Non-communicable diseases - programmatic and clinical guidelines (MSF OCA)

<table>
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<tr>
<th>Item type</th>
<th>Working Paper</th>
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<tbody>
<tr>
<td>Authors</td>
<td>Jobanputra, Kiran; Ansbro, Eimhin</td>
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## Glossary

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACEi</td>
<td>Angiotensin Converting Enzyme Inhibitor</td>
</tr>
<tr>
<td>AED</td>
<td>Anti-epileptic drug</td>
</tr>
<tr>
<td>AF</td>
<td>Atrial Fibrillation</td>
</tr>
<tr>
<td>ARB</td>
<td>Angiotensin 2 Receptor Blocker</td>
</tr>
<tr>
<td>ARV</td>
<td>Antiretroviral Medication</td>
</tr>
<tr>
<td>B-Blocker</td>
<td>Beta Blocker</td>
</tr>
<tr>
<td>BMI</td>
<td>Body Mass Index</td>
</tr>
<tr>
<td>BP</td>
<td>Blood Pressure</td>
</tr>
<tr>
<td>CCB</td>
<td>Calcium Channel Blocker</td>
</tr>
<tr>
<td>CHA2DS2-VASc</td>
<td>An indicator of Stroke risk</td>
</tr>
<tr>
<td>COCP</td>
<td>Combined Oral Contraceptive Pill</td>
</tr>
<tr>
<td>COPD</td>
<td>Chronic Obstructive Pulmonary Disease</td>
</tr>
<tr>
<td>CRP</td>
<td>C-reactive protein</td>
</tr>
<tr>
<td>CT</td>
<td>Computed Tomography scan</td>
</tr>
<tr>
<td>CVA</td>
<td>Cerebro-vascular accident</td>
</tr>
<tr>
<td>CVD</td>
<td>Cardiovascular Disease</td>
</tr>
<tr>
<td>CR</td>
<td>Chest X-ray</td>
</tr>
<tr>
<td>DM</td>
<td>Diabetes Mellitus</td>
</tr>
<tr>
<td>DVT</td>
<td>Deep Venous Thrombosis</td>
</tr>
<tr>
<td>ECG</td>
<td>Electrocardiogram</td>
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<tr>
<td>EEG</td>
<td>Electroencephalogram</td>
</tr>
<tr>
<td>ESR</td>
<td>Erythrocyte Sedimentation Rate</td>
</tr>
<tr>
<td>FAST</td>
<td>A screening tool for Stroke</td>
</tr>
<tr>
<td>FBC</td>
<td>Full blood Count</td>
</tr>
<tr>
<td>FBG</td>
<td>Fasting Blood Glucose</td>
</tr>
<tr>
<td>FEV1/FVC</td>
<td>Forced Expiratory Volume in 1 second/Forced Vital Capacity</td>
</tr>
<tr>
<td>GDM</td>
<td>Gestational Diabetes Mellitus</td>
</tr>
<tr>
<td>HAS-BLED</td>
<td>An indicator of bleeding risk</td>
</tr>
<tr>
<td>Hb</td>
<td>Haemoglobin</td>
</tr>
<tr>
<td>HbA1c</td>
<td>Glycosylated Haemoglobin</td>
</tr>
<tr>
<td>HTN</td>
<td>Hypertension</td>
</tr>
<tr>
<td>IPD</td>
<td>In-patient department</td>
</tr>
<tr>
<td>LABA</td>
<td>Long acting beta-adrenoreceptor agonist</td>
</tr>
<tr>
<td>LFTs</td>
<td>Liver Function Tests</td>
</tr>
<tr>
<td>MoH</td>
<td>Ministry of Health</td>
</tr>
<tr>
<td>MRI</td>
<td>Magnetic Resonance Imaging scan</td>
</tr>
<tr>
<td>NCD</td>
<td>Non-communicable disease</td>
</tr>
<tr>
<td>NNRTI</td>
<td>Non-nucleoside reverse transcriptase inhibitor</td>
</tr>
<tr>
<td>NPH</td>
<td>Neutral Protamine Hagedorn Insulin (intermediate acting)</td>
</tr>
<tr>
<td>NSAIDS</td>
<td>Non-steroidal anti-inflammatory drugs</td>
</tr>
<tr>
<td>PCI</td>
<td>Primary Care International</td>
</tr>
<tr>
<td>PE</td>
<td>Pulmonary Embolus</td>
</tr>
<tr>
<td>PEFR</td>
<td>Peak Expiratory Flow Volume</td>
</tr>
<tr>
<td>PI</td>
<td>Protease Inhibitor</td>
</tr>
<tr>
<td>PPI</td>
<td>Proton pump inhibitor</td>
</tr>
<tr>
<td>SABA</td>
<td>Short acting beta-adrenoreceptor agonist</td>
</tr>
<tr>
<td>SCA</td>
<td>Sickle Cell Anaemia</td>
</tr>
<tr>
<td>SOP</td>
<td>Standard Operating Procedures</td>
</tr>
<tr>
<td>TSH</td>
<td>Thyroid Stimulating Hormone</td>
</tr>
<tr>
<td>UTI</td>
<td>Urinary Tract Infection</td>
</tr>
<tr>
<td>VA</td>
<td>Visual Acuity</td>
</tr>
<tr>
<td>WHO</td>
<td>World Health Organisation</td>
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**Editor**

Kiran Jobanputra, NCD Advisor, MSF OCA

**Contributors**

MSF: Kiran Jobanputra and Eimhin Ansbro co-authored the guidelines; some sections have been adapted from the PCI field guide (with permission) and materials from other OCs. Thank you to Josie Gilday, Japp Karstens, Krzysztof Herboczek, Jay Achar, Anna Eschweiler, Annick Lenglet, Charity Kamau for contributions. Thank you to Philippa Boule (OCG), Jeff Edwards (OCB), Manal Shams (OCP) and Victor Llanes (OCBA) for peer review.

External: Thank you to Pablo Perel (LSHTM) for input into the cardiology section, to Richard Sullivan (KCL) for input into the Cancer section, and to Chantal Migone full peer-review of the final guidelines.

**Version control**

Version 1.95: Will be released as v2 following endorsement of other OCs.
Foreword from the Medical Director of MSF OCA

Non-communicable Diseases (NCDs) make the largest contribution to mortality both globally and in the majority of low- and middle-income countries (LMICs). Worldwide, NCDs account for 60% (35 million) of global deaths. The major NCDs used to be diseases of affluence; however, the changing epidemiology of NCDs (increasingly affecting lower and middle income countries), the changing patterns of refugee crises (away from settings where infectious disease represents the main burden of disease) mean that they now represent an increasing proportion of the cases we see in many MSF projects.

When we talk about NCDs in MSF, what are we referring to? We tend to use the term ‘NCDs’ to refer to those chronic conditions that represent the highest burden of disease: hypertension and cardio-vascular disease, chronic respiratory disease (asthma and COPD), diabetes and hypothyroidism, epilepsy and cancer. Mental illness has historically been considered as a separate specialist domain in MSF, yet we should start to consider it together with the other NCDs in view of the very high levels of comorbidity and poor outcomes in NCD patients who suffer from mental illness. In a few projects, MSF also provides treatment for chronic renal failure and haematological disorders (e.g. SCA). Whilst these conditions are excluded from the scope of this current document, they will be considered for inclusion in the next revision.

Although NCDs have only recently entered the MSF lexicon, we have in fact been providing care for NCDs since the very beginning. Currently in our OPD / IPD services, we offer basic care for the above mentioned NCDs, and in our HIV/TB programs, we provide care for co-morbid NCDs where capacity and local circumstances allow this. Increasingly we are providing enhanced care for one or more of these NCDs in settings where NCDs represent a significant unmet health need. In these projects, we aim for a patient-centred model of care, integrating mental health care as well as care for other co-morbidities where possible. In these projects we carry out rigorous monitoring and evaluations, to learn how we can improve the quality, accessibility, and efficiency of NCD services.

In all settings, our focus is on diagnosis and treatment, acute management and secondary prevention of complications arising from NCDs. With the exception of health education activities, we currently do not provide screening and primary prevention for NCDs. Evidence suggest that this approach maximises impact on death and disability, especially where resources are limited.

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1 With the exception of treatment of asymptomatic hypertension in patients at very high risk of cardio-vascular events, in certain settings.
How to use these guidelines

These guidelines cannot cover NCDs in great depth, but aim to address the particular information needs faced by MSF projects. Some conditions (e.g. Diabetes) are discussed in more detail, where these conditions pose particular challenges in the settings in which we practice. Conditions that are infrequently seen in our contexts (e.g. Cardiac Arrhythmias) are covered in less detail. Application of these guidelines depends on the project:

1. Projects with OPD / IPD components should provide basic care for NCDs:
   - The programmatic guidance (part A) will not all be applicable in these projects: NCD patients will generally be managed like any other out-patients, and will normally not have chronic care files. However, section A3 (updated NCD drug list) will help projects make their drug orders.
   - Projects should use the MSF OCA NCD clinical guidelines (Section B) to develop simplified Standard Operating Procedures (SOPs) adapted to their context.

