystitis or pyelonephritis in pregnancy
    - Important: screening of asymptomatic women for leucocytes, blood and nitrate in the urine and subsequent treatment of women with positive results
  - Glycosuria:
    - Possible sign of gestational diabetes (sensitivity 30%)
    - If pregnant woman has family history of diabetes mellitus, delivered babies with high birth weight (> 4.5 kg) in the past or if diabetes mellitus is suspected: check blood glucose; arrange oral glucose tolerance test (if woman is seen during our own antenatal checks, otherwise refer).

⊙ Blood pressure check:
- Hypertension (systolic ≥ 160 mmHg, diastolic ≥ 100 mmHg)
  - Treatment with methyldopa: start with 250 mg bid, increase if necessary (maximum 3 g daily dosage).
- Hypotension (systolic < 100 mmHg, diastolic < 60 mmHg)
  - Can occur when patient is lying on the back (pressure of uterus on veins and vena cava).
  - Advice to lie on left side, increase fluid intake.
  - Ask for danger signs e.g. pain, bleeding; refer if necessary.

⊙ Give iron and folic acid:
- Elementary iron: 60 mg od **plus** folic acid 0.8 mg od during the whole pregnancy
- Adjust dosage according to available iron preparation, (e.g. ferrous sulphate : elementary iron 3 : 1).

⊙ Immunization status: complete tetanus immunization if necessary to prevent neonatal tetanus.

11.2. Ectopic Pregnancy

- Egg implants outside the uterine cavity.
- Responsible for about 7% of maternal deaths
- Increased risk after pelvic inflammatory infection, previous ectopic pregnancy, endometriosis, tubal surgery, IUD in situ
- 97%: implantation in tubes

👁 Clinical manifestations:
- Abdominal pain; may be mild (without peritonism) in subacute manifestation; can severe in acute manifestation (acute abdomen with peritonism).
- Vaginal bleeding (dark or fresh) – often after about 8 weeks of amenorrhoea
- Collapse, shock (with pallor, tachycardia, low blood pressure)
- Occasionally shoulder tip pain
- Palpation: ?adnexal mass

⚖ Differential diagnosis:
- Twisted ovarian cyst (no amenorrhoea, no vaginal bleeding)
- Appendicitis (leucocytosis, fever)
- Perforated gastric/duodenal ulcer

✎ Diagnosis:
- Pregnancy test positive
- Ultrasound scan:
  - Tubal/abdominal mass
  - Empty uterus

Think of an ectopic pregnancy in:
- *Fertile women with lower abdominal pain associated with continuous vaginal bleeding*
- *Fertile women with collapse*
- *Always take a gynaecological history.*

Treatment:
- Set up IV infusion e.g. Ringer's Lactate solution.
- Refer to hospital straight away.

11.3. Pre-Eclampsia

- One of the most serious complications in pregnancy
- In industrialized countries: in 5-10 % of pregnancies, higher incidence in developing countries
- Usually in the 2nd and 3rd trimester
- Mainly primigravidae and women > 35 years affected

Clinical manifestations:
- Oedema
- Proteinuria
- Hypertension
- Can progress to eclampsia:
  - Headache, visual disturbance
  - Confusion
  - Tonic-clonic seizures, coma

- Renal failure, pulmonary oedema

Note:

*With vomiting, abdominal pain and tenderness over the liver: think of HELLP-syndrome (**h**aemolysis, **e**levated **l**iver enzymes, **l**ow **p**latelets.*
Refer to hospital immediately (life-threatening condition).

Treatment:

- Long term treatment:
  - Methyldopa PO: initially 250 mg bid - tid, increase gradually at intervals of at last 2 days prn (up to 3 g/day); usual dose: 250-1000 mg/day in 2 divided doses
- Emergency treatment (severe pre-eclampsia):
  - Hydralazine 5 mg diluted in 10 mL 0.9% normal saline IV every 20 minutes (maximum 30 mg; side effects: tachycardia, headache) **or**
  - Nifedipine caps 5 mg PO, repeat after 20 minutes if required (avoid first trimester)
- Refer to hospital for intensive treatment.
- Magnesium sulphate: although used commonly in developed countries it does not seem to be an option in the field due to risk of side effects and difficulties in administration.

⊙ Criteria for admission to hospital:

- Hypertension: systolic BP ≥ 160 mmHg or diastolic BP ≥ 100 mmHg
- Proteinuria and weight gain > 1 kg/week in the 3rd trimester
- Suspected HELLP-syndrome
- Reduced fetal kicks
- Suspected IUGR (intrauterine growth retardation)
- Additional findings: pre-existing maternal illness (renal, diabetes mellitus), multiple pregnancy, early gestational age (before 34. week), oligohydramnios

11.4. Antepartum/Postpartum Haemorrhage

11.4.1. Antepartum haemorrhage

- Vaginal bleeding after the 28th week and before birth of the child
- Main causes: abruptio placentae, placenta praevia, ruptured uterus

Clinical manifestations:

- Abruptio placentae:
  - Often without contractions
  - Blood loss can be concealed – therefore the condition can be far more serious than assumed from the amount of blood actually seen.
  - Patient can be in pain.
  - Shock
- Placenta praevia:
  - Previous medical history: often recurrent episodes of painless vaginal bleeding in pregnancy (esp. during the last 12 weeks)
  - Severe haemorrhage during labour with dilatation of cervix
- Ruptured uterus:
  - Esp. in patients with previous medical history of caesarian section and with obstructed labour or after numerous pregnancies
  - Abdominal pain
  - Shock
  - Life threatening event for mother and baby

Treatment:

- Check blood pressure and heart rate.
- Set up IV infusion: large IV cannula (16 G); if in shock give Ringer's Lactate solution 1-3 litres IV; if available give gelafundin 30-40 mL/kg IV.
- Refer to hospital.

With antepartem haemorrhage:

***Never** perform a vaginal examination as this can cause severe bleeding.*
***Always** refer to hospital as soon as possible!*

11.4.2. Postpartum haemorrhage

- Excessive vaginal bleeding after delivery
- Main causes: vaginal tear, cervical tear, placenta accreta, atonic uterus
- Blood loss difficult to assess as the blood is mixed with amniotic fluid and is lost in towels, linen etc.
- Normal blood loss: 200-300 mL; postpartum haemorrhage: > 500 mL

Clinical manifestations:

- Placenta accreta:
  - Placenta not separating from myometrium of uterus
- Atonic uterus
  - Inefficient uterine contraction/retraction after separation of placenta
  - Fundus soft, high (normally: uterus postpartum firm, fundus at the level of umbilicus)
  - Haemorrhage can be severe.

Treatment:

- Check blood pressure and heart rate.
- Set up IV infusion: large IV cannula (16 G); if in shock give Ringer's Lactate solution 1-3 litres IV; if available give gelafundin 30-40 mL/kg IV.
- Placenta accreta:
  - Give oxytocin 10 IU IV in 500 mL of Ringer's Lactate solution.
  - Send patient to hospital for manual removal of placenta.
- Atonic uterus:
  - With patient lying on her back rub uterus gently with one hand: place fingers behind the fundus, thumb in front of the fundus.
  - Give oxytocin 10 IU IV in 500 mL of Ringer's Lactate solution.
  - If no success: bimanual compression of uterus:
    - Right hand inserted into the vagina, formed into a fist and placed in anterior fornix of vagina pressing against the anterior wall of the uterus.
    - Left hand placed on the abdomen behind the uterus pressing downwards to press the posterior wall of the uterus against the anterior wall.
  - Last resort: compression of aorta:
    - One fist pressing downward into the abdomen just above the umbilicus, slightly to the left.

> Other hand palpating femoral pulse: if still palpable compression is insufficient and further pressure needs to be applied until bleeding is controlled.

With postpartum haemorrhage:

*Every patient **must** be sent to hospital immediately for further management.*

11.5. Mastitis

- Usually caused by staphylococci.
- Predisposing factors: nipple erosion, poor emptying of breast
- Non-lactating women: think of other causes e.g. carcinoma.

Clinical manifestations:
- Sore, cracked nipple
- Part of the breast hot, red, swollen
- Lymphadenopathy, occasionally fever
- Occasionally abscess

Treatment:
- Start as soon as possible to avoid abscess formation.
- Breastfeeding should be continued (shorter, but more often) if at all possible unless there is a severe infection; baby should feed from affected breast first.
- Clean nipples with boiled cool water.
- Gently rub breast milk on the nipples after feeding.
- Severe infection: express breast milk for a few days.
- Antibiotics PO:
  - Cloxacillin 500 mg qid **or** if penicillin allergy:
  - Erythromycin 500 mg qid
  - Duration of treatment: 7-10 days
- Cool compresses
- Abscess: trial of antibiotics; if no improvement: refer for surgical intervention.

12. SKIN PROBLEMS

12.1. Skin Rashes

12.1.1. Allergic rashes

- Can be caused by exposure to certain allergens e.g. special food, food additives, drugs (e.g. penicillin).
- Other causes: intestinal parasites e.g. helminths, viral infection (e.g. URTI), hepatitis, auto-immune disease

Clinical manifestations:
- Urticaria
- Maculo-papular rash

Diagnosis:
- Investigation according to possible underlying cause

Differential diagnosis:
- Non-allergic rashes e.g. due to
  - Syphilis
  - HIV
  - Viral disease
  - Typhoid fever

Treatment:
- Clean affected areas with cool water.
- Calamine lotion to stop the itch
- Chronic rash:
  - Zinc paste tid or
  - Hydrocortisone 1% ointment tid (only for a short period of time e.g. 10 days)
- Pruritus:
  - Diphenhydramine:
    - Children: 1-2 mg/kg tid prn
    - Adults: 50 mg tid prn
- If possible treat underlying cause.
- Advice to avoid exposure to allergens e.g. drugs, certain food etc.

12.2. Dermatitis/Eczema

12.2.1. Allergic contact dermatitis

- Caused by allergens e.g. perfumes, metals, chemicals, food or plants, rove or blister beetles (Nairobi eye)

12.2.2. Irritant contact dermatitis

- Exposure to irritants e.g. water, heat, chemical substances, cement, tar
- Affects men working without personal protective equipment or women with long-term exposure to water and manual work (laundry, cooking).


Clinical manifestations:

- Acute:
  - Redness, vesicles, blisters, pustules (with infection)
- Chronic:
  - Papules, lichenification, scaling
  - Painful fissures
  - Atrophy of skin


Treatment:

- Eczema with redness:
  - Hydrocortisone 1% ointment tid to affected areas
- Superinfected eczema:
  - First povidone iodine solution 10% tid or gentian violet solution 0.5% tid
- Sensitive skin:
  - Vaseline or coconut oil
- Advice to avoid exposure to sensitizing agents
- Advice regarding use of personal protective equipment or change of work if at all possible

- Nairobi eye:
  - Compresses with mild antiseptic solutions (e.g. gentian violet 0.5%)
  - Steroids e.g. prednisolone only in severe cases

12.3. Atopic Eczema

- Hereditary condition
- Often combined with allergic asthma or hayfever or allergy to certain food e.g. vegetables, herbs, fruit, nuts etc.
- Exacerbations often brought on by stress, illness etc.

Clinical manifestations:
- Babies:
  - Hyperkeratotic plaques on head (cradle cap)
- Smaller children:
  - Eczema with redness and tiny blisters
  - Often on cheeks and ears
- Older children:
  - Hyperkeratotic plaques and papules (lichenification), erosions, crusts, fissures
  - Mainly in flexures of knees and elbows, sides of neck, arms, hand, feet
- Adults:
  - Mainly isolated patches of eczema, esp. on lower legs and forefeet with pruritus, hyperpigmentation and lichenification (lichen simplex chronicus)
- Severe itch; secondary infection possible

Treatment:
- Cold compresses to itchy lesions
- Exposure to sunlight can be beneficial.
- Dry lesions:
  - Ichthammol ointment 20% or zinc oxide ointment tid
  - Hydrocortisone 1% ointment tid for several days
- For prevention of superinfection:
  - Hydrocortisone 1% cream at night **and**
  - Povidone iodine solution 10% in the morning

- Superinfected eczema:
  - Gentian violet solution 0.5% or povidone iodine solution 10% for treatment of infection
- If pruritus:
  - Diphenhydramine:
    - Children 1-2 mg/kg tid prn
    - Adults: 50 mg tid prn
- Advice to cut children's finger nails short to stop them from scratching; in babies it might be necessary to cover their hands with gloves or socks.

12.4. Bacterial Infections

12.4.1. Impetigo

- Highly contagious
- Often recurrent episodes
- Affects mainly children
- Complications e.g. renal involvement or rheumatoid arthritis more common in developing countries

Causative agents:
- Streptococci
- Staphylococci

Clinical manifestations:
- Mainly small, occasionally large fragile blisters, later with pus; yellow crusts
- Often associated with skin damage
- Lesions located especially around the mouth.
- Complications:
  - Spread over body affecting hair roots esp. in face and on head causing boils and abscesses
  - Rheumatic fever or acute glomerulonephritis (if caused by streptococci)
- Slight itchiness

- If located on the head: exclude head lice.
- If mainly nocturnal itchiness all over the body and involvement of other family members: exclude scabies.


Treatment:

- Wash affected areas several times a day with warm water and soap.
- Gentian violet solution 0.5% or povidone iodine solution 10% to affected areas
- In extensive cases (3-4 lesions present, abscess, boils):
  - Cloxacillin:
    - Children: 50 mg/kg in 3-4 divided doses
    - Adults: 500 mg qid
    - Duration of treatment: 1 week
  - Erythromycin:
    - Children: 50 mg/kg in 3 divided doses
    - Adults: 500 mg tid-qid
    - Duration of treatment: 1 week
  - Cefuroxime:
    - Children: 30 mg/kg in 2 divided doses
    - Adults: 250-500 mg bid
    - Duration of treatment: 10 days
- Advice to keep the affected child away from other children.
- Advice regarding cleanliness
- Treat underlying conditions e.g. headlice, scabies.

12.4.2. Abscess

- Caused by puncture wound or infected hair root
- Bacteria can spread after rupture of affected hair follicle or with blood stream leading to collection of pus in cutaneous and subcutaneous tissue.


Clinical manifestations:

- Localized swelling, erythema, warmth, tenderness
- Later: fluctuance


Treatment:

- Hot compresses repeatedly to affected area
- Ichthammol ointment 20% locally

- Larger fluctuant abscesses: incision and drainage
- Antibiotics in case of systemic infection e.g.
  - Erythromycin:
    - Children: 50 mg/kg in 3 divided doses
    - Adults: 500 mg qid
    - Duration of treatment: 1 week
  - In severe cases:
    - Cloxacillin:
      - Children: 50 mg/kg in 3-4 divided doses
      - Adults: 500-1000 mg qid
      - Duration of treatment: 1 week
      - To be taken on an empty stomach
        or if available
    - Cephalosporines e.g. cefuroxime:
      - Children: 30 mg/kg in 2 divided doses
      - Adults: 250-500 mg bid
      - Duration of treatment: 10 days

12.4.3. Erysipelas/cellulitis

- After minor trauma or other breaks in the skin
- Common site of entry for bacteria: interdigital space of feet after fungal infection; also insect bites

⊙ Risk factors:
- Immunodeficiency
- Diabetes mellitus
- Alcohol/drug abuse
- Anaemia
- Lymphoedema
- Obesity

12.4.3.1. Erysipelas

- Infection spreads in dermis and upper subcutaneous tissues

Causative agent:
- Group A ß-haemolytic streptococci

Clinical manifestations:
- Mainly on face or legs
- Red, hot, oedematous tender area of skin; sharply demarcated
- Severe illness: vesicles, bullae, erosion
- Accompanying lymphangitis
- Fever and malaise
- With recurrent episodes: fewer symptoms: mild erythema, persistent oedema

12.4.3.2. Cellulitis

- Spreading infection in dermis and epidermis

Causative agents:
- Staphylococci
- Group A ß-haemolytic streptococci

Clinical manifestations:
- Often affected: lower legs
- Mainly localized symptoms
- Redness (less well demarcated), diffuse oedema, warmth, pain
- Occasionally lymphangitis with adenopathy
- Complications: abscess formation, purulent blisters, necrosis of soft tissue, rarely necrotizing fasciitis

Treatment:
- Immobilize affected limb.
- Advice regarding cool compresses
- Antibiotics PO:
  - Cloxacillin:
    - Children: 50 mg/kg in 3-4 divided doses
    - Adults: 500-1000 mg qid
    - To be taken on an empty stomach
    - Duration of treatment: 1 week

    or
  - Erythromycin:
    - Children: 50 mg/kg in 3 divided doses

- Adults: 500 mg qid
- Duration of treatment: 1 week

or if available

- Cephalosporines e.g. cefuroxime:
  - Children: 30 mg/kg in 2 divided doses
  - Adults: 250-500 mg bid
  - Duration of treatment: 10 days

- Severe infections: admit to hospital for IV antibiotics and possible further intervention.
- With fungal infection of the foot: clotrimazole ointment tid for 3-4 weeks
- Check for underlying diseases and treat accordingly.

12.4.5 Tropical ulcer

- Often in malnourished patients with low protein intake
- Occurs after minor trauma e.g. insect bite, cut or abrasion.

Causative agents:

- Bacillus fusiformis, spirochaetes
- Mixed infections with other bacteria possible

Clinical manifestations:

- Usually affecting ankle or lower leg
- Initially papule or blister; develops rapidly into an ulcer and destroys the surrounding tissue
- Occasionally exposes muscles or tendons
- Very painful in the beginning, pain decreases after about 4 weeks.
- Healing slowly, but often becomes stationary at 1-10 cm in size
- Painless in chronic state
- Complications:
  - Infection of underlying bone or tendon
  - Septicaemia
  - Tetanus
  - Occasionally superinfection with diphtheria, leading to a white membrane on ulcer

Differential diagnosis:

- Tuberculosis

- Leishmaniasis
- Ecthyma (ulcerative bacterial infection caused by streptococci or staphylococci)

Treatment:

- Clean with povidone iodine solution or Ringer's Lactate solution.
- Daily dressings with povidone iodine ointment
- Acute stage:
  - Penicillin V:
    - Children: 30 mg/kg in 3-4 divided doses
    - Adults: 500 mg qid
    - Duration of treatment: 5-7 days
- If no improvement give:
  - Erythromycin:
    - Children: 50 mg/kg in 3 divided doses
    - Adults: 500 mg qid
    - Duration of treatment: 7 days

    or if available
  - Cephalosporine e.g. cefuroxime:
    - Children: 30 mg/kg in 2 divided doses
    - Adults: 250-500 mg bid
    - Duration of treatment: 10 days
- Tetanus prophylaxis
- Advice to wear shoes, if possible long trousers

12.5. Fungal Infections

12.5.1 Tinea (ringworm)

- Endemic in areas with hot and humid climate, esp. in crowded and dirty living conditions and close contact with animals

Causative agents:

- Dermatophytes (living in stratum corneum of skin invading horn of hair roots of body and scalp)

Clinical manifestations:

- Tinea pedis (athlete's foot), tinea manuum:
  - Itching, scaling, maceration, fissures between toes, fingers
  - Spreading to soles of foot or palms of hand
  - Occasionally hyperkeratotic lesions, sometimes only scaling of palm
- Tinea corporis:
  - Can affect groin, body and head
  - Round scaly areas with elevated papular border, initially erythematous, later often hyperpigmented
  - Occasionally pustules
  - Lesions may merge producing larger areas.
- Tinea capitis:
  - Round scaly area, erythematous, with papules, inflammation; occasionally folliculitis
  - If treated late permanent alopecia (due to scars) may develop.

Treatment:

- Body and clothes should be washed daily.
- Local treatment only effective in hairless areas; otherwise additional systemic treatment necessary
- Tinea pedis, manuum:
  - Gentian violet solution 0.5% bid-tid
  - Whitfield's ointment bid-tid
  - Clotrimazole cream 1% bid-tid
  - Duration of treatment: at least 3 weeks
- Tinea with hyperkeratosis on hand or feet, onychomycosis, tinea corporis:
  - Griseofulvin:
    - Children: 10 mg/kg in 2 divided doses
    - Adults: 500-750 mg od
    - Duration of treatment: 4 weeks
  - Ketokonazole:
    - Adults: 200 mg od
    - Duration of treatment: 2-3 weeks
    - Avoid in children.
- Tinea capitis:
  - Remove hair next to affected scalp areas.
  - Treat with griseofulvin or ketokonazole according to availability.

12.5.2 Candidiasis (thrush)

Causative agent:

- Mainly candida albicans

Clinical manifestations:

- Oropharyngeal:
  - White plaques on inflamed mucosa of mouth
- Vaginal:
  - White creamy discharge, inflamed mucosa, pruritus
- Cutaneous:
  - Red rash, wet, with papules or pustules
  - On perineum (e.g. nappy rash in babies) or in skin folds
  - White soggy-looking skin in interdigital space
- Severe widespread infections (also systemic) in immunocompromised patients, e.g. patients infected with HIV

Treatment:

- Skin should be cleaned on a daily base.
- Oropharyngeal thrush:
  - Nystatin suspension or gel qid
  - Gentian violet solution 0.5% bid-tid
  - Duration of treatment: 1 week
- Vaginal thrush:
  - Clotrimazole 500 mg vaginal tablet single dose or 200 mg on 3 consecutive nights
  - Treat sexual partner, advise condoms during treatment.
- Cutaneous thrush:
  - Gentian violet solution 0.5% bid-tid
  - Clotrimazole cream 1% bid-tid
  - Duration of treatment: up to 1 week after the disappearing of lesions (at least 3 weeks)
- Widespread lesions esp. in immunocompromised patients e.g. patients with HIV:
  - Ketokonazole 3-5 mg/kg od
  - Duration of treatment: 2-4 weeks
- Synthetics should be avoided; in nappy rash: expose bottom of child to air as much as possible.

12.5.3. Pityriasis (tinea) versicolor

- Very common in the tropics


Causative agent:
- Pityrosporon ovale (malassezia furfur)


Clinical manifestations:
- Hypo- or hyperpigmented macules, irregularly shaped, with scales
- On trunk, esp. back, upper arms, neck


Differential diagnosis:
- Pityriasis alba:
  - Eczema, mainly in children (face), but also adults
  - Different areas of the body affected, esp. arms and legs
  - With white, well demarcated areas
  - Occasionally slight pruritus
  - Self-limiting; no treatment necessary
- Vitiligo: persistent hypopigmented macules
- Leprosy: single or few macules


Treatment:
- Clotrimazole 1% cream bid-tid
- Whitfield's ointment bid-tid
- Duration of treatment: at least 3 weeks

12.6. Infestation of the Skin

12.6.1. Scabies (seven year itch)

- World-wide infection
- In areas without proper hygiene, with poverty and/or overcrowding


Causative agent:
- Sarcoptes scabiei

Transmission:
- Person-to-person (female mite), through clothes and bedding

Life cycle:
- Female mite lays eggs in a burrow in the skin.
- Larvae hatch, mould, undergo several stages and mature into adults.
- After fertilization on the surface females start burrows again.
- Transmission can occur at any time after infection with mites.

Clinical manifestations:
- Incubation period: 6-8 weeks until appearance of rash
- Initially small itchy papules (burrows with eggs and secretion of mites)
- After sensitization of skin generalized rash with vesicles and nodules, esp. between fingers and toes, wrists, genitals, buttocks, arms and legs
- Itch severe at night
- Scratching often leads to secondary infection.

Treatment:
- All members of the household should be treated at the same time (even if asymptomatic).
- Advice regarding cleanliness (daily bath) is very important.
- All clothes and bedding should be washed daily and dried in the sun.
- Benzyl benzoate 25% emulsion:
  - Adults, children > 10 years:
    - After bath apply emulsion to whole body from neck downward (including area behind the ears).
  - Younger children:
    - Dilute to half strength (12.5%).
    - Include head in treatment.
  - Leave overnight and wash off in the morning.
  - Treat for 3 consecutive days.
  - Treat whole family at the same time.
  - Treatment of large communities and problems with compliance: repeat treatment after 10 days.
- In superinfected scabies:
  - Cloxacillin:
    - Children: 50 mg/kg in 3-4 divided doses

        - Adults: 500-1000 mg qid
          or
      - Cefuroxime:
        - Children: 30 mg/kg in 2 divided doses
        - Adults: 250-500 mg bid
  - Topical treatment:
    - Gentian violet solution 0.5% and povidone iodine ointment/solution for pustules
  - Often itch persists for several weeks (i.e. an allergic reaction to dead mites, not a treatment failure); if recurrence of papular itchy lesions: recurrence of illness likely
  - Severe pruritus:
    - Diphenhydramine:
      - Children: 1-2 mg tid prn
      - Adults: 50 mg up to tid prn
  - Ivermectin:
    - Perhaps treatment of choice in the future (advantage: tablets only, better compliance, less treatment failure), but too expensive at present

12.6.2. Pediculosis (louse infestation)

- World-wide; in areas with poor hygiene

Causative agents:
  - Pediculus humanus (body louse)
  - Pediculus capitis (head louse)
  - Phthirus pubis (crab louse)

Life cycle:
  - Female louse attaches eggs firmly to body hair (close to the skin) or folds of clothing (P. humanus).
  - Nymphs hatch, develop into adult lice in about 3 weeks; both suck blood several times during the day.

Transmission:
  - Close contact, clothes, bedding

👁 Clinical manifestations:
- Papular rash with itching
- Intense scratching leading to secondary infection
- P. humanus can transmit louse-borne typhus or relapsing fever.

Always remember: impetigo of the scalp or neck can be caused by infestation with head lice.

 Treatment:
- Easiest solution is to shave head or affected areas; **otherwise**:
- Hair should be washed daily and combed with a fine comb.
- Benzyl benzoate 25% emulsion (diluted 1:3 with clean water):
  - Apply to affected areas (avoid contact with eyes).
  - Leave overnight, wash hair in the morning.
  - Apply on 3 consecutive days.
- Patient to check for nits: they may need to be removed with comb or fingers.
- Give antibiotics in severe infection.
- Clothes and bedding should be washed and boiled and left to dry in the sun.

12.7. Burns

- Mainly small children affected who play close to open fires and cooking pots

👁 Clinical manifestations:
- 1st degree burns: redness
- 2nd degree: blistering of skin
- 3rd degree: deep burn: black charred skin, diminished sensitivity
- Secondary infection possible
- Pain and fluid loss can lead to shock.

⊙ Assessment:
- Time of accident
- What happened?
- Depth of burn

- Extent of burned areas (rough estimate):
  - Children:
    - Entire head: 18%
    - Arm: 9%
    - Leg: 14%
    - Front of chest and abdomen: 15%
    - Back of chest and abdomen: 15%
    - Buttocks: 3% each
  - Adults:
    - Head: 9%
    - Front of trunk: 18%
    - Back of trunk: 18%
    - Arm: 9%
    - Hands 1%
    - Leg: 18%

 Treatment:

Burned area must be dipped in cool water or cooled down with cold compresses immediately to prevent major damage!

- 1st degree burn:
  - Painkillers e.g. paracetamol PO:
    - Children: 30 mg/kg in 3-4 divided doses
    - Adults: 500-1000 mg up to qid
  - For severe pain: tramadol PO, IV, IO, IM if available:
    - Children 1-11 years: 1-2 mg/kg up to tid prn
    - Children ≥ 12 years, adults: 2 mg/kg tid prn
- 2nd degree burn:
  - Avoid bursting the blisters.
  - Open blisters: gently clean burned area.
  - Silver sulphadiazine (flamazine) to affected areas to prevent infection:
    - Caution: avoid silver sulphadiazine in pregnancy (esp. in the last trimester), in breast-feeding women and in neonates (risk of neonatal haemolysis and methaemoglobinaemia; also question of increased risk of kernikterus). Use in pregnancy only if benefits are greater than risk to foetus.

  - Avoid using silver sulphadiazine for large areas (increased risk of side effects of sulphonamides e.g. leucopenia or rash).
- Apply clean dressing to burns. Dress each finger or toe separately.