2. Projects providing ‘Stepped-up care’ for one or more NCDs should be rigorously evaluated:
   - The programmatic guidelines (Section A) have been developed to support this type of service. NCD activities should be integrated into general OPD / hospital care. Section A3 lists the NCD drugs on the OCA Green List; the OCA pharmacist can help identify alternative formulations in case of local restrictions.
   - The clinical guidelines (Section B) should be used to create SOPs adapted to that context, taking into account local guidelines.

3. Care for co-morbid NCDs in HIV / TB programs should be provided where possible:
   - The programmatic guidelines (Section A), although not specifically developed for HIV / TB programmes, may be of use to HIV/TB projects wanting to integrate NCD care. TB / HIV programs should include screening for and treatment of NCDs in adults, where NCDs are believed to represent a substantial disease burden. Patient files should be integrated into those used for HIV/TB follow-up.
   - The Clinical NCD guidelines (Section B) should be used to develop SOPs adapted to the context.

How were the guidelines developed?

These guidelines were developed by medical specialists in MSF who have had substantial experience in providing and implementing chronic disease care (including HIV and TB) in MSF field projects. Several contributors have been involved in guideline development for MSF and other organisations. These guidelines were heavily informed by the following guidelines: WHO Guidelines on Prevention and Control of Non-communicable Diseases, WHO Package of Essential Non-communicable Disease Interventions for Primary Health Care, WHO Disease Specific Guidelines, the National Institute of Clinical Excellence (NICE) Guidelines, British Thoracic Society (BTS) Guidelines, European Society of Cardiology Guidelines. Numerous other guidelines were consulted (see references). External specialist input (e.g. Cardiology, Diabetology) was sought for the specific disease chapters.

The draft guidelines were shared with the MSF OCA medical department and with the NCD referents of the other MSF Operational Centres, many of whom had input at this stage. The draft was field-piloted for 6 months from 2015-2016, and was finalised following feedback from field teams and consultation with four current medcos. The final version was approved by the Medical Director in April 2016.
# Table of contents

FOREWORD FROM THE MEDICAL DIRECTOR OF MSF OCA........................................................................................................... 3

HOW TO USE THESE GUIDELINES............................................................................................................................................... 4

PART A: PROGRAMMATIC GUIDANCE ...................................................................................................................................... 6

1. ASSESSMENT AND PRIORITISATION ................................................................................................................................. 7

2. LEVELS OF CARE.................................................................................................................................................................. 8

3. SET-UP OF AN OUT-PATIENT NCD SERVICE ..................................................................................................................... 8

4. MEDICATIONS....................................................................................................................................................................... 12

5. DIAGNOSTIC SERVICES AND MEDICAL EQUIPMENT ..................................................................................................... 13

6. PATIENT FILES AND REGISTRATION............................................................................................................................... 14

7. PATIENT SUPPORT AND EDUCATION ............................................................................................................................. 15

8. SERVICE QUALITY AND SUPERVISION ........................................................................................................................ 16

9. MONITORING AND EVALUATION .................................................................................................................................. 17

PART B: CLINICAL GUIDELINES ........................................................................................................................................... 18

INTRODUCTION TO CLINICAL GUIDELINES ......................................................................................................................... 19

1. ASTHMA ............................................................................................................................................................................. 20

2. CHRONIC OBSTRUCTIVE PULMONARY DISEASE ........................................................................................................... 27

3. DIABETES .......................................................................................................................................................................... 31

4. HYPOTHYROIDISM ............................................................................................................................................................ 46

5. EPILEPSY ............................................................................................................................................................................. 48

6. CARDIOVASCULAR DISEASE AND HYPERTENSION .................................................................................................. 56

7. RENAL IMPAIRMENT......................................................................................................................................................... 76

8. CANCER ............................................................................................................................................................................. 76

REFERENCES ............................................................................................................................................................................ 79

ANNEXES .................................................................................................................................................................................. 82
Part A : Programmatic Guidance
1. Assessment and Prioritisation

Many of the health needs assessment and surveillance tools used by MSF were developed primarily for lower-income settings, and are very well adapted to certain types of emergency (e.g. mass displacement in closed settings) and health problems (e.g. infectious disease outbreaks).

Changing patterns of mass displacement (open settings), urbanisation, and the increasing conflict burden in low and middle-income settings have resulted in an epidemiological shift towards non-communicable diseases in the contexts where MSF is likely to intervene. Many traditional assessment tools are poorly adapted for these situations and may not provide the information required to enable appropriate programmatic decisions.

In these contexts, it is important to ensure that the assessment tools used take account of:
- Local demographics (e.g. age distribution, urbanisation)
- Disease patterns in that context (including non-communicable diseases)
- Types of vulnerability (especially elderly and socially isolated)
- Changes to the above over time (chronic conflicts resulting in constantly changing displacement patterns and health needs)

In general, mixed methods (qualitative and quantitative) assessments will be required, and ideally the approach should be robust and simple enough to be repeated every 3-6 months to provide data on changing health needs and vulnerabilities, as well as enabling monitoring of the health system response. Using a standardised methodology on an electronic platform such as ODK can make this more readily achievable.

The 2012 MSF Assessment Toolkit (available in the OCA treasury) provides guidance and resources that take into account the factors listed above.

Prioritisation in a new emergency

In the first 1-3 months, the priority is to ensure clinical management / stabilisation and referral of acute exacerbations (life-threatening or severely symptomatic); ensure identification of the sub-group of patients for whom discontinuation of treatment could be life-threatening; ensure continuation of treatment, prioritising those patients on the above list; ensure basic care for symptoms of advanced NCDs is available².

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² UNIATF: Non-communicable diseases in emergencies
## 2. Levels of care

<table>
<thead>
<tr>
<th>Disease and Condition</th>
<th>Primary care (usually provided directly by MSF when not covered by MoH)</th>
<th>Secondary Care (usually provided or funded by MSF if not covered by MoH or other actors)</th>
<th>Usually not provided by MSF</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cardio-vascular disease and Hypertension (including chronic renal disease)</td>
<td>Primary prevention (health education), diagnosis (referral of suspected DVTs), management of emergency presentations and referral if required, initiation of long-term treatment and on-going monitoring &amp; management, secondary prevention of complications</td>
<td>Definitive management of emergency presentations, definitive diagnosis of suspected DVT, management of symptoms not controlled in primary care, review of new AF patients</td>
<td>Angiography, stenting, dialysis</td>
</tr>
<tr>
<td>Diabetes and Hypothyroidism</td>
<td>Primary prevention (health education), diagnosis, management of emergency presentations and referral if required, initiation of long-term treatment and ongoing monitoring &amp; management, secondary prevention of complications, annual DM check (including retinal screening by fundoscopy if feasible, and referral for laser eye treatment), diabetic foot and ulcer care.</td>
<td>Definitive management of emergency presentations, retinal screening (if not available in primary care) and laser surgery, care for ulcers requiring surgery, management of symptoms not controlled in primary care</td>
<td>Dialysis</td>
</tr>
<tr>
<td>Asthma and COPD</td>
<td>Primary prevention (health education), Diagnosis, management of emergency presentations and referral if required, initiation of long term treatment and on-going monitoring &amp; management of chronic symptoms</td>
<td>Definitive management of emergency presentations, management of symptoms not controlled in primary care</td>
<td>LTOT</td>
</tr>
<tr>
<td>Epilepsy</td>
<td>Diagnosis (and referral if in doubt), management of emergency presentations and referral if required, initiation of long-term treatment (where feasible) and ongoing monitoring &amp; management,</td>
<td>Definitive management of emergency presentations, Verification of diagnosis if in doubt, Initiation of treatment where not feasible in Primary Care, management of symptoms not controlled in primary care</td>
<td>Surgical interventions, EEG, MRI</td>
</tr>
</tbody>
</table>

In emergencies, effort should focus on

- management of acute presentations (life threatening or severe symptoms) with referral if required
- initiation of long-term treatment in these patients.
- Continuation of treatment for those already on medication
3. Set-up of an out-patient NCD service

The ‘standard’ patient circuit
The table below represent an idealised NCD service, but the actual set-up will depend on:
- Whether the service is run by MSF, or by the Ministry of Health / another provider with MSF support.
- What the service is aiming to achieve. For example, an NCD service in a refugee transit centre may aim just to ensure that people with established NCDs have enough medication until they move on; whereas a comprehensive NCD service in an established community may aim to identify, test and treat for NCDs as well as providing long term supportive care.
- Whether it is integrated with management of other pathologies (e.g. comprehensive health care, HIV/TB/NCD service) or a vertical service targeting one or more specific NCDs.
- Whether the service is at primary care level, secondary care level (including hospitalisation) or both.

<table>
<thead>
<tr>
<th>Steps of NCD Service</th>
<th>Personnel involved</th>
<th>Tasks</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Patient registration</strong></td>
<td>Usually by a receptionist, data clerk or nursing assistant</td>
<td><strong>New patients</strong> - entered into a new patient (NCD) register &lt;br&gt; • New file is opened - receptionist fills in basic demographic info and gives file to patient &lt;br&gt; <strong>Return patients</strong> - ‘ticked’ in the appointment register &lt;br&gt; • Patient is given their file.</td>
</tr>
<tr>
<td><strong>Triage and emergency care</strong></td>
<td>Usually by a nurse / auxiliary nurse</td>
<td>• Takes and records vital signs (HR, RR, BP, Temp, Ht, Wt, BMI) &lt;br&gt; • Check capillary blood glucose and urinalysis and record results &lt;br&gt; • If available, all new patients with known CVD / Hypertension / DM should have ECG; and all smokers should undergo spirometry &lt;br&gt; • Rapidly identifies outpatients requiring urgent medical care and provides first aid. &lt;br&gt; • Ensures patients without NCDs are screened out</td>
</tr>
<tr>
<td><strong>Medical assessment and management plan</strong></td>
<td>Usually by a doctor or clinical officer; can be task-shifted to nurses</td>
<td><strong>Initial assessment:</strong> In NCD care this can be very detailed (ideally 30 minutes); in case of multi-morbidity, Dr will need to prioritise and treat less urgent conditions at subsequent appointments. &lt;br&gt; <strong>Follow-up appointments</strong> are shorter (10-15 minutes). &lt;br&gt; All notes are recorded in the patient file. &lt;br&gt; If the patient requires specialist referral or diagnostic tests, the doctor gives the patient a request form/ letter.</td>
</tr>
<tr>
<td><strong>Standard diagnostic tests</strong></td>
<td>Nurse, lab tech, or external lab</td>
<td>If available, new diabetic, hypertensive and CVD patients should have: FBC, U&amp;E, Creatinine, LFT, Cholesterol. Diabetics should also have HbA1c and microalbuminuria. See lab section below for other tests.</td>
</tr>
<tr>
<td><strong>Patient support and education (and counselling if necessary)</strong></td>
<td>Nurse, health educator, dietician or similar</td>
<td>At the 1st visit, an in-depth ‘new patient’ session should take place to ensure the patient understands and is ready for chronic care. For 1:1 consultations, brief notes are recorded in the patient file. Where resources are limited, the Dr can identify and refer those most in need for patient education and support. At each subsequent visit all patients should be provided with support and education. If necessary, referral can be made again to the dietician, health educator or nurse educator</td>
</tr>
<tr>
<td><strong>Pharmacy / dispensary</strong></td>
<td>Pharmacist or Nurse</td>
<td>On receiving medication, the patient’s understanding of their treatment should be checked and the medication explained again</td>
</tr>
<tr>
<td><strong>Arrange next appointment</strong></td>
<td>Receptionist, data clerk or any other staff member</td>
<td>For new patients with confirmed NCDs: passport (see section 5) given to patient. The date of the next appointment should be recorded in the appointment register (+/- on the patient card/ passport – see below). The patient returns their file to the receptionist which should be stored in the facility. Patients who missed the day’s appointment should be identified and followed up by phone.</td>
</tr>
</tbody>
</table>
Additional services

The following services should be provided on-site or at an accessible location for referral
- Emergency room or facility to stabilize patients (e.g. acute asthma, DKA)
- Nursing room or facility to provide basic wound care / diabetic foot care
- Dietician or equivalent.
- Chiropodist, nurse or other trained healthcare worker trained to do foot and nail care.
- Psychologist of trained counsellor (and ideally a Social Worker).
- Comprehensive laboratory services (see section 4)

Appointment schedule
- The appointment schedule depends on the condition being treated. For some conditions e.g. Diabetes, new patients will usually require weekly reviews until their condition is stable and they fully understand their treatment, according to the opinion of the Dr and patient education team.
- For some conditions e.g. hypothyroidism, stabilisation takes longer. Therefore patients can be seen monthly until stable.
- Stable patients can generally be seen at three to six month intervals, with monthly medication pick-ups to ensure good compliance. Exceptions can be made for patients facing barriers to monthly attendance.

Standard procedures to improve efficiency and quality of care (see Annex 1 for example from Jordan).
The following supporting activities can improve quality of care and efficiency of the service:
- Having clear criteria for (1) identification of patients, inclusion and exclusion for the service, (2) triage for urgent cases, and (3) identifying those patients requiring medical review (if consultations are done by nurses).
- Locally adapted clinical SOPs and a local formulary based on the clinical guidance and drug list in this document, national or Ministry of Health (MoH) clinical guidelines and formularies, and local procurement legislation. Clinicians should be trained how to use these tools which should be available in all consulting rooms.
- Establishing referral pathways (and clarify who will pay) for patients who do not meet the inclusion criteria, for those who meet the inclusion criteria but have a co-morbidity that is not covered by the service, or for those included patients that have a complication that cannot be managed in the service.
- Reliable follow-up: Use of SMS appointment reminders and a system of contacting patients who miss appointments
- Regular supportive supervision: attention to hygiene, availability of medical equipment, drug stock and consumption, adherence to SOPs and triage criteria, appropriate observance of inclusion and exclusion criteria. Regular clinical audit helps ensure maintenance of good quality of care.
- Service demand management: define a target maximum waiting time for 1st appointment (e.g. 2 weeks). If waiting time exceeds this, can you expand the service through opening more clinics / consultation rooms? If not, are there additional measures that may improve efficiency?
  o space out follow-up appointments e.g. from 3 to 6 monthly
  o reduce appointment times (e.g. 20 mins for initial appointment, 10 mins for follow-up)
  o task-shift follow-up appointments from doctor to nurse and health education from nurse to lay counsellor
  o decentralise nurse-led care to health posts or small primary care centres
Integration with mental health services
In humanitarian settings, a significant proportion of patients with NCDs will also suffer from mental illness, whether due to traumatic experiences (e.g. stress disorders), secondary to the NCD (e.g. depression), or co- incidental. In general, the presence of a mental illness significantly worsens the prognosis of the NCD. It is thus important to integrate mental health care into NCD services where possible. This is ideally done by:

- Ensuring clinicians are confident in prescribing antidepressants.
- Training NCD staff in basic mental health care (e.g. using the WHO MH-GAP materials)
- Ensuring access to a specialist mental health service providing in-depth counselling and psychiatric care. Attention should be given to establishing referral and counter-referral systems, as well as regular meetings between the two teams for service harmonisation.

Integration with HIV / TB services
Integration can mean: integration of entry points / clinical services / decision making / technologies etc. May depend on context: whilst generally one-stop-shop is preferred, in some countries (e.g. Swaziland) patients may be less likely to come if integrated. Also depends on structure of health system.

Highly unstable settings
Providing NCD care in highly unstable setting presents a number of additional challenges, including:

- Interruptions to access of patients to the health service
- Interruptions of service provision
- Interruptions of presence of senior / experienced staff due to evacuations or security concerns
- Interruptions of supply of drugs and medical materials to the service

Projects in these settings are encouraged to plan for these interruptions, for example through:

- Providing larger take-home medication supplies for patients (e.g. 3 months), at times where access to clinics is difficult. (For Insulin, 3 month’s supply can be given if patient has access to refrigeration; otherwise 1 month’s supply can be given with instruction of how to keep the Insulin cool).
- Ensuring patients receive training in self-management of their condition
- Regular training of junior staff, so that the service can run autonomously (i.e. without senior staff input) for several months at a time.
- Ensuring significant buffer stocks of drugs and medical materials if supply chain is at risk.