Alternatively:

- Clean burns.
- Dressing with sofratull and povidone iodine solution/ointment
- Infected burns: broad-spectrum antibiotics e.g. amoxicillin
- Painkillers e.g.:
  - Children:
    - Paracetamol 30 mg/kg PO in 3-4 divided doses **or**
    - Tramadol 1-2 mg/kg PO, IV, IO, IM tid if available **or**
    - Metamizole ½ drop/kg (= 10 mg/kg) PO in 3 divided doses
  - Adults:
    - Paracetamol 500-1000 mg PO qid **or**
    - Tramadol 2 mg/kg PO, IV, IO, IM up to tid **or**
    - Metamizole 18-36 drops PO up to qid
- Rehydration:
  - Increase fluid intake:
    - Normal fluid requirement (see *Moderate dehydration plan B,* p.91)
    - Add 20 mL/kg for every 10% of body surface or part of it
    - Give ORS (oral rehydration solution), in severe burns IV-infusion e.g. with Ringer's Lactate solution.
- Give tetanus prophylaxis.

➢ Refer to hospital:
- Severe burns (> 25% body surface)
- 3rd degree burns
- Burns to face and eyelids
- Patients with contractures

Note:

For change of dressing it might be necessary to give ketamine.

12.8. Wounds

General guidelines:

- Wounds older than 6 hours should not be sutured; in remote areas this rule can be stretched to up to 24 hours if the patient can be observed afterwards for any sign of infection.
- Infected wound or incised abscesses should never be sutured.
- Wounds due to bites of animals or humans should not be sutured.
- "Open fracture" means that there is a break in the skin overlying the fracture.
- Always give antitetanus prophylaxis if not fully immunized.

Treatment:

- Clean wound and surrounding area (e.g. with povidone iodine solution or Ringer's Lactate solution).
- Anaesthetize with lidocaine 1% or 2%.
- Explore wound to exclude foreign bodies, underlying fracture, involvement of other structures e.g. tendons, major blood vessels etc.
- Clean wound thoroughly.
- Use interrupted sutures (non-resorbable sutures e.g. silk for skin, resorbable sutures e.g. chromic catgut for subcutaneous tissues).
- Use finer suture material e.g. 3/0 for face, thicker material e.g. 2/0 for scalp or limbs (the higher the numbers the finer is the suture material).
- Removal of sutures: face: after 5 days; other wounds: after 7 days; wounds overlying joints: after 10 days

Note:

When treating wounds do not forget to give tetanus prophylaxis and, with dirty or infected wounds, antibiotics e.g. cefuroxime or erythromycin.

13. OPHTHALMOLOGICAL PROBLEMS

13.1. Cataract

- Most common cause of blindness worldwide
- In tropical regions: occurring about 10 years earlier than in Western countries
- Risk factors: possibly associated with sunlight, malnutrition, diabetes mellitus, hypertension

Clinical manifestations:
- White opacity in pupil
- Decreasing visual acuity
- Increased glare


Treatment:
- Surgery (only if both eyes affected; eye camps in some of our projects e.g. in the Philippines)
- Normally glasses used for aphakic correction
- In some hospitals: intraocular lens implantat

Note:

An operation is important to avoid permanent blindness which leads to loss of income and additional burden to the family (the blind needing to be looked after permanently by a member of the family).

13.2. Conjunctivitis


Causative agents:
- Bacteria, viruses, fungi; often highly contagious
- Also: allergic in origin (often associated with hay fever)
- Visual acuity usually not affected

Clinical manifestations:

- Bacterial/fungal conjunctivitis:
  - Red eye, irritation
  - Purulent discharge
  - Occasionally with chemosis
  - Ophthalmia neonatorum: see chapter *STD,* p.143
- Viral infection:
  - Red eye
  - Watery discharge
  - Occasionally: keratitis (severe pain, photophobia) or secondary bacterial infection
- Allergic conjunctivitis:
  - Red eye
  - Severe pruritus
  - Watery discharge
  - Eyelid oedema
  - Often associated with other allergic diseases e.g. eczema or asthma

Treatment:

- Bacterial conjunctivitis:
  - Chloramphenicol 0.5% eye drops tid for 5-7 days
  - Tetracycline 1% ointment (for very watery eyes) tid for 5-7 days
  - If severe illness: treat for up to 14 days (esp. in neonates).
- Viral conjunctivitis:
  - Cold compresses
  - Antibiotic eye drops or ointment for secondary infection
- Allergic conjunctivitis:
  - Cold compresses
  - Severe illness: antihistamines PO e.g. diphenhydramine:
    - Children: 2 mg/kg tid prn
    - Adults: 50 mg tid prn

Eyes should be cleaned regularly with normal saline.
Do not pad an infected eye.

☂ Prevention:
- Advice to wash towel or cloth thoroughly and dry in the sun after cleaning the infected eye
- Advice not to share towels or cloths
- Hands should be cleaned with soap and water after applying eye drops or touching the infected eye.
- Advice to avoid touching a non-infected eye after touching the infected eye

13.3. Pterygium

- Very common in the tropics (possibly due to high exposure to ultraviolet light)
- More common in males than in females

👁 Clinical manifestations:
- Fibrovascular mass on the surface of conjunctiva and cornea
- Growing across the cornea from temporal or nasal side
- Flat or raised and injected
- Can grow rapidly.
- Possible: itching, irritation, visual disturbance

⚖ Differential diagnosis:
- Pinguecula:
  - Small asymptomatic nodules (often yellowish) on bulbar surface of conjunctiva
  - Not extending to cornea

 Treatment:
- Normal saline drops for irritation or itching
- Operation only with visual problems; high recurrence rate

13.4. Trachoma

- Most common eye disease in the world (500 million people infected), major cause of blindness, second only to cataract
- Endemic in dry and hot areas of Africa, India and South-East Asia
- Disease of poverty, associated with poor hygiene, lack of water and overcrowding
- Risk factors (five D's): dry, dusty, dirty, density (overcrowding of homes), (eye-) discharge
- Mainly in children between 1 to 6 years; also affected: contacts e.g. mothers and older siblings


Causative agent:
- Chlamydia trachomatis type A-C


Transmission:
- Flies, faeces, fingers, contaminated clothes (smear infection)


Clinical manifestations:
- Problem: recurrent episodes of infection and bacterial superinfection leading to scarring of conjunctiva and cornea with subsequent blindness
- Usually both eyes affected
- Stage I:
  - Trachomatous inflammation - follicular (TF):
    - 5 or more follicles (white, grey, yellow) in the upper tarsal conjunctiva
- Stage II:
  - Trachomatous inflammation - intense (TI):
    - Intense inflammation with red, thickened conjunctiva of the upper lid
    - Follicles
- Stage III:
  - Trachomatous scarring (TS):
    - Scarring of the tarsal conjunctiva (white lines or bands in the upper tarsal conjunctiva)
    - Increased risk of entropium with resulting trichiasis

- Stage IV:
  - Trachomatous trichiasis (TT):
    - At least 1 eyelash rubbing the cornea
    - Ulceration and chronic inflammation of cornea
- Stage V:
  - Corneal opacity (CO):
    - Vascularization of cornea (pannus)
    - Scarring of cornea
    - Loss of vision

✎ Diagnosis:

- Early diagnosis crucial for prognosis
- Important: Examination of conjunctiva and cornea for inflammation and discharge:
  - Evert upper eyelid and examine the tarsal conjunctiva for inflammation, follicles or scarring (ask the patient to look down and pull the eyelashes up while rotating the upper eyelid against a matchstick or similar object).
  - Check for corneal opacities.

 Treatment:

Only early treatment can prevent blindness, only early stages can be cured completely.

- Stage I/II:
  - Facial cleanliness:
    - Cleaning of eyes and face several times during the day with clean water
  - Systemic antibiotic treatment:
    - Azithromycin:
      - Child > 6 months: 30 mg/kg single dose
      - Adults: 1 g single dose
    - Treat whole family.
    - **If** azithromycin **not available** give:
  - Topical treatment:
    - Tetracycline eye 1% ointment to be applied bid for 6 weeks to both eyes

- Stage III:
  - Surgical intervention as early as possible to avoid persistent corneal damage
- WHO strategy:
  - SAFE: **s**urgery (for trichiasis), **a**ntibiotics, **f**acial cleanliness, **e**nvironmental improvement (improved access to clean water)
  - Goal: eradication of blinding trachoma by 2020

☂ Prevention
- Education regarding cleanliness and hygiene is very important to prevent transmission and reinfection (e.g. advice regarding regular daily face and hand washing with clean water).
- Education regarding use of latrines and burning of rubbish etc.

14. ENT PROBLEMS

14.1. Otitis Externa

- Diffuse inflammation of the skin in the external ear canal

Causative agents:
- Bacterial infection (e.g. staphylococci or pseudomonas)
- Fungal infection (e.g. candida albicans)
- Trauma of the ear canal

Clinical manifestations:
- Irritation
- Discharge (”runny ear”)
- Pain on moving the pinna or compression of the tragus
- Deafness
- Tympanic membrane intact

Treatment:
- Aural toilet:
  - Flush external ear canal gently with normal saline.
  - Mop ear dry from the outside.
  - Wait for 10 minutes before applying ear drops.
- Chloramphenicol 0.5% ear drops: 2 drops tid **or**
- Gentamycin 0.5% ear drops: 2 drops tid
- Duration of treatment: 5-7 days
- Tragus massage after application of ear drops

14.2. Otitis Media

- Common disease in childhood
- Often chronic in older children, esp. with impaired resistance e.g. through malnutrition or measles (chronic suppurative otitis media)
- If untreated risk of ossicular destruction and hearing loss
- Often combined with common cold, tonsillitis, sinusitis

Causative agents:

- Bacteria e.g. pneumococci, streptococci, haemophilus influenzae
- Viruses

Clinical manifestations:

- Acute:
  - Pain
  - Deafness
  - Pyrexia
  - Inspection: dull ear drum, bulging; purple colour; sometimes perforation of ear drum with discharge
- Chronic:
  - Perforated ear drum
  - Smelly discharge (”runny ear”)
  - Complications: cholesteatoma, mastoiditis, labyrinthitis, meningitis etc.

Note:

All children with fever, diarrhoea or vomiting should have their ears checked.

Treatment:

- Acute otitis media:
  - Antibiotic treatment e.g.:
    - Amoxicillin:
      - Children: high dose of 80 mg/kg in 3 divided doses
      - Adults: 500 mg tid
      - Duration of treatment: children < 2 years: 10 days; children > 2 years, adults: 5-7 days
    - If allergic to penicillin give erythromycin:
      - Children: 50 mg/kg in 3 divided doses
      - Adults: 500 mg tid-qid
  - Paracetamol for pain and pyrexia
- Chronic suppurative otitis media:
  - Aural toilet 3 to 4 times/day:
    - Flush external ear canal gently with normal saline.

- > Mop ear dry from the outside.
- > Wait for 10 minutes before applying ear drops.
- > Important: education of patient how to mop ear canal

- o Chloramphenicol ear drops tid or gentamicin ear drops: 3 drops tid-qid to ear canal
  - > Tragus massage after application
  - > Duration of treatment: 2 weeks minimum
- o With first manifestation of aural secretion: trial of amoxicillin or cotrimoxazole for 2 weeks
- o Refer to hospital in case of complications e.g. mastoiditis (persistent pain, discharge, pyrexia, swelling and tenderness behind the ear).

14.3. Cerumen

- Try to avoid manipulation e.g. syringing of the ear – there is always a risk of causing an infection (esp. if the patient has a perforated ear drum).
- Better: use oil (e.g. coconut oil) to soften the wax: apply nightly for at least one week instilling the oil when lying on the side; the wax will be removed by the hair in the ear canal.
- Syringing with *warm* water is rarely needed.

14.4. Rhinitis/Sinusitis

- Increase fluid intake.
- Use saline nose drops (0.9% NaCl) to liquefy nasal secretions; for infants instil nose drops 10 minutes before feeding.
- Children > 4 years, adults with yellow discharge, fever and headache: consider sinusitis; treat with antibiotics such as amoxicillin or cotrimoxazole and paracetamol for fever and pain.
- Advice regarding salt water douches (sniffing a little salt water into each nostril)
- With pain over sinuses: always check for dental problems, e.g. abscess.

Unilateral purulent discharge: check for foreign body in the nostril.

14.5. Acute Tonsillitis

- Most frequent under the age of 9

Causative agents:
- Mainly streptococci
- Viruses
- Spread by droplet infection

Clinical manifestations:
- Sore throat
- Dysphagia
- Earache, headache
- Pyrexia
- Tonsils enlarged, inflamed, occasionally with exudate
- Tender cervical lymph glands
- Complications:
  - Acute otitis media, peritonsillar abscess (quinsy)
  - Acute nephritis, rheumatic fever
- Viral tonsillitis less severe

Treatment:
- Paracetamol or aspirin (adults) for pain and pyrexia
- Increase fluid intake.
- Penicillin V:
  - Children: 30-60 mg/kg in 3-4 divided doses
  - Adults: 500 mg qid
- Erythromycin (for patients with penicillin-allergy):
  - Children: 50 mg/kg in 3 divided doses
  - Adults: 500 mg tid-qid
- Treat for 10 days to avoid complications.
- Salt water gargles (1 teaspoon of salt in 1 glass of warm water)

15. DIFFERENT OTHER CONDITIONS

15.1. Endocrinological Problems

15.1.1. Goitre

15.1.1.1. Iodine deficiency

- Most common cause of goitre
- Endemic in some areas; contributing factors: malnutrition, staple foods such as cassava or cabbage or increasing iodine requirement during puberty, pregnancy and breast feeding

 Clinical manifestations:

- Usually euthyroid
  - First: diffuse enlargement
  - Later: regressive changes with mononodular, then multinodular goitre with risk of developing autonomous areas and hyper-thyroidism
- Maternal iodine deficiency during pregnancy (euthyroid or hypothyroid) leading to endemic cretinism in the infant with:
  - Poor feeding, constipation, hypotonia, prolonged neonatal jaundice
  - Later: growth failure, deaf-mutism and mental retardation

 Diagnosis:

- Palpation
- Check TSH if hyper- or hypothyroidism is suspected (raised in only 20%).

 Treatment:

- Iodized salt
- Operation only if there is danger of compression of the trachea

 Prevention:

- Regular use of iodized salt e.g. in bread or added after cooking

- Advice regarding food: increase consumption of seafood or seaweed (as most of the iodine is found in the water after cooking: prepare soup or sauces)
- Avoid cassava or water it for one hour before preparing the meal.