This plan should ideally be written down as a project-specific SOP, validated by the Medco.
4. Medications

When preparing the Mission Standard List (MSL), it is important to take into account national clinical guidelines local restrictions on importing, as this may obliged you to seek alternative formulations after discussion with the OCA pharmacist. (Red = HA approval required)

<table>
<thead>
<tr>
<th>Code</th>
<th>Asthma/COPD</th>
<th>Explanation</th>
</tr>
</thead>
<tbody>
<tr>
<td>DORALB25F</td>
<td>SALBUTAMOL sulfate, eq.0.1mg base/puff, 200 puffs, aerosol</td>
<td>Asthma (reliever)</td>
</tr>
<tr>
<td>DORASOGCV</td>
<td>SODIUM chloride 6%, for nebuliser, 4 ml vial</td>
<td>Asthma (severe exacerbation)</td>
</tr>
<tr>
<td>DORASUL2N</td>
<td>SALBUTAMOL solution for nebuliser, 2 ml/ml, 2.5ml monodose</td>
<td>Asthma (severe exacerbation)</td>
</tr>
<tr>
<td>DORASBUF1SF</td>
<td>BECOMETASONE dipropionate, 0.10mg/puff, 200 puffs, aerosol</td>
<td>Asthma</td>
</tr>
<tr>
<td>DORASCF5SF</td>
<td>BECOMETASONE dipropionate, 0.05mg/puff, 200 puffs, aerosol</td>
<td>Asthma</td>
</tr>
<tr>
<td>DORASAM2SF</td>
<td>SALBETAMETAZOL, 25ug/puff, 120 puffs, aerosol</td>
<td>Needs HA approval</td>
</tr>
<tr>
<td>DORAP2SF</td>
<td>IPRATROPium bromide, 250ug/ml, 2ml sol. for nebuliser</td>
<td>Exac asthma</td>
</tr>
<tr>
<td>DORAPR2SF</td>
<td>IPRATROPium bromide, 20µg/puff, 200 puffs, aerosol</td>
<td>COPD step 2</td>
</tr>
<tr>
<td>DINAMC5A</td>
<td>MAGNESIUM SULPHATE, 0.5 g/ml, 10 ml amp.</td>
<td>Acute life-threatening asthma</td>
</tr>
<tr>
<td>DORAMINTYC</td>
<td>MONTFELOX 5 mg, chewing tab.</td>
<td>Needs HA approval</td>
</tr>
<tr>
<td>DORAPRO2T</td>
<td>PREGNISOLONE, 5 mg, tab.</td>
<td>Asthma step 5 or acute exacerbation</td>
</tr>
<tr>
<td>DINHYDRO1V</td>
<td>HYDROCORTISON sodium succinate, eq.100mg base, powder, vial</td>
<td>Asthma severe exacerbation</td>
</tr>
<tr>
<td>DORASLF5SF</td>
<td>FLUPRONE enalaprilat 50ug/puff aerosol, 240 doses</td>
<td>Needs HA approval</td>
</tr>
<tr>
<td>DORAME5T</td>
<td>METFORMIN HYDROCHLORIDE, 500 mg, tab.</td>
<td>Diabetes</td>
</tr>
<tr>
<td>DORAGUB5T</td>
<td>GLIMEPIRIDE, 5 mg, breakable tab.</td>
<td>Diabetes</td>
</tr>
<tr>
<td>DORAGUE8T</td>
<td>GLUCLAZIDE, 80mg, tab.</td>
<td>Diabetes</td>
</tr>
<tr>
<td>DINLUSVS5</td>
<td>GLUCOSE HYPERTONE, 50%, 50 ml vial</td>
<td>Hypoglycaemia</td>
</tr>
<tr>
<td>DORINIS8V</td>
<td>INSULIN BIPHASIC 30, human, 100 iu/ml, 10 ml vial</td>
<td>Diabetes</td>
</tr>
<tr>
<td>DORINIS7V</td>
<td>INSULIN SOFAHNE [PHIL], human, 100 iu/ml, 10 ml vial</td>
<td>Diabetes</td>
</tr>
<tr>
<td>DORINISAR</td>
<td>INSULIN RAPID, human, 100 iu/ml, 10 ml vial</td>
<td>Diabetes</td>
</tr>
<tr>
<td>DORINOP1FA</td>
<td>POTASSIUM chloride, 100 mg/ml, 10 ml amp.</td>
<td>Diabetic ketoacidosis</td>
</tr>
<tr>
<td>DORINISH5PB</td>
<td>INSULIN BIPHASIC 30, 1000 U/ml, pre-filled pen, 3ml (Novomix)</td>
<td>Needs HA approval</td>
</tr>
<tr>
<td>EMEOAST2</td>
<td>POINT AESTHESIOMETER, retractable, 10g, incl. 2 monofi</td>
<td>Diabetic neuroprathy screening</td>
</tr>
<tr>
<td>EMEOAST101</td>
<td>POINT AESTHESIOMETER MONOFILAMENT, 10 g</td>
<td>Diabetic neuroprathy screening</td>
</tr>
<tr>
<td>EMEOVCA1E</td>
<td>TUMBLE EYE CHART, 23 x 35.5cm</td>
<td>Diabetic eye testing</td>
</tr>
<tr>
<td>DORALEV0T</td>
<td>LEVOTHYROID SODIUM, 0.1 mg, tab.</td>
<td>Hypothyroidism</td>
</tr>
<tr>
<td>DORALEV0T</td>
<td>LEVOTHYROID SODIUM, 0.025 mg, tab.</td>
<td>Thyroid hormone (in ITC)</td>
</tr>
<tr>
<td>DORACAR82T</td>
<td>CARBAMAZEPINE, 200 mg, tab.</td>
<td>Epilepsy (Partial)</td>
</tr>
<tr>
<td>DORARALP2T</td>
<td>VALPROATE SODIUM, 200 mg, gastro-resistant tab.</td>
<td>Epilepsy (Generalised)</td>
</tr>
<tr>
<td>DORARALP8</td>
<td>VALPROATE SODIUM, 500 mg, gastro-resistant tab.</td>
<td>Epilepsy (Generalised)</td>
</tr>
<tr>
<td>DORALEVE2T</td>
<td>LEVETIRACETAM, 200 mg, tab.</td>
<td>Epilepsy (Generalised)</td>
</tr>
<tr>
<td>DORAPHY1T</td>
<td>PHENYTOIN sodium, 100 mg, tab.</td>
<td>Epilepsy (Generalised)</td>
</tr>
<tr>
<td>DINPHEN2A</td>
<td>PHENOBARBITAL SODIUM, 200 mg/ml, 1 ml, amp.</td>
<td>Epilepsy (Generalised)</td>
</tr>
<tr>
<td>DINPHEN2A</td>
<td>PHENOBARBITAL SODIUM, 200 mg/ml, 1 ml, amp.</td>
<td>Epilepsy (Generalised)</td>
</tr>
<tr>
<td>DINHALL2A</td>
<td>DIAZEPAM 5 mg/ml 2 ml amp.</td>
<td>Treatment of convulsions</td>
</tr>
<tr>
<td>DORANHY02T</td>
<td>HYDROCHLOROTHIAZIDE, 25mg tab.</td>
<td>Hypertension</td>
</tr>
<tr>
<td>DORANHY02T</td>
<td>HYDROCHLOROTHIAZIDE, 4 mg, tab.</td>
<td>Hypertension</td>
</tr>
<tr>
<td>DINHATE1A</td>
<td>LEMETALOL hydrochloride, 5 mg/ml, 20 ml amp.</td>
<td>Hypertensive crisis</td>
</tr>
<tr>
<td>DORASL5ST</td>
<td>AMLODIPINE, 5 mg, tab.</td>
<td>Hypertension</td>
</tr>
<tr>
<td>DORANOL2T</td>
<td>ENALAPRIL maleate, 5 mg, tab.</td>
<td>Hypertension</td>
</tr>
<tr>
<td>DORANOL2T</td>
<td>ENALAPRIL maleate, 20 mg, tab.</td>
<td>Hypertension</td>
</tr>
<tr>
<td>DINPAPY2V</td>
<td>PAPAVERIUM SODIUM, 1.6 mg/ml, 5 ml vial</td>
<td>Needs HA approval</td>
</tr>
<tr>
<td>DORINP45T</td>
<td>ENOKAPRINE, 100 mg/ml, 1 ml vial</td>
<td>Needs HA approval</td>
</tr>
<tr>
<td>DINTRXIV</td>
<td>STREPTOCINASE, 1,500,000 IU, powder, vial</td>
<td>Needs HA approval</td>
</tr>
<tr>
<td>DININMP14</td>
<td>MOSCINOL hydrochloride, 10 mg/ml, 1ml amp.</td>
<td>Needs HA approval</td>
</tr>
<tr>
<td>DININMP14</td>
<td>MOSCINOL hydrochloride, 10 mg/ml, 1ml amp.</td>
<td>Needs HA approval</td>
</tr>
<tr>
<td>DORASG5T</td>
<td>GLICLAZIDE, 80mg, tab.</td>
<td>Needs HA approval</td>
</tr>
<tr>
<td>DORADOR1T</td>
<td>ADRAVASTATIN, 10 mg, tab.</td>
<td>Needs HA approval</td>
</tr>
<tr>
<td>DORADOL8</td>
<td>ADRAVASTATIN, 80 mg, tab.</td>
<td>Needs HA approval</td>
</tr>
<tr>
<td>DORABAC47T</td>
<td>ACETYLCHOLINE, acid (asoin), 75 mg, gastro-resistant tab.</td>
<td>Cardiac arrhythmia</td>
</tr>
<tr>
<td>DORACO97T</td>
<td>KETOCONAZOLE 75 mg, tab.</td>
<td>Where ascorin contraindicated</td>
</tr>
<tr>
<td>DINHYDRA2A</td>
<td>HYDROCORTISON sodium, 20 mg, powder, amp.</td>
<td>Cardiac arrhythmia</td>
</tr>
<tr>
<td>DORADEY0T</td>
<td>METHYLOXAN, 250 mg, tab.</td>
<td>Hypertensive crisis</td>
</tr>
<tr>
<td>DORAGLY5T</td>
<td>GLYCERYL TRINITRATE, 0.5 mg, sublingual tab.</td>
<td>Angina (1st line)</td>
</tr>
<tr>
<td>DORASOGR5T</td>
<td>ISOOSORBIDE DINITRATE, 5 mg, sublingual tab.</td>
<td>Angina (2nd line)</td>
</tr>
<tr>
<td>DINFRUSOA</td>
<td>FUROSEMIDE 40 mg, tab.</td>
<td>Cardiac failure (emergency)</td>
</tr>
<tr>
<td>DINFRUSOA</td>
<td>FUROSEMIDE 10 mg/ml, 2 ml amp.</td>
<td>Cardiac failure (symptomatic relief, 1st line)</td>
</tr>
<tr>
<td>DORAP2SF</td>
<td>SPINONILOXAN, 25 mg, tab.</td>
<td>Cardiac failure (symptomatic relief, 2nd line)</td>
</tr>
<tr>
<td>DORADIG2T</td>
<td>DIGOXIN, 0.25 mg, tab.</td>
<td>Cardiac failure (emergency)</td>
</tr>
<tr>
<td>DORAWAR0T</td>
<td>WARFARIN, 1 mg tab/ WARFARIN, 5 mg tab.</td>
<td>Needs HA approval</td>
</tr>
<tr>
<td>DINFHY2T1S</td>
<td>PHENOTIN sulphate, 50 mg/ml, 1 ml amp.</td>
<td>Needs HA approval</td>
</tr>
<tr>
<td>DINMAM01A</td>
<td>AMIODARONE hydrochloride, 50 mg/ml, 3 ml amp.</td>
<td>Atrioventricular block</td>
</tr>
<tr>
<td>DORATEN5T</td>
<td>ATENOLOL, 50 mg, 88b</td>
<td>Hypertension (phasing out)</td>
</tr>
<tr>
<td>DINLEPHIAV</td>
<td>EPINEPHRINE (adrenaline) tartrate, eq.1 mg/ml base, 1ml amp IV</td>
<td>Arrhythmias / cardiac arrest</td>
</tr>
</tbody>
</table>
5. Diagnostic services and medical equipment