15.1.1.2. Hypothyroidism

Causes:
- In our projects: mainly side effect of treatment (e.g. with carbimazole or post-operative)
- Autoimmune disease (M. Hashimoto)
- Congenital

Clinical manifestations:
- Bradycardia
- Dry, thickened skin
- Non-pitting oedema

Diagnosis:
- TSH

Treatment:
- L-thyroxin 50-100 mcg od

15.1.1.3. Hyperthyroidism

Causes:
- Graves' disease (usually with goitre but sometimes without goitre)
- Toxic adenoma

Clinical manifestations:
- Restlessness, tremor, tachycardia
- Weight loss, diarrhoea, weakness
- Goitre with thyroid bruit
- Exophthalmos (can be unilateral)

✎ Diagnosis:
- Clinical manifestations
- TSH; if low TSH (< 0.3): check T4 prior to treatment with carbimazole.
- Ultrasound of goitre (to differentiate between Graves' disease and toxic adenoma)

Treatment:

*Do **not** start treatment without hormone tests for confirmation of diagnosis.*

- Therapeutic:
  - Carbimazole:
    - Start with 10 mg (up to 30 mg) od (according to initial T4).
    - Check **T4** after 4 weeks, then after 3 months and adjust treatment according to result (repeated checks of TSH **not** necessary as it takes a long time to adjust).
    - Maintenance dose: 2.5-15 mg od
    - Side effect: agranulocytosis (1%); occurs suddenly: therefore check white cell count only in symptomatic patients (sore throat, fever, other signs of infection); stop treatment immediately.
- Symptomatic (with tremor and tachycardia):
  - Metoprolol:
    - Give 50-100 mg od
    - Improves tremor and tachycardia and reduces the conversion of T4 to T3.
    - Adjust according to heart rate and blood pressure; if normal: stop.
- Duration of treatment:
  - Graves' disease:
    - Try to stop treatment after 12-18 months.
    - In 50% remission after 12-18 months; if symptoms recur consider referral for operation (subtotal thyroidectomy).
  - Toxic adenoma: treatment life-long; consider referral for operation.

Diagnosis and Therapy of Hyperthyroidism

TSH < 0.3 mU/l

T4 normal

> Subclinical hyperthyroidism
> Avoid iodine
> Observe

T4 raised (> 2 ng/dl)

> Clinical hyperthyroidism
> Treatment:

> **Carbimazole** 10 mg od
> Consider: **Metoprolol** ret. 50 mg od

> After **4** weeks: check **T4**
> Adjust dose of carbimazole (maintenance dose: 2.5-15 mg od)
> Aim for normal values of T4

+ Arrange

Ultrasound scan of thyroid gland

> Nodules (toxic adenoma)
> Life-long treatment or operation

> Diffuse enlargement (Graves' disease)
> Stop carbimazole after 12-18 months
> Observe

Important to remember:

- Avoid hypothyroid stage – risk of deterioration of ophthalmopathy and enlargement of goitre.
- Patients with goitre should be checked at each consultation regarding heart rate, blood pressure and weight to avoid problems under therapy.
- Patients **must** be asked to present immediately with signs of infection, especially with fever or sore throat; if this happens they **must** be told to stop treatment with carbimazole.

15.1.2. Diabetes mellitus

- Prevalence dependent on age
- Increasing in developing countries due to population growth and urbanization and increasing prevalence of obesity and physical inactivity

2 types of diabetes mellitus:

	Type I Diabetes mellitus	**Type II Diabetes mellitus**
Frequency (% of population worldwide)	< 10%	> 90%
Cause	Autoimmune disease, loss of pancreatic beta cells	Insulin secretory defect, insulin resistance
Age of onset	Mainly affected: children, young people	> 40 years
Onset	Abrupt	Slow
Constitution	Lean, weight loss	Obese, increasing weight
Ketoacidosis	Common	Rare
Sulfonylureas	Not effective	Effective

👁 Clinical manifestations:
- Polyuria, polydipsia
- Weight loss, lethargy
- Dehydration, with visual disturbance and leg cramps
- Pruritus, skin infections (bacterial, fungal)
- Untreated: coma, death
- Complications:
  - Peripheral neuropathy e.g. bilateral lower extremity sensory neuropathy (burning feet), diabetic foot with painless ulcers
  - Microangiopathy e.g. retinopathy, nephropathy
  - Macroangiopathy: myocardial infarct, stroke
  - Often associated with hypertension

✎ Diagnosis:
- Random blood sugar: > 200 mg/dl (11.1 mmol/l)
- Fasting glucose: > 125 mg/dl (7.0 mmol/l)
- Urine dipstick: positive for ketones

 Treatment:

Every patient with diabetes mellitus must be referred to a diabetic clinic if at all possible; regular check-ups are of utmost importance, esp. in patients on insulin and sulfonylureas.

- **Type II** Diabetes mellitus:
  - First line treatment:
    - Advice regarding diet, exercise and weight reduction (avoid food containing sugar; advice to eat several small meals and to avoid fat)
  - Second line treatment: oral medication in cooperative patients:
    - Metformin (for insulin resistance):
      - Initially 500 mg od (up to 1000 mg bid)
      - Contra-indications: renal impairment, cardiac failure, respiratory failure, hepatic impairment; has to be stopped in any severe illness (e.g. tuberculosis, pneumonia or dehydration), prior to investigations with x-ray contrast media or 48 h prior to general anaesthetic.
      - Side-effects: nausea, vomiting, rarely: lactic acidosis
      - Note: Problem with fasting periods during Ramadan (medication to be taken at night)
      - Advantage: no risk of hypoglycaemia
    - Glibenclamide (sulfonylurea; stimulation of beta cells):
      - Dosage: 1.75 mg (up to 10.5 mg); give 2/3 of medication in the morning, 1/3 in the evening.
      - To be taken before meals
      - Side effect: hypoglycaemia, esp. with irregular food intake
      - Contraindicated in pregnancy
- **Type I** Diabetes mellitus:
  - Mixed insulin SC:
    - Give 2/3 in the morning, 1/3 at night.

- > Side-effect: hypoglycaemia, esp. with irregular food intake
- o **Only** to be given in **rare** cases:
  - > Cooperative patient
  - > Education of patient and close follow-up e.g. in diabetic clinic or with local coordinator
  - > Problems:
    - – No home glucose testing
    - – Storage (no refrigerator)

➢ Hypoglycaemia:
- o Side-effect in treatment with sulfonylureas (prolonged hypoglycaemia) and insulin
- o Clinical manifestations:
  - > Hunger, nausea, restlessness, tremor
  - > Sweating, tachycardia
  - > Seizures, coma
- o Treatment:
  - > Mild hypoglycaemia, conscious patient:
    - – Give sugary drink e.g. coca-cola.
    - – Then give long-acting carbohydrates e.g. biscuits, bread.
    - – Recheck blood sugar prior to discharge of patient.
  - > Severe hypoglycaemia, semi- or unconscious patient:
    - – 40% glucose IV: 40-100 mL stat (with frequent blood glucose checks), **then**
    - – 5% glucose IV (up to blood sugar of 200 mg/dl)
    - – Refer to hospital.

➢ Follow up:
- o History: ?problems ?hypoglycaemia
- o BM-stix or blood glucose
- o Blood pressure check
- o Urine dipstick ?albumin (rule out UTI)
- o Serum creatinine with possible nephropathy
- o Check feet (pulses, sores, nails), advice to wear slippers or shoes for protection.
- o Education and referral to diabetes clinic

Gestational diabetes:

- Glucose intolerance, first onset during pregnancy
- Increased risk of developing type II diabetes mellitus after delivery


Treatment (only by specialist):

- Diet advice (e.g. avoidance of sugar, several small meals)
- Insulin SC
- Metformin PO (only studies with patients in 2nd and 3rd trimester; can be given in the first trimester if benefit outweighs the risk; not known to be teratogenic in animals)

15.2. Epilepsy

- Seizure: due to paroxysmal discharge of cerebral neurones
- Epilepsy: should only be diagnosed after 2 seizures


Causes:

- Hereditary: low seizure threshold
- Brain disorders e.g. after perinatal hypoxaemia
- Acute infections or trauma to the central nervous system e.g. encephalitis, meningitis, haemorrhage, abscess, cysticercosis, cerebral malaria
- Drugs, alcohol or withdrawal of drugs; poisoning
- Metabolic disorders e.g. hypoglycaemia, uraemia, dehydration etc.
- Intracranial tumors
- Pyrexia: febrile convulsions in children


Clinical manifestations:

- Classification:
  - Generalized seizures (grand mal seizures; neuronal discharge involving both hemispheres, generalized symptoms):
    - Primary or secondarily generalized (following partial seizure)
    - Mainly idiopathic, but can be hereditary or due to brain disorders
    - Preceding aura in secondarily generalized seizures
    - Sudden loss of consciousness with tonic/clonic movements of limbs, lasting for several minutes, then post-ictal confusion or drowsiness
    - Often with tongue bite and/or incontinence of urine or faeces

- Absence seizures (petit mal):
  - Childhood disorder, may develop into grand mal fits in adult life
  - Sudden onset, child stops all activity, looks vacant for a few seconds, then resumes previous activity.
- Partial seizures (neuronal discharge involving part of the brain; focal symptoms):
  - Simple partial seizure:
    - Consciousness not impaired
    - Motor, sensory or autonomic disturbance depending on site of origin in brain
  - Complex partial seizure:
    - With aura
    - Consciousness impaired
    - Verbal or motor automatisms depending on area of brain involved
- Febrile seizures (convulsions):
  - Age: 6 months to 5 years
  - Tonic-clonic seizure, focal seizure
  - Often less than 15 minutes
  - No neurological deficit

⚖ Differential diagnosis:
- Vasovagal syncope: occasionally accompanied by rhythmic jerks; no post-ictal drowsiness
- Chilling: tremor, no loss of consciousness, no post-ictal phase
- Underlying causes e.g. meningitis, encephalitis, malaria, tuberculosis, parasitic disease e.g. schistosomiasis, cysticercosis etc.

✎ Diagnosis:
- Detailed history including family history and detailed description of fits
- Temperature
- Blood sugar
- In rare cases: EEG, CT-scan

Treatment:

- Emergency treatment:
  - Keep calm – usually a seizure is not a life threatening event and resolves spontaneously.
  - Prevent patient from injuring himself.
  - Secure airway, if possible recovery position.
  - Give oxygen if available.
  - If seizure longer than 5 minutes:
    - Diazepam (0.5-0.7 mg/kg):
      - Children < 15 kg: 5 mg PR
      - Children > 15 kg, adults: 10 mg PR (use parenteral solution in syringe)
      - Status epilepticus: diazepam IV (slowly over 3 minutes)
    - With fever:
      - Sponging with tepid water
  - Treat underlying causes (e.g. meningitis, malaria).
- Long-term treatment:
  - General aspects:
    - To avoid side effects: start with $^{1}/_{3}$ of dose and increase in intervals from 3 days up to 3 weeks.
    - Always give lowest dose controlling the epilepsy, preferably monotherapy.
    - Consider side effects e.g. hepatotoxicity.
    - Pregnant women: problems with teratogenicity, esp. in the first trimester; important: referral to specialist
    - *Avoid quinolones if possible (e.g. ciprofloxacin; side effect: convulsions)*
  - Generalized seizures:
    - First line treatment:
      - Sodium valproate 20 mg/kg in 2 divided doses; start with 5-10 mg/kg
    - Second line treatment:
      - Phenobarbital up to 5 mg/kg od
    - Secondarily generalized seizures:
      - If grand mal while asleep: Carbamazepine 20 mg/kg in 2 divided doses

- Partial seizures:
  - First line treatment:
    - Carbamazepine 20 mg/kg/day in 2 divided doses (up to 1200 mg/day)
  - Second line treatment (for children > 6 years, adults):
    - Sodium valproate 20 mg/kg in 2 divided doses; start with 5-10 mg/kg **or**
    - Phenytoin 5 mg/kg in 2 divided doses
- If not controlled **add**:
  - Phenobarbital up to 5 mg/kg od
- Febrile seizures (convulsions):
  - Consider prophylactic medication **only** with more than 4 seizures.
  - Phenobarbital up to 5 mg/kg od **or**
  - Sodium valproate 20-30 mg/kg in 2 divided doses
- Side effects:
  - Sodium valproate:
    - Hair loss
    - Teratogenic: avoid in the 1st trimester: increased risk of neural tube defects
    - Rarely hepatic failure
  - Carbamazepine:
    - Allergic reactions, hair loss
    - Teratogenic: avoid in the 1st trimester: increased risk of neural tube defects; adequate folate supplements advised, therefore start folic acid prior to pregnancy.
    - Interactions with theophylline, digoxin, erythromycin, furosemide, phenobarbital
    - Storage: tablets must be stored in a dry place.
  - Phenobarbital:
    - Sedation, esp. in adults
    - Behavioural disturbances, hyperactivity (children)
    - Risk of rebound seizures on withdrawal
    - Pregnancy: risk of congenital malformations
    - Interactions with carbamazepine (reduced plasma concentration), phenytoin, sodium valproate
    - Hepatitis, cholestasis
    - Allergy

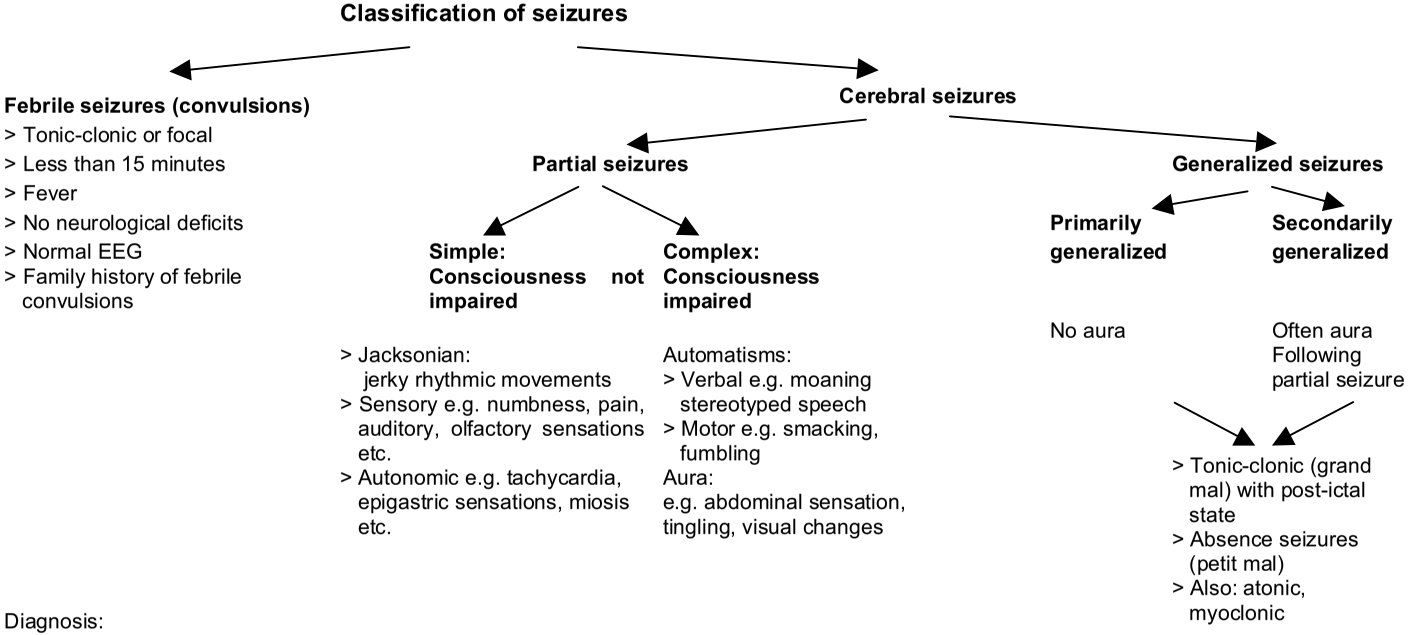
- Phenytoin:
  - Small increase in dosage may produce large rise in plasma concentration
  - Acne, hirsutism, gingival hyperplasia
  - Megaloblastic anaemia (treatment with folic acid)
  - Rarely: hepatotoxicity
  - Congenital malformations
  - Interactions with phenobarbital, digoxin, furosemide, cimetidine, theophylline, vitamin D (increased requirement)

- Withdrawal of medication:
  - May be attempted after 2-3 years without seizures and normal EEG.
  - Avoid abrupt withdrawal: risk of rebound seizures.
  - Important: gradual reduction of medication over several weeks (up to months)
  - In patients with several drugs: gradual withdrawal of one drug at a time

☂ Prevention:
- Avoid alcohol, lack of sleep
- Drug treatment only in cooperative patients (convulsions may be caused by sudden withdrawal of anticonvulsants) and frequent seizures
- Febrile convulsions: paracetamol and tepid sponging with increasing temperature

Important to remember:

- Taking a detailed history is of utmost importance.
- Think of epileptic fit in a patient with sudden loss of consciousness lasting seconds to minutes, incontinence and subsequent disorientation or coma.



Diagnosis:

> Temperature
> Blood sugar
> Microscopy e.g. faeces (schistosomiasis)
> In rare cases: CT, EEG

Long-term Therapy of Seizures

Febrile Seizures (Convulsions):

Prophylaxis (if more than 4 convulsions):

> Antipyretic treatment with temperature > 38.5° esp. in the first 24 hours
> Consider phenobarbital up to 5 mg/kg od **or**
> Consider sodium valproate 20-30 mg/kg in 2 divided doses

Seizures:

Starting therapy:

> Gradual increase until control of seizures (intervals from 3 days up to 3 weeks)

Withdrawal of medication:

> Free of seizures for 2-3 years
> Normal EEG
> Gradual withdrawal over several weeks depending on medication

General information

> Medication must be taken regularly
> Preferably monotherapy
> Consider side-effects e.g. hepatotoxicity
> *If possible avoid treatment with quinolones e.g. ciprofloxacin (Side effect: convulsions)*

Partial Seizures
see opposite page

Generalized Seizures
see opposite page

Partial Seizures

First line treatment:

> Carbamazepine 20 mg/kg
in 2 divided doses*

Second line treatment:

Children > 6 yrs:

> Sodium valproate 20 mg/kg
in 2 divided doses **or**

> Phenytoin 5 mg/kg in 2 divided doses

Generalized Seizures

First line treatment:

> Sodium valproate 20 mg/kg
in 2 divided doses*

Second line treatment:

> Phenobarbital up to 5 mg/kg od

** if still not controlled add:*

> Phenobarbital up to 5 mg/kg od

Note:
Secondarily generalized seizures:

if grand mal while asleep:

carbamazepine 20 mg/kg in 2 divided doses

15.3. Hypertension

- Increasing problem in developing countries due to improving living standards
- Risk factor for cardiac disease, stroke, renal failure and arteriosclerosis
- In pregnant patients: increased risk of abruption of placenta, eclampsia and premature labour

⊙ Borderline hypertension:
- ➢ Drug treatment not indicated.
- ➢ Advise life style changes e.g. smoking cessation, weight reduction, reduction of alcohol intake, exercise, low salt diet, increased fruit and vegetable intake.

⊙ Diagnosis of hypertension:
- ➢ At least 3 consecutive readings with blood pressure of 160/100 mmHg and higher over a period of several days
- ➢ If hypertension **not** responding to treatment: exclude secondary hypertension:
  - o Urine dipstick
  - o Ultrasound scan of kidneys
  - o TSH

 Treatment:
- ➢ In most cases medication must be taken life-long
- ➢ Medication necessary if non-drug treatment fails
- ➢ Drug treatment dependent on possible concomitant diseases or race (ACE-inhibitors less effective in black patients):
  - o Hydrochlorothiazide:
    - > 12.5-25 mg od
    - > First line treatment for most patients
    - > Use preferably in black patients.
    - > Avoid in patients with renal failure (creatinine > 2.0), diabetes mellitus, gout, and in pregnant patients.
    - > If necessary can be combined with ß-blocker or ACE-inhibitor.

- ß-Blocker:
  - First line treatment in patients with heart failure or a history of myocardial infarction
  - Bisoprolol 5-10 mg od
  - Metoprolol 25-100 mg bid or Metoprolol retard 50-200 mg od
  - Avoid in patients with bradycardia, bronchial asthma, COPD, diabetes mellitus (deterioration of problems).
- Methyldopa:
  - Indication: hypertension in *Pregnancy*; see p.165
- Calcium-channel-blockers:
  - Can be combined with hydrochlorothiazide, especially in black patients if monotherapy is not working.
  - Nifedipine retard: 20 mg od
  - Amlodipine: 5-10 mg od
- ACE-inhibitors:
  - First line treatment in patients with heart failure or a history of myocardial infarction
  - Enalapril: 10-20 mg od
  - Ramipril: 2.5-5 mg od

Avoid treatment with ACE-inhibitors in women of child-bearing age (risk of malformations).

Hypertensive crisis:

- Severe hypertension e.g. with diastolic BP > 140 mmHg
- Can be associated with headache, convulsions, sudden onset of heart failure and renal failure.

 Treatment:

Avoid aggressive treatment e.g. sublingual nifedipine (risk of hypotension, stroke or myocardial and renal ischaemia).

- Advice rest.
- Give treatment as above.

- If complications:
  - Treat as required e.g. GTN-spray SL 1 puff stat., furosemide IV 40 mg stat.
  - Refer to hospital.

To ensure compliance of patients use once daily medication when at all possible.

Important to remember:

- During consultation it is important to decide whether the raised blood pressure is genuine or reactive e.g. induced by the visit to the doctor.
- At least 3 blood pressure readings on different days are necessary to make the diagnosis of hypertension.
- If hypertension is not responding to treatment exclude secondary hypertension (hyperthyroidism, renal hypertension). In the tropics 20-30% of hypertensive problems are due to renal disease.
- Patient compliance and continuity of treatment are of utmost importance. It is useless to treat patients for 3 weeks only.

15.4. Coronary Heart Disease

- Main cause of death in developed countries
- Men affected at an earlier age than women (protective effect of oestrogen)
- Getting more common in developing countries due to increasing urbanization
- 2 types:
  - Acute coronary syndrome
  - Stable coronary heart disease

⊙ Risk factors:
- Smoking
- Diabetes mellitus (high risk group)
- Hypertension
- Family history: myocardial infarct, stroke

- Hypercholesterolaemia

👁 Clinical manifestations:
- Acute coronary syndrome:
  - Acute myocardial infarction:
    - Chest pain for longer than 30 minutes, intense, often with fear of dying, not relieved by nitrates or rest
    - Dyspnoea, tachypnoea,
    - Pallor, sweating, distress
    - Nausea, vomiting
    - Complications: arrhythmias, congestive cardiac failure, cardiogenic shock
- Stable coronary artery disease:
  - Angina:
    - Precipitated by exertion, stress etc.
    - Recurrent crushing chest pain, radiating to neck, jaw or arms
    - Dyspnoea
    - Relieved by rest or nitrates

⚖ Differential diagnosis:
- Cardiovascular disease: perimyocarditis, arrhythmias (?palpitations), heart valve disease (aortic stenosis), aortic dissection
- Pulmonary disease: pulmonary embolism, pleuritis, pneumothorax
- Musculoskeletal disease: rib fracture, muscular strain, thoracic nerve compression
- Gastrointestinal disease: oesophagitis, gastric or duodenal ulcer, pancreatitis, biliary colic
- Other diseases: thoracic varicella zoster, rib tumor

✎ Diagnosis:
- History (?risk factor, predisposing illnesses, precipitating factors, duration, family history)
- ECG
- Cardiac enzymes e.g. troponin (not available in the projects)

Note:

ECGs are rarely relevant in patients with stable angina; with suspected myocardial infarction send patient to hospital straight away.


Treatment:

- Acute coronary syndrome:
  - Try to relax patient.
  - Analgesics as available
    - Morphine not available in our projects; therefore give
    - Tramadol hydrochloride 2 mg/kg IV
  - Oxygen via nasal prongs
  - Glycerol trinitrate 0.5 mg SL (caps) or 1-2 puffs of spray
  - Acetylsalicylic acid 600 mg PO stat, then continue at 150 mg od
  - ß-blocker e.g. metoprolol 100-200 mg od (contraindicated in patients with bronchial asthma, COPD, bradycardia, heart failure, hypotension)
  - Treat complications e.g. heart failure (furosemide 40 mg IV stat).
  - Refer to hospital for observation and further treatment.
- Stable coronary heart disease:
  - Acetylsalicylic acid 100 mg od
  - Angina:
    - Glyceryl trinitrate SL prn
    - Metoprolol 100-200 mg od (consider contraindications!)
  - Advice to stop smoking
  - Treat underlying diseases e.g. hypertension, diabetes mellitus.

Important to remember:

- Pain in the chest is a common complaint, but in most cases not connected to the heart (e.g. short stabbing pain, pain relieved by moving, pain in different locations of the chest).
- Taking a proper history, examining the patient properly and making a diagnosis is of utmost importance in the treatment of chest pain.

15.5. Stroke (Cerebro-Vascular Accident)

- Sudden onset of focal neurological deficit
- Mainly due to cerebral infarction (80%), less due to intracranial haemorrhages (20%)
- TIA (transient ischaemic attack): loss of cerebral function for less than 24 hours
- PRIND (prolonged neurological deficit, minor stroke): symptoms longer than 24 hours, but less than 7 days

⊙ Risk factors:
- Hypertension
- Coronary artery disease, atrial fibrillation
- Diabetes mellitus
- Smoking

👁 Clinical manifestations:
- Clinically no difference between ischaemic and haemorrhagic stroke
- Contralateral hemiparesis, sensory loss
- Visual disturbance (diplopia, amaurosis fugax)
- Cranial nerve palsy (e.g. facial nerve palsy)
- Aphasia, dysarthria
- Confusion, loss of consciousness, coma
- Epileptic fits
- Irregular pulse with atrial fibrillation
- Carotid bruit with stenosis of carotid arteries

⚖ Differential diagnosis:
- Hypertensive crisis
- Migraine with aura
- Hypoglycaemia
- Cerebral tumor, abscess, meningitis
- Cerebral schistosomiasis
- Subdural haematoma after trauma

Treatment:

- Ensure vital functions (e.g. pulse, breathing, blood pressure, temperature).
- If possible give oxygen via nasal prongs.
- Check for hypoglycaemia and treat if necessary.
- Lower high blood pressure slowly:
  - First 3 days: tolerate BP up to 220/110 mmHg.
  - With very high BP (diastolic: 240, systolic 130 mmHg): lower by max. 20% of initial BP.
- Lower raised temperature (> 37.5^{o}) with paracetamol and sponging with lukewarm water.
- Start IVI in patients with swallowing difficulties and refer to hospital.
- Treat underlying diseases (e.g. diabetes mellitus).
- Start rehabilitation program as soon as possible.

Note:

In our projects there is only basic treatment possible; standardized investigations (e.g. CT-scan of brain) or treatment in stroke unit are not possible due to lack of availability and funds.

16. IMMUNIZATIONS

In developing countries it is of utmost importance to check the immunization status and complete immunizations if necessary because:

- normal childhood illnesses can be life threatening due to poor living conditions with malnutrition and lack of hygiene.
- medical help is not readily available.
- 5 million children die due to infectious diseases every year in developing countries.
- 2 million deaths could be prevented by immunization.

⊙ The following immunizations are recommended for children:

- BCG (bacillus Calmet-Guerin): against tuberculosis; given intra-cutaneously
- DPT: against diphtheria, pertussis, tetanus; IM
- Polio (OPV): oral polio vaccine; PO
- Measles-vaccine; SC
- Hepatitis B; IM

Immunization schedule for children:

Right after birth	—	BCG
At 6 weeks	—	1. DPT, 1. polio, 1. hepatitis B
At 10 weeks	—	2. DPT, 2. polio, 2. hepatitis B
At 14 weeks	—	3. DPT, 3. polio, 3. hepatitis B
At 9 months	—	Measles
At 18 months	—	DPT – and polio booster

Childhood vaccination schedule for infants in developing countries		
Vaccine	**Age at immunization**	**Notes**
BCG (tuberculosis)	Birth	Not later than the 8th week of life
Polio	6, 10 and 14 weeks + 18 months	At birth, in **endemic** countries – "zero dose"
Diphtheria, Tetanus, Pertussis	6, 10 and 14 weeks + 18 months	
Hepatitis B	6, 10 and 14 weeks	
Measles	9 months	A second vaccination should be provided (after 8 weeks)

Tetanus-immunization schedule for pregnant women:

Dose	**Date**	**Protection**
1	At first contact, e.g. for antenatal care	No protection
2	At least 4 weeks later	3 years
3	At least 6 months later	5 years
4	At least 1 year later	10 years
5	At least 1 year later	Lifelong

17. LIST OF DRUGS

17.1. Binding Drug List for all Outpatient Projects

The following drug list is compiled by a group our experts who worked for several months in different projects of the committee. This drug list was updated in 2010 in accordance with guidelines of the World Health Organization.