**Diagnostics**
The availability of investigations will vary according to setting. The following tests should ideally be available for good NCD care; the minimum essential tests (e.g. for emergencies) are listed in bold:

- **Bloods:** Hb, U&E, Creatinine, LFTs, Total Cholesterol, TFTs, FBC, Glucose, HbA1c, CRP / ESR, INR, Troponin.
- Radiology: CXR
- Cardiology: ECG
- Diabetic complication screening: monofilament testing, visual acuity testing,
- Lung function testing: Spirometry, PEFR.
- **Urine:** Urinalysis (ketones, protein, glucose), urinary micro-albuminuria

In settings with a MSF OPD/IPD, the lab will be able to provide these services on site (an upgrade may be required). In some contexts, the project may need to provide investigations directly, training non-lab personnel to use simple point-of-care tests (e.g. Glucose, Hb, Creatinine, Electrolytes, HbA1c). In others a local laboratory may be able to provide tests at an acceptable level of quality (the OCA lab advisor must validate this). The MSF OCA laboratory advisor can help the team identify the most appropriate choice in their setting.

**Key equipment**
The minimum essential items (e.g. for emergencies) are listed in bold:

- **BP cuff** (large and standard adult, paediatric) and stethoscope
- Scales, height measure, tape measure
- **Glucometer with strips, lancets, cotton wool, needles and sharps bins.**
- Peak Flow Meter and disposable mouthpieces
- Nebuliser and oxygen concentrator, oxygen masks and tubing, spacer devices.
- **Urine pots and dipsticks**
- Monofilaments
- Visual acuity charts
- WHO / ISH Cardio-vascular risk assessment charts
- (Optional) HbA1c meter, Spirometer, ECG machine
6. Patient files and registration

Treating NCDs requires a long-term ("chronic") care approach. Well-kept patient files are a valuable tool to enable communication between clinic staff, allow the patient’s condition to be monitored over time and drug treatment to be checked, and ensure that systematic health assessments are being done.

Whether an Electronic Medical Record (on computers or tablets) or a paper file is used, there are four parts to the basic file / registration package:

1. **A patient file** (with a unique identifier) stored at the facility. Generally this will have a front page(s) where demographic and general health information is recorded; and continuation pages where each subsequent visit is recorded in a smaller space. Test results will usually be stored in the file, and there may be a page for annual review where this is provided.

2. **A patient-held card** which has their unique identifier on it – this enables the reception staff to quickly locate their file by searching for their unique identifier. Most projects will record some other pieces of info on this card, such as their next appointment and their current prescription (in case they cannot come to the MSF clinic and need to obtain their drugs elsewhere). In some cases, you may wish to include on the card some information about the condition and how to manage it, for the patient to better understand their condition. This detailed card is sometimes called a ‘health passport’.

3. **The new patient (NCD) register**, where each patient is recorded on a separate line with their unique identifier – so that their file can be traced even if they lose their patient card.

4. **An appointment register**, with one page per day: the name of each patient with an appointment on a given day is recorded on a separate line. This enables planning of the clinic, appointment reminders (if offered) and identification of those who have missed appointments so that they can be traced (if this service is provided).

An example of a patient file is given in annex 2

Note: if patient files are replaced by electronic medical records, paper registers may no longer be required.
7. Patient Support and Education

Patient education is an essential part of setting up an NCD service. Patients are being diagnosed with life-long illnesses that require continuous treatment often using a complex regime, of which the benefits can take some time to see. On top of this, patients are told they are now dependent on healthcare services to provide them with their treatment and are being asked to make several life style changes. Helping the patient to understand these changes and why they are necessary is essential to maintaining their health.

The aim of patient education is to improve the patients’ health and enable them to actively participate in their care and treatment; ultimately to make them into experts who can educate others.

There are several benefits to patient education and a few are listed below:

- Increasing the patient’s ability to cope with the disease and manage their health
- Empowers patients to take control of their health and make decisions about their treatment
- Increases adherence
- Reduces the amount of time the patient spends at the clinic or in hospital

Patient education needs to be tailored to the patient and their situation. Having a good understanding of the patient’s education background and learning styles, day to day life, where and with whom they live, what stresses they have, as well as understanding their culture and context is essential in order to provide the right education. Provide information and education by exploring the following:

- **The diagnosis and the disease**: explain to the patient clearly what their diagnosis means, what the disease is. Explain how it affects the body and how to reduce complications.
- **Treatment and adherence**: The patient needs to understand clearly that they are likely to need this treatment for the rest of their life. The treatment regime should be clearly explained. They should know what to expect at follow-up appointments.
- Their ideas, concerns and expectations about the disease and its treatment need to be understood.
- **Life style changes**: With the diagnosis of an NCD the patient is often required to make life style changes as well as start treatment. Patients need to be fully aware of what life style changes they need to make, what help they can expect and what benefits they will have as a result.
- If the patient has missed appointments, consider the reasons and ask about barriers to adherence. E.g. unable to access clinic, unable to afford medication/interruption to drug supply in MoH setting, health beliefs, side effects. If the patient is asymptomatic at the time of diagnosis, they may feel worse on medication.

Patient education can be done through written information or in picture format, and through 1:1 or group sessions. Some patients may require an action plan (see Annex 3 for an example) or a diary. Involving family members and friends in patient education can be beneficial. This is a task for the whole team – including doctors and nurses. The team will need training in consulting and communication skills as well as motivational techniques.
8. Service quality and supervision

Like any clinical service, NCD services require regular supervision to ensure maintenance and continual improvement in quality of care. Quality of care can be defined in many ways, but most definitions include the key elements of clinical effectiveness, patient safety, and patient centeredness.

Supervision can also take many forms, from the informal day-to-day supervision to formal monthly or quarterly service reviews using a detailed checklist. We recommend a mixture of the two. Whichever approach is used, supervision should aim to address the following key elements:

Structure: (best assessed through visiting the facility and analysis of project documentation)
- Material resources (safety and cleanliness of facilities, sufficient space, equipment in working order)
- Human resources (number of personnel, appropriateness of personnel in terms of competencies, working conditions, clarity of job descriptions)
- Organisational structure (medical staff organisation, methods of peer review)

Process: (best assessed through file/document review and direct observation of consultations)
- Patient circuit: coherent circuit that is understandable to patient, acceptable wait times
- Dignity: Patient treated with respect, confidentiality and privacy observed
- Triage: exclusion/inclusion criteria observed, quality of clinical observations
- Nursing care (Health education, triage, dressings): guidelines or SOPs followed where applicable
- Pharmacy: conditions of storage, supply issues and stock-outs, adequacy/appropriateness of treatments issued
- Clinical management: appropriateness/coherence of treatment, investigation and follow-up, guidelines/SOPs followed where applicable
- Hygiene and infection control practices
- Quality Improvement activities in place (Medical incident reporting, audit, and means of collecting patient feedback)
- Staff meetings/education sessions and on-the-job training

Outcomes: (best assessed through analysis of current data sources)
- Aggregate clinical and programmatic outcomes from project M&E (next page).
- Analysis of deaths, critical event, nosocomial infections, adverse drug reactions and medical errors.
- Patient satisfaction analysis or exit interviews.