Occasionally certain drugs are not available locally (depending on the project and supplier). This list is a standard which should be observed as close as possible.

The following guidelines are **binding** for every doctor working one of our projects.

Only drugs of group A – must be available at any time (a stock of drugs for about 4 weeks). As soon as the stock of one of the drugs is going down it must be ordered according to the local situation and supplier.

The binding drug list contains three groups of drugs:

Group A: drugs which are used on a regular base and which should be stocked in large amounts

Group B: drugs for special indications which should be used occasionally and should be stocked in small amounts

Group C: drugs used only exceptionally and should be ordered only on special request

Drugs not on the list can be prescribed and ordered for selected patients after discussion with the local coordinator.

We can order drugs for patients referred by us to a hospital or a local specialist. We should use our own drugs if at all possible.

ANAESTHETICS

Lidocaine amp

Ketamine amp

ANALGESICS/NON-STEROIDAL ANTIINFLAMMATORY DRUGS

Acetylsalicylic acid tab
Diclofenac tab
Ibuprofen tab
Paracetamol tab/susp

Hyoscine butylbromide tab/amp
Metamizol gutt
Tramadol gutt

ANTACIDS/REHYDRATION

Mixt. Magnesium Trisilicate tab
Ranitidine tab
ORS Sach

Omeprazol tab

ANTHELMINTICS/ANTIPROTOZOAL DRUGS

Mebendazole tab
Albendazole tab
Metronidazole tab/susp
Pyrantel-Pamoat susp

Praziquantel tab (Phil/Kenya)
Ivermectin tab

ANTIASTHMATIC DRUGS

Aminophyllin tab/amp
Salbutamol tab
Terbutaline susp

Beclomethasone inhaler
Prednisolone tab

Salbutamol inhaler

ANTIBIOTICS/ANTIVIRAL DRUGS:

Amoxicillin tab/susp
Ciprofloxacin tab
Cotrimoxazole tab/susp
Doxycycline tab
Erythromycin tab/susp
Penicillin V tab/susp

Acyclovir tab
Chloramphenicol amp (tab/susp Phil)
Clindamycin tab
Cloxacillin tab/susp
Cefachlor/Cefuroxime (or other cephalosporin 2nd generation)

Azithromycin tab
Clarithromycin tab

ANTIDIABETICS

Glibenclamide tab
Metformin tab

Mixed insulin 30/70

ANTIEPILEPTICS

Carbamazepine tab
Phenytoin tab/susp
Sodium valproate tab/susp

ANTIFUNGAL DRUGS

Griseofulvin tab

Ketaconazol tab

ANTIHISTAMINS/ANTIEMETICS

Diphenhydramine tab

Metoclopramide tab
Promethazine tab

ANTIMALARIAL DRUGS

Amodiaquine tab (Kenya)
Chloroquine tab/susp
Quinine tab (Kenya/Phil)
Fansidar tab (Kenya/Phil)
Mefloquine tab

Primaquine tab (India/Bangladesh)

ANTITUBERCULOSIS DRUGS

Ethambutol tab
Isoniazid tab
Pyrazinamide tab
Rifampicin tab
Streptomycin amp

CARDIOVASCULAR DRUGS

Bisoprolol/Metoprolol tab
Enalapril/Ramipril tab
Hydrochlorothiazide tab

Digoxin tab
Furosemide tab
Amlodipine/ Nifedipine ret. tab

ASS 100 tab
Isosorbide Mononitrate tab
Methyldopa tab
Spironolactone tab

DERMATOLOGICAL DRUGS

Benzyl benzoate 25% sol

Clotrimazole 1% cream
Gentian violet 0.5% sol
Hydrocortisone 1% cream
Ichthammol 20% ointment
Povidone iodine 10% sol/ointment
Vaseline
Whitfield Ointment
Zink oxide 10% ointment

Framycetin (Soframycin) ointment
Nystatin 100 000 IU oral gel
Silver sulfadiazine ointment
Calamine lotion

GYNECOLOGICAL DRUGS

Cotrimoxazole pessaries/cream

Ergometrine amp
Oxytocin amp

OPHTHALMOLOGICAL/OTOLOGICAL PREPARATION/ NASAL DROPS

Chloramphenicol 0.5% drops (eyes, ears)
Gentamycin drops (eyes, ears)
Saline nose drops
Tetracycline 1% eye ointment

VITAMINS/IRON

Ferrous sulphate tab/susp
Folic acid tab
Multivitamin tab
Vitamin A caps

Iodized oil caps
Vitamin D susp, amp

Vitamin B tab

17.2. Important Medicines and their Dosages

		Children		Adult
		Daily dosage	divided in doses per day	Daily dosage (tbl)
Acetylsalicylic acid	300 mg	—		3-4 x 1-2 1x ½ (CHD) (+ children >12 yrs)
Acyclovir	400 mg			3 x 1
Albendazole	400 mg	½ tab (<2 yrs)	single dose	single dose (+ children >2 yrs)
Aminophylline	100 mg			3 x 1-2
Amlodipine	5 mg	—		1 x 1-2
Amoxicillin	500 mg	50-100 mg/kg	3	3 x 1-2
Artemether + Lumefantrine	20 mg 120 mg		initial dose: 1 tab (5-14 kg) initial dose: 2 tab (15-24 kg) initial dose: 3 tab (25-34 kg) always repeat: at 8,24,36,48, 60 hours (≥2 mo ≤16 yrs)	initial dose: 4 tab repeat at 8, 24, 36, 48, 60 hours (+ children >16 yrs, ≥35 kg)
Azithromycin	500 mg	30 mg/kg (>6 mo)	single dose	2 tab single dose
Bisoprolol	5 mg	—		1 x 1-2
Carbamazepine	200 mg	20 mg/kg (up to 1200 mg/d)	2	20 mg/kg in 2 dvided doses
Carbimazole	5 mg	—		initial dose: 10 mg (-30 mg) od maintenance dose: 2.5-15 mg od
Cefuroxime	250 mg	30 mg/kg	2	2 x 1-2
Chloramphenicol	250 mg	25-100 mg/kg (high doses with typhoid fever, meningitis)	4	3 x 1 - 3 x 4 (high doses with typhoid fever, meningitis)
Chloroquine (Base)	150 mg	10 mg/kg, then 5 mg/kg	day 1 after 6 hours, day 2, 3	4 tab day 1, then 2 tab after 6 hours, day 2,3
Ciprofloxacin	250 mg	30-40 mg/kg	2	2 x 1-2
Clarithromycin	250 mg			2 x 1-2
Cloxacillin	250 mg	50 mg/kg	3-4	4 x 2-4

Cotrimoxazole (TMP+SMZ)		8 mg/kg TMP + 40 mg SMZ	2	2 x 1 (160 mg TMP + 800 mg SMZ)
Diclofenac	25 mg	—	—	3 x 1-2
Digoxin	0.25 mg	—	—	1 x ½ - 1 steady state
Diphenhydramine	50 mg	3-6 mg/kg	3	3 x 1
Doxycycline	100 mg	—	—	1-2 x 1
Enalapril	5 mg	—	—	1 x 2 - 1 x 4
Erythromycin	250 mg	50 mg/kg	3	3-4 x 2
Ferrous (elementary) (Fe : Fe-Sulphate: 1 : 3)		5 mg/kg (treatment)	1	1 x 60 mg (prophylaxis, pregnant women)
		2 mg/kg (malnutrition)	1	1 x 120 mg (treatment)
Folic acid	5 mg	0.5 mg/kg (children <1 yr)	1-3	1 x 1 (treatment; + children > 1 yr)
	800 mcg			1 x 1 (prophylaxis in pregnancy)
Furosemide	40 mg	1-4 mg/kg	3-4 as needed	1 tab as needed
Glibenclamide	3.5 mg	—	—	1 x ½ - 3 x 1 (2/3 morning, 1/3 evening; up to 2 tab morning, 1 tab nocte)
Griseofulvin	125 mg	10 mg/kg	2	1 x 4 - 1 x 6
Hydrochlorothiazide	25 mg	—	—	1 x ½ - 1 x 1
Hyoscine butylbromide	20 mg	30 mg (6-12 yrs)	3	3 x ½ - 3 x 1 (+ children >12 yrs)
Ibuprofen	200 mg	30 mg/kg (>7 kg)	3	3 x 2-4
Isoniazid	100 mg	5-10 mg/kg	1	1 x 3
Ivermectin		200 mcg/kg (>15 kg)	1	1 x 200 mcg/kg
Ketoconazole	200 mg			1 x 1 1 x 3-5 mg/kg (immunocompromised patients)
L-Thyroxin	25 mcg			1 x 2-4
Magnesium trisil.	120 mg	—	—	4 x 1
Mebendazole	100 mg	2 x 1 tab (>2 yrs)		2 x 1
Mefloquine	250 mg	15 mg/kg, then 10 mg/kg after 6-12 hrs (≥6 mo, >5kg)	single dose single dose	3 - 2 (-1 >60 kg) 6-hourly intervals
Metformin	500 mg	—		1 x 1 - 2 x 2
Methyldopa	250 mg	—	—	2 x 1 - 3 x 2 (up to 3 x 4)
Metoclopramide	10 mg	—	—	3 x 1
Metoprolol	50 mg	—	—	2 x ½ - 2
Metoprolol ret.	50 mg	—	—	1 x 1 - 1 x 4

Metronidazole	250 mg 200 mg	30 mg/kg	3	3 x 2, 2 x 2 (STD) 2 x 2 (STD), 2 x 4 (giardia)
Niclosamide	500 mg	2 tab (11-34 kg) 3 tab (>34 kg)	single dose single dose	1 x 4 single dose
Nifedipine ret.	20 mg	—	—	1 x 1
Omeprazole	20 mg			2 x 1
Paracetamol	500 mg	30 mg/kg	3-4	4 x 1-2
Penicillin V 0.4 M =	250 mg	30-60 mg/kg	3-4	4 x 2
Phenobarbital	15 mg	2-5 mg/kg	2	1 x 2-5 mg/kg
Phenytoin	100 mg	5 mg/kg	2	5 mg/kg in 2 divided doses
Praziquantel	600 mg	60 mg/kg (S.japonicum) 40 mg/kg (S. mansoni, haematobium) 5-10 mg/kg (tapeworm)	2-3 1-2 single dose	60 mg/kg in 2-3 divided doses (S. japonicum) 40 mg/kg in 1-2 divided doses (S. mansoni, haematobium) 5-10 mg/kg single dose (tapeworm)
Prednisolone	5 mg	1-2 mg/kg	1	as needed
Primaquine	15 mg	0.25 mg/kg	1	1 x 1
Promethazine	25 mg	1 mg/kg	2-3	1 x 1 - 3 x 2
Quinine	300 mg	30 mg/kg	3	3 x 2
Ramipril	5 mg	—	—	1 x ½- 1 x 1
Ranitidine	300 mg	—	—	2 x ½ - 1 x 1
Salbutamol	4 mg	0.3-0.6 mg/kg (2-6 yrs)	3	3-4 x ½ (+ children 6-12 yrs) 3-4 x ½ -1 (+ children >12 yrs)
Sodium valproate	150 mg	20 mg/kg (initially 5-10 mg/kg)	2	20 mg/kg in 2 divided doses (initially 5-10 mg/kg)
Tinidazole	500 mg	50-60 mg/kg (≥6 yrs)	1	1 x 4
Tramadol	50 mg			3-4 x 1-2
Vitamin A	Prophylaxis:			
	100 000 IU	6 -12 mo	every 6 months	
	200 000 IU	> 1 yr	every 6 months	
	Treatment:			
	50 000 IU	<6 mo	day 1, 2, 8	
	100 000 IU	6-12 mo	day 1, 2, 8	
	200 000 IU	> 1 yr	day 1, 2, 8	1 tab day 1, 2, 8
	25 000 IU			1 tab every week (pregnant women)

Suspensions

	mg/5 ml	**5 ml = 1 teaspoon**		
Albendazole	200 mg		single dose	(children < 2 yrs)
Amoxicillin	250 mg	50 mg/kg	3	—
Chloramphenicol	125 mg	25-100 mg/kg	4	
		(high doses with typhoid fever, meningitis)		
Chloroquine (Base)	150 mg	10 mg/kg, then	day 1	
		5 mg/kg	after 6 hours,	
			day 2, 3	
Cotrimoxazole (TMP+SMZ)		8 mg/kg TMP +	2	—
		40 mg SMZ		
Erythromycin	250 mg	50 mg/kg	3	—
Ferrous (elementary)		5 mg/kg	1	
Fe : Fe-Sulphate: 1 : 3)		(treatment)		
		2 mg/kg	1	
		(malnutrition)		
Metamizole		½ drop/kg =	3	1-4 x 18-36 drops
(1ml = 20 drops = 500 mg)		10 mg/kg		(adults)
Metronidazole	125 mg	30 mg/kg	3	—
Paracetamol	250 mg	30 mg/kg	3-4	—
Terbutaline	1.5 mg	0.2 mg/kg	3	—
Tramadol		½ drop/kg =	can be repeated	1-4 x 20-40 drops
		1.25 mg/kg	after 30-60 min	(+ children >13 yrs)
			Do not exceed 4	
			doses in 24 hrs.	
Vitamin D	6000 IU	7 drops	1	
(6 000 IU = 7 drops)				

Always check, whether the concentration of tablets or suspension has changed (e.g. chloroquine, erythromycin, metronidazole)**!**

Always check text for further information about the appropriate dosage!!

17.3. Emergency Kit

17.3.1. Emergency drugs

Amount	Name	Indication	Dosage	Application
4	Adrenaline 1:1000 (1 amp = 1 mg)	Anaphylaxis, anaphylactic shock	Adults: ½ amp (0.5 mg = 0.5 mL), children: 0.01 mg/kg (=0.01 mL/kg) Repeat according to response	IM (SC)
	Adrenaline 1:1000 (1 amp = 1 ml = 1 mg)	Croup	0.5 mL/kg per dose (maximum dose: 5 mL) of 1:1000 solution	By nebulization
	Adrenaline 1:10 000	Anaphylactic shock	Adults: titrate 0.5 ml boluses according to response, children: 0.01 mg/kg (=0.1 mL/kg = 10 mcg/kg); titrate according to response	IV, IO
5	Aminophylline 250 mg amp	Asthma	Adults: 5-7 mg/kg slowly, avoid in children	IV, IO
	Aminophylline 250 mg amp	Asthma	Adults: 1 amp (250 mg) up to tid, avoid in children	PO
4	Atropine 0.5 mg amp	Bradycardia, adjunct in anaesthesia with ketamine, organophosphate poisoning	Adults: 0.01-0.1 mg/kg, children: 0.02 mg/kg	IV, IO

2	Biperiden 5 mg amp	Drug-induced extrapyramidal symptoms, parkinsonism	Adults: 0.05-0.1 mg/kg slowly	IV, IO
2	Dexamethasone 8 mg amp	Anaphylaxis, thyrotoxicosis	Adults, children: 0.1 mg/kg slowly	IV, IO
2	Diazepam 10 mg amp	Anxiety, panic attacks, epileptic fit, acute coronary syndrome	Adults: starting with 5-10 mg titrate slowly in 5 min intervals (15 – 20 – 25 mg etc; maximum dose: 60 mg), children: 0.3 mg/kg, then give 0.1 mg/kg according to response	IV, IO
2	Diazepam 5 mg rectal tube	Childhood seizure; avoid in croup	Adults, children > 15 kg: 10 mg (2 rectal tubes), children < 15 kg: 5 mg (1 rectal tube)	PR
2	Diphenhydramine 50mg amp	Allergy, anaphylaxis, nausea, sedation	Adults, children: 1-2 mg/kg slowly up to tid prn	IV, IO, IM, PO
2	Furosemide 20 mg amp	Pulmonary oedema, congestive cardiac failure, ascites, fresh water drowning	Adults, children: 0.5-1 mg/kg	IV, IO
1	Gelafundin 500 ml	Shock, low blood volume	Adults: 30 ml/kg; avoid in children	IV, IO
1	Glucose 40% 20 ml	Loss of consciousness of unknown origin, hypoglycaemia	Adults: 20 ml slowly, avoid in children	IV, IO

	Glucose 10%	Loss of consciousness of unknown origin, hypoglycaemia	Children: 2.5 mL/kg slowly	IV, IO
1	GTN-spray	Acute coronary syndrome, hypertensive crisis	1-2 puffs	SL
4	Hydrocortisone 100mg amp	Anaphylaxis, allergy, bronchial asthma, croup	Adults: 2 mg/kg, children: 4-8 mg/kg stat, then 2 mg/kg up to qid prn	IV, IO,IM
2	Hyoscine butylbromide 20 mg amp	Biliary colic, ureteric colic, acute abdomen	Adults: 0.5 mg/kg slowly up to tid prn; avoid in children	IV, IO, IM
2	Ketamine 500 mg amp	Analgesia	Adults, children: 0.25-0.5-1 mg/kg	IV, IO
	Ketamine 500 mg amp	Sedation	Adults, children: 1-1.5 mg/kg **or** 4-5 mg/kg	IV, IO IM, PO
	Ketamine 500 mg amp	Anaesthesia	Adults, children: 2 mg/kg **or** 5-6 mg/kg repeat after 15-20 min.	IV, IO IM, PO
1	Lidocaine 2% 50 ml (1 ml = 20 mg)	Ventricular tachycardia, ventricular fibrillation (electric shock), ventricular arrhythmias	Adults: 0.5 mg/kg slowly, children: 1 mg/kg slowly	IV, IO

5	Methylergometrine 0.2 mg amp (store under refrigeration, protect from light)	Uterine atony (postpartum)	1 amp	SC
10	Metoclopramide 10 mg amp	Nausea, vomiting, migraine	Adults, children ≥12 yrs: 5-10 mg tid prn	IV, IO, IM
2	Nalbuphine 10 mg amp	Analgesia, acute coronary syndrome	Adults, children: 0.2 mg/kg, repeat prn every 3-6 hours	IV, IO, IM, SC
2	Oxytocin 10 IU amp (store under refrigeration)	Induction or enhancement of labour; postpartum haemorrhage	4 IU in 500 ml Ringer's Lactate solution	IV-infusion
2	Promethazine 50mg amp	Allergy, anaphylaxis, nausea, sedation	Adults: 1 mg/kg children: 0.25-1 mg/kg up to tid prn	IV, IO, PO
2	Ringer's Lactate solution 500 ml	Intravenous infusion, shock, volume depletion	Adults: 50 mL/kg, children: 10-20 mL/kg, repeat prn	IV, IO

1	Salbutamol inhaler	Bronchial asthma, croup, status asthmaticus	Adults, children: 2-4 puffs, preferably with spacer, repeat prn after 20 min	Inhalation
	Salbutamol nebules 2.5 mg	Bronchial asthma, status asthmaticus	Adults, children > 5yrs: 2.5-5 mg, children ≤ 5yrs: 2.5 mg Repeat prn after 20 min	By nebulization
	Tramadol 400 mg amp	Analgesia	Adults, children ≥ 12 yrs: 2 mg/kg, children 1-11 yrs: 1-2 mg/kg up to tid prn	IV, IO, IM, PO

Applications (abbreviation):

IM: intramuscular
IO: intraosseous
IV: intravenous
PO: oral
SC: subcutaneous
SL: sublingual

17.3.2. Emergency equipment

Abbocath neddles (G 16, 20, 24 – each 2)	6
Alcohol 70% bottle	1
Ambubag	1
Butterfly needles (G 21, 23, 25 – each 2)	6
Catgut	15
(2-0, 3-0, 4-0 – each 5)	15
Flashlight with batteries	1
Gloves, nonsterile pairs	3
Guedel tubes (child: 1, adult: 1)	2
Glucosticks pack	1
IV tubing	5
KY jelly	1
Masks (child: 1, adult: 1)	2
Nasogastric tubes (size Fr 10, 14 – each 1)	2
Needles (G 20, 22, 25 – each 4)	12
Roller bandage	1
Rolls of tape (small: 1, broad: 1)	2
Saw for ampules	2
Scissors	2
Silk (2-0, 3-0 – each 3)	6
Sterile OS pack	1
Syringes (1 ml, 2 ml, 5 ml, 10 ml – each 3)	12
Tongue depressor	10
Tourniquet	2
Urine catheters (size 12, 14, 16)	3

17.4. Drugs during Pregnancy and Breastfeeding

Classification of drugs in pregnancy and breastfeeding:

+	first line agent	usually safe in pregnancy and breast-feeding; use only if non-drug treatment presumably not effective
±	second line agent	only indicated if other treatment is not effective; often insufficient information available about pregnancy and breastfeeding
S	single dose only	single dose or low dose for 1-3 days
(–)	potentially toxic	for embryo, fetus, newborn or breastfed infant; use only when potential benefit greater than the risk taken
–	contra-indicated	probably teratogenic or fetotoxic, possible adverse effects during breastfeeding or the benefit to the mother not outweighing the risk to the fetus

Drug	First trimester (1st -12th week)	Second/ third trimester (> 13th week)	Short before term/ during labour	Breast-feeding
Acetylsalicylic acid	±, S	±, S	–	±, S
ACE-inhibitors	(–)	–	–	+
Acyclovir	+	+	+	+
Adrenaline	+	+	+	+
Albendazole	(–)	+	+	+
Aminophylline	+	+	+	+
Amlodipine	(–)	±	±	+
Amoxicillin	+	+	+	+
Antacids	+	+	+	+
Artemether + Lumefantrine	(–)	±	±	±
Atropine	+	+	–	–
Azithromycin	+	+	+	+
Beclomethasone (inhaler)	+	+	+	+
Benzyl benzoate (topical)	+	+	+	+ – on breast
Biperiden	+	+	+	+
Bisoprolol	+	+	(–)	+
Carbamazepine	(–)	±	±	+
Carbimazole	–	–	–	+
Cefuroxime	+	+	+	+
Chloramphenicol	(–)	(–)	(–)	–
Chloroquine	+	+	+	–
Ciprofloxacin	(–)	+	+	–
Clemastine	+	+	+	+, S
Clindamycin	+	+	+	–
Clarithromycin	+	+	+	–
Cloxacillin	+	+	+	+
Cotrimoxazole	(–)	–	–	–
Dexamethasone	+	+	+	+
Diazepam	+	+	+, S	+, S
Diclofenac	+	(–), S	(–), S	+
Diethylcarbamazine	–	–	–	(–)
Digoxin	+	+	+	+

Diphenhydramine	+	+	+	+
Doxycycline	±	–	–	–
Enalapril	(–)	–	–	+
Ethambutol	+	+	+	+
Ergometrine	–	–	– (postpartum possible with atonic uterus)	(–)
Erythromycin	+	+	+	+
Ethambutol	+	+	+	+
Ferrous sulphate	+	+	+	+
Folic acid	+	+	+	+
Furosemide	±	±	±	±
Gentamycin	–	–	–	+
Glibenclamide	±	±	±	(–)
Glyceryl trinitrate	+	+	+	+
Griseofulvin	(–)	(–)	(–)	–
H_2–receptor antagonists	+	+	+	–
Hydrochlorothiazide	±	±	±	+
Hyoscine butylbromide	+, S	+, S	+, S	+, S
Ibuprofen	+	(–), S	(–), S	+
Insulin	+	+	+	+
Isoniazid	+	+	+	+
Isosorbide Mononitrate	+	+	+	+
Ivermectin	–	–	–	–
Ketamine	+	+	+	+
Ketoconazole	±	±	±	±
Lidocaine (local anaesthetic)	+	+	+	+
Mebendazole	(–)	+	+	+
Mefloquine	(–)	(–)	(–)	–
Metamizole	(–)	(–)	(–)	(–)
Metformin	+	±	±	+
Methyldopa	+	+	+	+
Metoclopramide	±	+	+	(–), S
Metoprolol	+	+	(–)	+
Metronidazole	+	+	+	(–), S
Multivitamins (vit. A < 6 000 IU/d)	+	+	+	+
Nalbuphine	+	+	(–)	+

Niclosamide	+	+	+	+
Nifedipine	(–)	±	±	+
Nystatin	+	+	+	+
Omeprazole	±	+	+	+
Oxytocin	–	–	+ (postpartum)	+
Paracetamol	+	+	+	+
Penicillin V	+	+	+	+
Phenobarbital	(–)	(–)	(–)	+
Phenytoin	(–)	(–)	(–)	+
Povidone iodine (topical)	+	(–)	(–)	–
Praziquantel	±	+	+	+
Prednisolone	+	+	+	+
Primaquine	–	–	–	–
Promethazine	+	+	+	+
Pyrazinamide	+	+	+	+
Quinine	–	±	–	+
Ramipril	(–)	–	–	+
Ranitidine	+	+	+	–
Rifampicin	±	+	+	+
Salbutamol (inhaler)	+	+	+	+
Salbutamol p.o.	+	+	+, S	+
Silver sulfadiazine (topical)	+	+	(–)	(–)
Sodium valproate	(–)	(–)	(–)	+
Streptomycin	–	–	–	+
Terbutaline	+	+	+, S	+
Tetracycline (topical)	±	–	–	–
Tinidazole	(–)	±	±	(–)
Tramadol	(–)	+	+	+
Vit. A > 10 000 IU/d	–	–	–	+*
Vit. B	+	+	+	+
Vit. D	±	±	±	+

* Vitamin A 200 000 IU can be given to mothers within 8 weeks of delivery (WHO recommendations)

18. ABBREVIATIONS

They should not be learned by heart! They are mentioned to give you an idea what you can find in a chart or a letter and to help you to understand.

AC	before meals
Adm	admission
AF	atrial fibrillation
AFB	acid fast bacilli
am	in the morning
ARI	acute respiratory tract infection
ASA	acetylsalicylic acid
AXR	abdominal x-ray
BBB	bundle branch block
BE	barium enema
bid	twice daily (bis in die)
BM	bowel movement
BP	blood pressure
BS	bowel sounds
BUN	blood urea nitrogen
Bx	biopsy
C	with
CA	carcinoma
CAD	coronary artery disease
Caps	capsule
CBC	complete blood count
CC	cough and cold
CCF/CHF	congestive cardiac/heart failure
CHD	congenital heart disease
CI	contraindication
CNS	central nervous system
C/o	complaining of
COPD	chronic obstructive pulmonary disease
CRF	chronic renal failure
C&S	culture and sensitivity
CSF	cerebrospinal fluid
CVA	cerebrovascular accident
CXR	chest x-ray
D	day (d) or diarrhoea (D)
D&C	dilatation and curettage

D&V	diarrhoea and vomiting
DC	differential count
DCT	diagnostic counselling and testing
DF	dengue fever
DHF	dengue haemorrhagic fever
DM	diabetes mellitus
DOB	date of birth
DSS	dengue shock syndrome
Dx	diagnosis
EENT	eye, ear, nose and throat (department)
ENT	ear, nose and throat (department)
EPH	oedema, proteinuria, hypertension
EOR	error of refraction
ESR	erythrocyte sedimentation rate
FB	foreign body
FBC	full blood count
FBS	fasting blood sugar
F/U	follow-up
FUO	fever of unknown origin
Fx	fracture
GIT	gastrointestinal tract
GUT	genito-urinary tract
H	hour
HAART	highly active antiretroviral therapy
Hb	haemoglobin
HBP	high blood pressure
Hct	haematocrit
Ht	height
Hx	history
I&D	incision and drainage
ICS	intercostal space
ID	intradermal
IM	intramuscular
IO	intraosseous
IUD	intrauterine device
IV	intravenous
IVP	intravenous pyelogram
KUB	kidney, ureter, bladder (x-ray)
LBM	loose bowel movement
LBP	lower back pain
LLE	left lower extremity

LLL	left lower lobe
LLQ	left lower quadrant
LMP	last menstrual period
LN	lymph node
LOC	loss of consciousness
LP	lumbar puncture
LUL	left upper lobe
LUQ	left upper quadrant
LVF	left ventricular failure
MUAC	mid-upper arm circumference
ND	not done
No	number
NPO	nil by mouth (nihil per os)
NS	normal saline
NSAID	non-steroidal anti-inflammatory drug
O&P	ova and parasites
OB-GYN	obstetrics and gynaecology
od	once daily
OE	otitis externa
OM	otitis media
OPD	outpatient department
ORS	oral rehydration solution
PEP	post-exposure prophylaxis
PID	pelvic inflammatory disease
pm	in the afternoon
PMB	postmenopausal bleeding
PMH	past medical history
PO	per os
PR	per rectum; pulse rate
prn	as required
PTA	prior to admission
PTB	pulmonary tuberculosis
PUD	peptic ulcer disease
PUO	pyrexia of unknown origin
PVD	peripheral vascular disease
qid	four times a day (quattuor in die)
RA	rheumatoid arthritis
RBC	red blood count
RBS	random blood sugar
RLE	right lower extremity
RLL	right lower lobe

RLQ	right lower quadrant
r/o	rule out
RR	respiratory rate
RUE	right upper extremity
RUL	right upper lobe
RUQ	right upper quadrant
Rx	prescription
SC	subcutaneous
S/e	side effects
SL	sublingual
SMP	smear for malarial parasites
SOB	shortness of breath
Stat	straight away
STD	sexually transmitted disease
TCB	to come back
tid	three times a day (ter in die)
TLC	tender loving care
UGI	upper GI series
US	ultrasound
URTI	upper respiratory tract infection
UTI	urinary tract infection
V	vomiting
VCT	voluntary counselling and testing
V/E	vaginal examination
WBC	white cell count
Wt	weight

19. DICTIONARY GERMAN – RNGLISH

To help our colleagues with the translation of some of the most important terms.