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9. Monitoring and Evaluation

Monitoring and evaluation means using the routine data we gather in our projects to assess the quality of care we are delivering and to identify problems that require intervention. In order to measure the quality of care provided, “indicators” are used. OCA has defined a minimum set of indicators for NCD projects (the ‘Standard Indicators’) which give an overview of the level of activity and quality of care to enable comparison across settings. In addition, many projects measure additional indicators to give more detailed information about where the gaps are and the problems requiring intervention.

It is important to ensure that the data necessary to calculate these indicators are extracted from the patient files and registers regularly, and are accurately entered into a database that has been configured appropriately. A standard NCD database is given in Annex 3. A project that only targets one NCD should select those data fields that are relevant to that condition. If the project is an HIV/TB project managing co-morbid NCDs, then the unique identifier would be their HIV or TB number.

For projects in pilot phase, the indicators will need to be calculated manually – an epidemiologist is available in HQ to support this if required. Once a project is established, the database can be programmed to calculate the indicators automatically.

**Standard epidemiological / service activity indicators:**
- number / % of new patient consultations per month
- number / % of follow-up consultations per month (% of total visits) (age, gender, nationality)
- number/ % of patients presenting with the following morbidities: DM Type I, DM Type II, Hypertension, other cardiovascular disease, Asthma, COPD, Hypothyroidism, other
- Number of new diagnoses over a period of time
- Number/ % of exits per month: % defaulter (see definition of defaulter), % dead (by primary diagnosis), % self-transferred, % other

**Standard quality indicators**:  
- Number / % of DM patients that have micro-albuminuria or urinary protein testing in the last year (Target = 80%)
- Number / % of patients with DM or on ACE inhibitor (ACEi) with Creatinine testing in the last year (Target 80%)
- Number/ % asthmas and COPD receive control review (spirometry or clinical) in the last year (Target = 80%)
- Number/ % of asthma patients with acute exacerbations/ admissions in the last year (Target = 20%)
- Number / % of diabetics / hypertensives, that have a mean BP <= 140/90 over the last 12 months (Target = 80%)
- Number / % of diabetic patients have a mean HbA1C < 8.0 % (or average FBG<150) over the last 12 months (Target = 80%)

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2 Quality indicators calculated on patients in programme for >1 year, and the first 3 months since registration should be excluded.
Part B: Clinical Guidelines
Introduction to Clinical Guidelines

The following ‘model’ guidelines should be used to develop mission-specific clinical SOPs. They are designed to be adapted to the context, and not to be used in their ‘pure’ form. This is because:

- The guidelines are primarily aimed for projects with a focus on NCDs. If NCDs represent a minor component of the project work, we suggest converting the relevant sections into brief SOPs. Likewise if the project is focused on HIV / TB, we would suggest integrating the relevant parts of this guideline into the projects HIV / TB protocols (the NCD guidelines do contain notes on HIV / TB to help with this).
- These guidelines are focused on primary care. The ‘emergency management’ sections are more relevant to secondary care – these sections have red titles.
- These model guidelines are based on a typical lower-middle income context. They may thus represent an ‘unattainable’ level of care in lower income contexts, and would need to be adjusted accordingly. In particular, we should minimize the use of therapies and technologies that will not be available when MSF leave.
- Many of the contexts where MSF provides NCD care have their own national or medical association guidelines on NCD care. We may be required to use those guidelines. Even if we are not required to use them if they are of an acceptable standard it is advisable to use them. Alternatively SOPs based on MSF guidelines that incorporate elements of national guidelines can be used. Using existing national guidelines maintains continuity when the patient moves back to MoH care. However, beware that some national guidelines are not evidence based, and/ or are out of date and may not be impartial (e.g. written with the help of pharmaceutical companies.)
- Some countries have National Drug Formularies or restrictions on importing drugs, therefore the drug choices in these model guidelines. May need to be modified. Where there are several possible alternatives to a particular drug class (e.g. B-Blockers), the preferred alternative, which is on the MSF OCA Green list, is given in brackets in the text.
1. Asthma

Background
Asthma is a chronic respiratory disease, which affects 300 million people worldwide and is responsible for 3% of global deaths. It is a chronic inflammatory disorder of the airways and characterised by reversible airflow limitation. Airway narrowing occurs due to bronchial smooth muscle contraction in response to stimuli including allergens and irritants. Patients with Asthma have recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from person to person. Symptoms may occur several times in a day or week and for some people become worse during physical activity or at night. Recurrent asthma symptoms frequently cause sleeplessness, daytime fatigue, reduced activity levels and days missed in school or work.

Clinical features
- Diagnosis is clinical. Asthma should be suspected in patients with episodic, recurrent wheeze, chest tightness or cough (dry) of variable frequency, severity and duration;
- Diurnal variation is typical - symptoms worse in the morning yet improve later in the day; often disturbing sleep. Symptoms may be triggered during or after exercise, after exposure to allergens or irritants (e.g. cold air, perfumes, animal dander, dust), by viral infections, weather changes, and certain medications (aspirin, NSAIDs or beta blocker).
- A personal or family history of atopy (eczema, allergic or chronic rhinitis/conjunctivitis) or a family history of asthma increases probability of asthma but their absence does not exclude asthma.
- Presence of global expiratory wheeze in an unwell patient and/or response to asthma therapy supports diagnosis of asthma. Sputum production and fever reduce the likelihood of asthma
- Lower probability of asthma if: symptoms occur with colds only, isolated/chronic productive cough, repeatedly normal exam or peak expiratory flow rate (PEFR) when symptomatic, failure to respond to asthma therapy, smoking history.
- See chapter on COPD on how to differentiate Asthma from COPD
- Asthma diagnosis in children <5 years should be carefully considered and repeatedly reassessed. Different childhood diseases may cause symptoms similar to asthma, therefore diagnosis in young children is challenging.

History and Examination
- Diagnosis is clinical. A careful history should be taken.
- When well: examination should be normal; when unwell there should be widespread expiratory wheeze throughout the chest. In more severe illness, respiratory rate increases and there may be tachycardia and global inspiratory wheeze. In very severe (life threatening) asthma, the chest may be silent and there may be haemodynamic changes (hypotension and tachycardia).

Investigations
- An improvement of 12% in PEFR pre- and post-bronchodilator supports the diagnosis of asthma (but non-response to bronchodilators does not out-rule a diagnosis of asthma).
- In patients over 5 years of age, confirm the diagnosis with spirometry if available. If not available, and diagnosis is in doubt, consider a therapeutic trial of 14 days oral Prednisolone (30mg daily in an adult, 1 mg/kg in a child). X-Ray and blood tests are useful only to rule out other conditions if suspected.
- Consider alternative diagnoses: epiglottitis, croup, viral induced wheeze, foreign body in bronchus (in children), cystic fibrosis, TB, COPD, lung cancer, heart failure, bronchiectasis, pulmonary embolus, hyperventilation, pulmonary fibrosis, gastro-oesophageal reflux or asbestosis,
Management of chronic asthma (see tables for Acute Asthma)

Goal:
Appropriate management can control the disease and enable people to enjoy a good quality of life. Goal is to reduce chronic symptoms, maintain (near) normal lung function and activity levels, reduce need of short-acting “rescue” medications, and reduce risk of exacerbations, including need for emergency care and hospitalisation, preventing loss of lung function and minimise drug side effects.

Patients with asthma should rarely or never require emergency care – if a patient is requiring emergency care every year (or more than once in one year), their asthma care needs to be reviewed.

Assessment and Monitoring:
First Visit: Assess severity to decide which treatment step to start with.
Follow-up Visits: Assess asthma control to decide if treatment needs to be adjusted. Review number of exacerbations, use of rescue inhaler or oral corticosteroids, and time off work or school since last assessment. Check if patient recognises triggers to asthma symptoms. Check medication side effects, use of written asthma action plan, patient concerns, exposure to tobacco smoke. Check growth in children.
- **Asthma Control.** Ask: “In the last week (or month),
  - Have you had difficulty sleeping because of your asthma symptoms (including cough)?
  - Have you had your usual asthma symptoms during the day (cough, wheeze, chest tightness or breathlessness)?
  - Has your asthma interfered with your usual activities (e.g. housework, work/school etc.)?”