A

Ablauf	drainage
Abort	abortion, miscarriage
Abstillen	weaning
Abstrich	smear
Abwehrspannung	guarding
Ambulant	outpatient
Anfall	heart: attack; epileptic: seizure, fit, convulsion (generalized)
Angina	sore throat
Arzneimittel	drugs
Atemgeräusch	breath sounds
Atemgymnastik	respiratory exercises
Atmen, vesikulär	vesicular breath sounds
Attest	medical certificate
Aufnahme (stationär)	admission
Augenbraue	eyebrow
Augenlid	eyelid
Ausfluss	discharge
Ausrenkung	dislocation
Ausschlag	rash, eruption
Auswurf	sputum, phlegm

B

Bandwurm	tapeworm
Bauch	belly, abdomen
Becken	pelvis
Beschwerden	complaints
Bewußtlosigkeit	unconsciousness, loss of consciousness
Bewußtseinsstörung	impaired consciousness
Bindegewebe	connective tissue
Bissverletzung	bite injury
Blähung	flatulence, wind
Blase	blister (derm.), bladder (urol.)
Blasensprung	rupture of the membranes

Blutausstrich	blood smear, blood slide
Blutbild	blood count
Blutprobe	blood sample, blood specimen
Blutung	bleeding, haemorrhage
Brandwunde	burn
Brechdurchfall	diarrhoea and vomiting
Brechreiz	nausea
Brille	spectacles, eye glasses
Bruch	hernia (inguinal), fracture (bone)
Brummen	rhonchi
Brustkorb	chest
Brustwarze	nipple
BWS	thoracic spine

D

Darm	bowel, intestine
Darmgeräusche	bowel sounds
Daumen	thumb
Doppelsehen	double vision
Dosierung	dosage
Dumpf	dull
Durchblutungsstörung	circulatory disorder

E

Eierstock	ovary
Einlauf	enema
Einmal...	disposable
Einschnitt	incision, cut
Eisenmangelanämie	iron deficiency anemia
Eiter	pus
Ellenbogengelenk	elbow joint
Empfängnisverhütung	contraception, birth control
Entbindung	delivery
Entfernung	removal (chir.)
Entlassung	discharge (from hospital)
Entlastung	relief
Erblindung	loss of vision
Erguss	effusion
Erkältung	cold
Erreger	causative agent
Erste Hilfe	first aid

Erstickung	suffocation, asphyxiation
Ertrinken	drowning
Esslöffel	tablespoon

F

Fehlgeburt	miscarriage
Ferse	heel
Fieberkrämpfe	febrile convulsions
Frösteln	shiver
Frühgeburt	preterm labour
Fußknöchel	ankle
Fußpilz	tinea pedis, athlete's foot

G

Gallenblase	gallbladder
Gallenkolik	biliary colic
Gallenstein	gallstone
Gallenwege	bile ducts
Gaumen	palate
Gebärmutter	uterus, womb
Gebiss, künstliches	denture
Gebühr	fee, charge
Geburt	delivery
Geburtswehen	contraction
Gedeihstörung	failure to thrive
Gehgips	walking cast
Gehirnerschütterung	concussion
Geisteskrankheit	mental disorder
Gelbsucht	jaundice
Gelenkerguss	joint effusion
Gesäß	bottom
Gesäßhälfte	buttock
Geschlechtskrankheit	sexually transmitted disease, venereal disease
Geschwür	ulcer, sore
Geschwulst	tumor
Gewichtsverlust	weight loss
Gewichtszunahme	weight gain
Gicht	gout
Giemen	wheezes
Gipsschiene	plaster splint
Gipsverband	plaster cast

Gliedmaßen	limbs
Grippe	flu, influenza
Gürtelrose	shingles, herpes zoster
Gurgeln	gargle

H

Haarausfall	loss of hair, alopecia
Hämorrhoiden	hemorrhoids, piles
Hals	neck
Halsschmerzen	sore throat
Handgelenk	wrist
Handschuh	glove
Harnblase	bladder
Harnverhalt	urinary retention
Hasenscharte	harelip
Hautausschlag	rash
Hauterkrankung	skin disease
Hebamme	midwife
Heiserkeit	hoarseness
Herzgeräusch	heart murmur
Herzinfarkt	myocardial infarction
Herzinsuffizienz	heart failure
Herzklappenfehler	valvular defect
Herzton	heart sound
Heuschnupfen	hay fever
Hoden	testicles
Hüftgelenk	hip joint
Husten, produktiver	productive cough
HWS	cervical spine

I

Impfstoff	vaccine
Impfung	vaccination
Ischialgie	sciatica, lumbago

J

Jodmangelstruma	iodine deficiency goitre
Juckreiz	itch(ing)

K

Kaiserschnitt	caesarean section
Kehle	throat
Kehlkopf	larynx
Keuchhusten	whooping cough
Kiefer	jaw
Kinderkrankheit	childhood disease
Kinn	chin
Klagen	complaints
Kleinkind	toddler
Knöchelödem	ankle oedema
Kopfverletzung	head injury
Krätze	scabies
Krampf	spasm, cramp
Krampfadern	varicose veins, varices
Krankenblatt	medical record
Krankentrage	stretcher
Krankheit	illness, disease
Krebs	cancer
Kreislaufversagen	circulatory failure
Kreuzschmerzen	lower back pain
Krücke	crutch

L

Lähmung	paralysis, palsy
Lebendimpfstoff	live vaccine
Leistenbruch	inguinal hernia
Lungenentzündung	pneumonia
Lymphknoten	lymph node

M

Magensonde	nasogastric tube
Mandeln	tonsils
Milbe	mite
Milz	spleen
Missbildung	malformation
Müdigkeit	fatigue
Mundsoor	oral thrush
Muskelriss	ruptured muscle

N

Nabel	navel, umbilicus
Nabelbruch	umbilical hernia
Nachtblindheit	night blindness
Nackenstarre	stiff neck
Nadelstichverletzung	needle-stick injury
Nässend	weeping
Naht	suture
Narbe	scar
Nasenbluten	epistaxis
Nasenflügelatmen	nasal flaring
Nasenloch	nostril
Nebenniere	adrenal gland
Nebenwirkung	side effect
Nervenzusammenbruch	nervous breakdown
Niere	kidney
Nierenstein	renal stone
Nierenkolik	renal colic
Niesen	sneezing
Nisse	nit
Nüchtern	fasting

O

Oberlid	upper lid
Oberschenkel	thigh
Oberschenkelhals	neck of femur
Ödem	oedema
Ohnmacht	fainting
Ohrenschmalz	earwax, cerumen
Ohrenschmerzen	ear-ache

P

Pflaster	plaster, tape
Placentalösung	abruption of placenta
Pleurareiben	pleural rub
Pleuritis	pleurisy
Punktion	puncture

Q

Quetschung	contusion, bruise

R

Rachitis	rickets
Rasselgeräusche	rales
feucht/ trocken	moist, crackling/ dry
Reizhusten	dry cough
Rezidivierend	relapsing, recurrent
Rheuma	rheumatism
Röntgen	x-ray
Röteln	rubella, German measles
Rückenmark	spinal cord
Rückfall	relapse
Ruhr	dysentery

S

Säugling	infant
Salbe	ointment
Saugen	sucking
Schädel	skull
Schälen	peeling
Scharlach	scarlet fever
Scheidenausfluß	vaginal discharge
Schere	scissors
Schiene	splint
Schlaff	floppy
Schlaflosigkeit	insomnia
Schlaganfall	stroke, cerebro-vascular accident
Schleimig	mucus
Schluckauf	hiccup
Schlucken	swallowing
Schlüsselbein	collarbone, clavicle
Schmerz	pain
Schmierinfektion	smear infection
Schnittwunde	cut
Schnupfen	common cold
Schürfwunde	graze, abrasion
Schüttelfrost	chills, rigor
Schwäche	weakness
Schwangerschaft	pregnancy
Schwindel	dizziness, vertigo
Sehne	tendon
Sehnenscheidenentzündung	tenosynovitis

Sodbrennen	heartburn
Soor	thrush
Speichel	saliva
Spätreaktion	delayed reaction
Spatel	spatula
Spirale	IUD (intrauterine device)
Sprache, verwaschene	slurred speech
Sprunggelenk	ankle joint
Stanze	punch
Stauschlauch	tourniquet
Stich	stitch, prick
Stichwunde	stab wound
Stillen	breast feeding
Stimmband	vocal cord
Stirn	forehead
Stuhl	stool, faeces
Stuhlerbrechen	faecal vomiting
Stuhlgang	defecation
Sucht	addiction
Synkope	syncope, fainting

T

Taille	waist
Taub	deaf, numb
Tinea	ringworm
Tollwut	rabies
Totgeburt	stillbirth
Trinkschwäche	sucking weakness
Trommelfell	eardrum, tympanic membrane
Tropf	drip
Typhus	typhoid fever

U

Übelkeit	nausea, sickness
Unfall	accident
Unterarm	forearm
Unterschenkel	lower leg

V

Vene	vein

Verband	bandage, dressing
Verbrennung	burn
Verbrühung	scald
Verdauung	digestion
Vergewaltigung	rape
Vergiftung	poisoning, intoxication
Verlaufskontrolle	follow-up
Verschreibung	prescription

W

Wachstumsverzögerung	growth retardation
Wade	calf
Wange	cheek
Warze	wart, verruca
Watte	cotton wool
Wehen	labour
Windeldermatitis	nappy rash
Windpocken	chickenpox
Wirbelsäule	spinal column
Würmer	worms
Wundschorf	scab

Z

Zahnfleisch	gum
Zahnfleischentzündung	gingivitis
Zahnpflege	dental care
Zahnschmerz	toothache
Zahnstein	calculus
Zehe	toe
Zerrung	distorsion, sprain

20. BIBLIOGRAPHY

British National Formulary, No. 56, September 2008.

Cook, G. C., *Manson's Tropical Diseases*, W.B. Saunders Company Ltd., 21st edition, 2003.

Eddleston, M.; Davidson, R.; Wilkinson, R.; Pierini, S.: *Oxford Handbook of Tropical Medicine.* Oxford University Press, 2nd edition, 2005.

Fitzgerald, D. F.; Kilham H. A.: *Croup: Assessment and Evidence-based Management*. Medical Journal of Australia, 2003; 179: 372-377.

Friese, K.; Mörike,K., Neumann,G.; Windörfer, A.: *Arzneimittel in Schwangerschaft und Stillzeit.* Wissenschaftliche Verlagsgesellschaft mbH, 6. Auflage, Stuttgart, 2006.

Herold, G., *Innere Medizin*, Official site: www.herold-innere-medizin.de, 2010.

Médecins sans Frontières, *Clinical Guidelines*, 2010.

Rote Liste 2010, Editio Cantor Verlag, Aulendorf/ Württ.

Scholz,H.; Belohradsky, B. H.; Bialek, R.; Heininger, Kreth, H.W.; Roos, R.: *DGPI-Handbuch. Deutsche Gesellschaft für Pädiatrische Infektiologie e.V.*, Georg Thieme Verlag, 5. Auflage, Stuttgart, 2009.

UNAIDS - The Joint United Nations Program on HIV/AIDS: *Report on the Global AIDS Epidemic*, Geneva, 2009.

Working Group of the Resuscitation Council (UK): *Emergency treatment of anaphylactic reactions*, *Guidelines for healthcare providers*, London, January 2008.

World Health Organization (WHO):

Management of the Child with a Serious Infection or Severe Malnutrition, WHO, 2000.

Hospital Care of Children, WHO 2005.

WHO Child Growth Standards and the Identification of Severe Acute Malnutrition in Infants and Children, WHO and UNICEF 2009.

Current Strategies for Human Rabies Pre- and Post-exposure Prophylaxis, WHO 2010.

Implementing New Recommendations on the Clinical Management of Diarrhoea, WHO 2006.

Treatment of Diarrhoea, A Manual for Physicians and other Senior Health Workers, WHO 2005.

Background Document: The Diagnosis, Treatment and Prevention of Typhoid Fever, WHO 2003.

Guidelines for the Control of Shigellosis, including Epidemics due to Shigella Dysenteriae Type 1, WHO 2005.

Guidelines for the Treatment of Malaria, WHO 2006.

Guidelines for the Management of Sexually Transmitted Infections, WHO 2003.

Guidelines for the Treatment of Malaria, WHO 2006.

The Global Initiative for Asthma (GINA):

GINA Report, *Global Strategy for Asthma Management and Prevention*, December 2009.

Global Strategy for the Diagnosis and Management of Asthma in Children 5 years and Younger, May 2009.

Pocket Guide for Asthma Management and Prevention, December 2010.

The Global Initiative for Chronic Obstructive Lung Disease (COLD):

Global Strategy for the Diagnosis, Management and Prevention of Chronic Obstructive Pulmonary Disease, Updated 2009.

Pocket Guide to COPD Diagnosis, Management and Prevention, updated 2010.

Websites:

www.who.int

www.cdc.gov

www.goldcopd.org

www.ginasthma.com

www.uptodate.com

www.emedicine.medscape.com

21. INDEX