  “No to ALL Questions” = controlled asthma

- **Patient adherence:** It is important to check with patients when they are taking their inhalers and other medication. Adherence can deteriorate when symptoms become mild or less frequent.
- **Review inhaler technique:** Incorrect or inadequate use of medicines and inhalers remains the most common reason for failure to achieve good control. Offer a spacer to all patients. (See annex 5 for details).
- **Review smoking status and smoky environment** e.g. from cooking fires inside dwellings. Advise to stop smoking and reduce exposure to indoor air pollution.

Pharmacological therapy:
- Use a step-wise treatment approach. Start treatment at the step most appropriate to the patient’s condition. Then maintain control by stepping treatment up or down if necessary,
- First, check patient adherence and understanding. Check and eliminate trigger factors if possible.
- Check inhaler technique. Spacer devices allow much better drug delivery and are recommended for adults and children. See below.
- Do not step up if the patient is unwell or breathless during the visit - treat as an exacerbation.
- Step up asthma treatment if there are persistent symptoms e.g. persistent cough.
- **Step up** if asthma is poorly controlled i.e. using a reliever inhaler more than 3 times per week or using two or more canisters of reliever per month
- **Step down** if well controlled for 3 months. Decision on which drug to stop first and at what rate depends on the severity of asthma, treatment side effects, time on current dose, beneficial effects achieved and patient preference.
- **Inhaled corticosteroids** are the most effective long-term control therapy but may have long-term side effects at high doses. Patients should be maintained on the **lowest possible dose of inhaled steroids.** Reduce dose slowly, 25-50% at a time.
- **Do not** use antihistamines/cough suppressants/mucolytics or oral salbutamol/salbutamol syrup in asthma management.
Patient Education and Self-Management:
At each visit review the following:
1. **Self-monitoring**: Ensure the patient is able recognise symptoms of worsening control. Agree on treatment goals with patient. Include: daily actions to control asthma, adjusting medications in response to worsening asthma, when to seek medical care.
2. **Medication**: Ensure patients know how and when to take their medication. Explain long-term “preventer” medications reduce inflammation and should be taken daily. They do not give quick relief but prevent/ reduce exacerbations that interfere with daily life or require hospitalisation. “Reliever” medications relax airway muscles and provide fast symptom relief. If used more than 3 times/week may need to start/increase long-term preventer medication.
3. Check inhaler technique (see Annex 5).
4. **Adherence**: Explain the importance of continuing to take their inhalers and medication as prescribed and continue to use their “preventer” medications even when symptoms improve, are mild or infrequent.
5. **Avoid/ Reduce exposure to triggers** that worsen asthma e.g. smoking. Cooking on open fires indoors should also be avoided or adequate ventilation for the smoke to leave the building should be put in place.
6. Develop a **written asthma action plan** (see Annex 3).
7. **Involve** family and other healthcare providers (pharmacist, nurse etc), provide encouragement.
8. Explain the importance of attending **follow up appointments**.
9. **Encourage exercise** on a regular basis

**Special Circumstances:**
**Comorbidities:** consider allergic bronchopulmonary aspergillosis, gastro-oesophageal reflux, obstructive sleep apnoea, rhinitis and sinusitis, stress or depression. Treatment of these conditions may improve asthma control.
**Exercise induced bronchospasm (EIB):** Encourage physical activity. EIB should not limit patient’s participation in sporting activities. Advise patients to take 2 puffs of Salbutamol 30 minutes before exercise. EIB is often a marker of inadequate asthma control so consider adding or increasing the dose of inhaled corticosteroid.
**Pregnancy:** it is important to maintain asthma control during pregnancy to ensure adequate oxygen control to the foetus. Use Beclometasone if long-term ‘preventer’ inhaler is required. Check control at antenatal visits. Asthma can either worsen or improve during pregnancy; inhalers are safe in pregnancy.
**HIV:** Some data suggest asthma is more common in people living with HIV than in the general population. It has been associated with female gender, obesity, not being on ART, history of bacterial or Pneumocystis pneumonia and is more likely to be diagnosed in adulthood rather than in childhood as in the general population. Avoid co-prescribing Ritonavir with inhaled corticosteroids (Beclometasone) due to the risk of hypercortisolism (fatigue, weight gain, truncal obesity, hirsutism, Cushing’s syndrome, osteonecrosis). If oral steroids are required to treat an acute exacerbation, be aware of increased glucocorticoid concentrations and side effects as well as a potential reduction in blood levels of protease inhibitors.
**TB:** Risk of TB is associated with long-term doses of oral prednisolone of 7.5 mg daily. Inhaled corticosteroid - ICS-alone (without concurrent use of oral steroid) has a similar dose-dependent effect. In contexts of high TB prevalence, screen for TB before starting oral / inhaled steroids (CXR and sputum smear), and limit use of steroids to patients who gain clear benefit.

**Inhaler Technique (always use a spacer if possible):**
Even with correct technique, only 20-35% of the drug reaches the lungs. Always check technique before stepping up treatment. See Annex 5 for details of Inhaler technique.
### Management of Chronic Stable Asthma in ADULTS and CHILDREN

<table>
<thead>
<tr>
<th>Step 1</th>
<th>Step 2</th>
<th>Step 3</th>
<th>Step 4</th>
<th>Step 5</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>START RELIEVER INHALER:</strong> Inhaled short acting B2 agonist (SABA) as needed</td>
<td><strong>ADD PREVENTER:</strong> Inhaled steroid regularly</td>
<td><strong>ADD SECOND PREVENTER (if available):</strong></td>
<td><strong>INCREASE INHALED STEROID regularly</strong></td>
<td><strong>DAILY STEROID TABLET</strong></td>
</tr>
<tr>
<td>Salbutamol 100 mcg 2 puffs</td>
<td>Beclometasone (^8)</td>
<td>1. In adults and children (5+), use Inhaled long acting b2 agonist: Salmeterol Dose: ADULT (&gt;12): 50-100 mcg twice daily CHILD 5-12 years: 50 mcg twice daily If Good response to LABA, continue. If some response to LABA but inadequate control, continue LABA and ensure Beclometasone is at full dose (see column to left). If no response to LABA:</td>
<td>Beclometasone ADULT (&gt;12): up to 1000 mcg twice daily CHILD (5-12): to 400 mcg twice daily CHILD (&lt;5): to 200 mcg twice daily INTRODUCE Montelukast (if available) CONTINUE reliever inhaler as needed.</td>
<td><strong>ADULT:</strong> Start 25 mg Prednisolone(^9) daily. Aim to reduce to 10 mg daily within 2 months reducing slowly. Consider increasing high dose inhaled steroid to 1000 mcg twice daily <strong>CHILD:</strong> Refer to specialist - Use lowest dose providing adequate control - Refer patient for specialist care CONTINUE other inhalers.</td>
</tr>
<tr>
<td>Check compliance and inhaler technique before you move to the next treatment step</td>
<td>ADULT (&gt;12 years) 200-400 mcg twice daily CHILD (≤12 years): 100-200 mcg twice daily SEEK SPECIALIST ADVICE ON ANY CHILD &lt;2 NOT CONTROLLED AT THIS STAGE. DO NOT PROCEED TO STEP 3</td>
<td><strong>1.</strong> If Good response to LABA, continue. If some response to LABA but inadequate control, continue LABA and ensure Beclometasone is at full dose (see column to left). If no response to LABA:</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>2.</strong> In children &lt;5, or any age showing no response to LABA, start Montelukast (if available) Dose: ADULT (&gt;12) 10 mg daily CHILD (≤12 years): 5 mg daily</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Refer to Specialist if: child <2 uncontrolled at step 2; child <5 uncontrolled at step 4; child < 12 uncontrolled at step 4; adult uncontrolled at step 5; frequent exacerbations requiring hospitalization; diagnostic uncertainty

### Triage

Any patient who is breathless, cannot complete full sentences or has visible signs of respiratory distress, should be moved to a treatment room, ABCs assessed at the same time as treatment is initiated and urgent doctor review. Patients who are lethargic or with signs of life threatening asthma should be moved to the treatment room, with immediate resuscitation and immediate review by a doctor.

---

\(^8\) Rinse mouth after *beclometasone* use to avoid oral candidiasis. Side effects become more frequent at doses greater than 800 mcg per day

\(^9\) Patients taking oral steroids for more than 3 months or 3-4 short courses per year are at risk of systemic side effects. Monitor blood pressure, blood sugar and cholesterol. Consider treatment for osteoporosis if available
**Management of Acute Asthma in CHILDREN < 16 years**

### ASSESS SEVERITY

<table>
<thead>
<tr>
<th>MILD/MODERATE EXACERBATION</th>
<th>SEVERE EXACERBATION</th>
<th>LIFE THREATENING EXACERBATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alert. Can walk and speak whole sentences in one breath. Young children can crawl and vocalise.</td>
<td>Any of: unable to speak in full sentences, lethargic, visibly breathless. Moderate respiratory distress (paradoxical chest wall movement, subcostal or intercostal recession, use of accessory neck muscles, tracheal tug) tachycardic, tachypnoeic, O2 Sats 90-94%, PEFR 33-50% predicted.</td>
<td>Any of: can’t talk/vocalise, drowsy, confused, exhausted, coma, cyanosis, severe distress (tripod or head bobbing)/poor respiratory effort, hypotension, bradycardia, cardiac arrhythmia, O2 Saturation &lt; 90%, PEFR &lt; 33% predicted.</td>
</tr>
<tr>
<td>Pulse and respiratory rate in normal range for age</td>
<td></td>
<td></td>
</tr>
<tr>
<td>No respiratory distress/ mild abdominal excursion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Peak flow 50-75% predicted. O2 Saturation &gt; 94%</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### MANAGEMENT OF ACUTE EXACERBATION

**Oxygen** via non-rebreather face mask if SaO2 is less than 95% or if patient is dyspneic - titrate to oxygen saturation of 95% and until patient is no longer dyspneic.

#### Immediately

<table>
<thead>
<tr>
<th>Salbutamol: Inhaler via spacer over 10 minutes:</th>
</tr>
</thead>
<tbody>
<tr>
<td>6+ years: 6-12 puffs</td>
</tr>
<tr>
<td>0-5 years: 4-6 puffs with facemask</td>
</tr>
<tr>
<td>If patient cannot breathe through spacer, start nebulised Salbutamol</td>
</tr>
<tr>
<td>&lt; 1 year unlikely to be asthma – consider bronchiolitis, croup, epiglottitis, foreign body, pneumonia</td>
</tr>
<tr>
<td>Reassess after 10 minutes and repeat dose every 20 minutes for first hour if needed.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Salbutamol: If SaO2 is ≥ 95%, inhaler via spacer (1-2 facemask) over 10 minutes. Shake inhaler before each puff.</th>
</tr>
</thead>
<tbody>
<tr>
<td>6+ years: 12 puffs; 0-5 years: 6 puffs</td>
</tr>
<tr>
<td>If patient cannot breathe through spacer, start nebulised Salbutamol. Oxygen driven if SaO2 is &lt; 95%.</td>
</tr>
<tr>
<td>6+ years: 5mg; 0-5 years: 2.5 mg</td>
</tr>
<tr>
<td>Repeat every 20 minutes for one hour (total 3 times), or sooner if needed.</td>
</tr>
</tbody>
</table>

#### Within minutes

**Reassess severity and if poor response add nebulised Ipratropium Bromide**

| 6+ years: 8 puffs (160 mcg) via inhaler with spacer (21mcg/actuation) every 20 minutes for first hour |
| 0-5 years: 4 puffs (80 mcg) via inhaler with spacer and facemask (21mcg/actuation) every 20 minutes for first hour OR |
| If requiring nebuliser, add Ipratropium nebuliser to nebulised salbutamol every 20 minutes for first hour: 6+ years: 0.5 mg nebule; 0-5 years: 0.25mg nebule |

#### Within 1st hour

**Start Systemic Corticosteroids**

| Oral Prednisolone for 5 days or until better: 20mg/ day (0-5 years), 40mg/day (6+ years) OR, if oral route not possible, Hydrocortisone IV initial dose 8-10mg/kg (maximum 300 mg) then 4-5 mg/kg every 6 hours on Day 1, then every 12 hours on Day 2, then once only on Day 3. In children aged 0-5 years, avoid steroids if they have only signs of mild/moderate exacerbation and responds well to initial bronchodilator treatment. |

**Intravenous drugs: only if life-threatening asthma not responding to nebulisers. (they have limited benefit)**

| Magnesium sulphate 0.1-0.2 mmol/kg IV over 20 minutes – preferred option if available; avoid in children < 2 years. |
| Adrenaline 1:1000 (1mg/ml) sc 0.01 mg/kg divided into 3 doses of approximately 0.3 mg every 20 minutes in life-threatening asthma |

**Antibiotics: are indicated where there is clear evidence of infection (fever, productive cough) – see Green book**

#### After 1 hour

**Reassess response to treatment 1 hour after starting salbutamol:**

| a) Stable, dyspnoea resolved. |
| Observe for one hour and then discharge home. |
| Salbutamol: 4 puffs 4 hourly for 24 hours then reduce to twice daily. |

**b) Persisting Mild/Moderate signs: Admit to hospital;**

| Consider intubation/ventilation if expertise/equipment available. |
| Salbutamol: 4-6 puffs via space or 10 mg via nebuliser 2-4 hourly or more often, for 24 hours then review. 2 hourly vital signs and alert doctor if deteriorating. |

**c) Persisting Severe or Life-threatening signs: Transfer to ICU/ High dependency unit if available.**

**Discharge**

| Prednisolone: 2 mg/kg (max 50 mg) on Day 1 then 1 mg/kg Days 2 and 3; Beclometasone via spacer: 200 mcg daily (increase baseline dose if taking regularly); Antibiotics: only if clear evidence of infection (fever, productive cough, consolidation on Chest Xray). Treat according to local protocols, Amoxicillin, Erythromycin, Azithromycin are reasonable choices. Check: Patient can cope at home, inhaler and spacer technique, asthma action plan in place, arrange follow-up. |
| Follow up: 1 week after discharge |

| Follow up: 2-3 days after discharge |
## Management of Acute Asthma in ADULTS 16 years or older

### ASSESS SEVERITY

<table>
<thead>
<tr>
<th>MILD/MODERATE EXACERBATION</th>
<th>SEVERE EXACERBATION</th>
<th>LIFE THREATENING EXACERBATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>Can walk and speak whole sentences in one breath. Pulse &lt; 110 bpm Respiratory rate &lt; 25 rpm Peak flow 50-75% predicted; O2 Sats &gt; 94%</td>
<td>Any of: unable to speak in full sentences, visibly breathless, respiratory rate &gt; 25 rpm, pulse &gt; 1100 bpm; oxygen saturation 90-94%; PEFR 33-50% predicted.</td>
<td>Any of: can't talk, drowsy, confused, exhausted, coma, cyanosis, poor respiratory effort, hypotension, bradycardia, oxygen saturation less than 90%, PEFR &lt; 33% predicted.</td>
</tr>
</tbody>
</table>

### MANAGEMENT OF ACUTE EXACERBATION

**Immediately**

- **Oxygen** via non-rebreather face mask if SaO2 is less than 95% - titrate to oxygen saturation of 92-95%
- **Salbutamol**: 6-12 puffs of inhaler via spacer over 10 minutes. Reassess after 10 minutes and repeat 10 Salbutamol puffs every 20 minutes for the first hour if needed.

**Within minutes**

- **Reassess severity and if poor response add Ipratropium Bromide**
  - Add Ipratropium Bromide 8 puffs (160 mcg) via inhaler with spacer (21mcg/actuation) every 20 minutes for first hour OR
  - If requiring nebuliser, give 0.5 mg Ipratropium Bromide nebuliser added to nebulised salbutamol every 20 minutes for first hour.

**Within 1 hour**

- **Start Systemic Corticosteroids**
- **Oral Prednisolone** 40 mg OR if oral route is not possible,
- **Hydrocortisone** 100 mg IV every 6 hours until patient can take oral prednisolone (IM is less effective)
- **Magnesium sulphate** (preferred option if available): 2g IV over 20 minutes;
- **Adrenalin 1:1000 (1mg/ml) sc 0.01 mg/kg divided into 3 doses of approximately 0.3 mg every 20 minutes** in life-threatening asthma
- **Antibiotics**: are indicated where there is clear evidence of infection (fever, productive cough) – see Green Book

**After 1 hour**

- **Repeat vital signs, pulse oximetry, perform PEFR / spirometry if patient is capable.**
  - a) **Stable, dyspnoea resolved.** Observe for one hour and then discharge home.
  - b) **Persisting Mild/Moderate signs:** Admit to hospital;
  - c) **Persisting Severe or Life-threatening signs:** Transfer to ICU/ High dependency unit if available. Consider intubation/ventilation if expertise/equipment available.
  - Salbutamol: 4 puffs 4 hourly for 24 hours then reduce to twice daily. Advise if patient require s salbutamol more than 4 hourly, they need to be reviewed by a doctor again.

**Discharge**

- **Prednisolone**: 30-40 mg orally for 5 days or until better; **Beclometasone** via spacer: 400mcg daily (or increase baseline dose if already taking regularly);
- **Antibiotics**: only if clear evidence of infection (fever, productive cough, consolidation on Chest Xray). Treat according to local protocols. Amoxicillin, Erythromycin, Azithromycin, Clarithromycin are reasonable choices.
- **Check:** Patient can cope at home, inhaler and spacer technique, asthma action plan in place, arrange follow-up.

**Follow up:** 1 week after discharge

**Follow up:** 2-3 days after discharge
<table>
<thead>
<tr>
<th>Drug (Class)</th>
<th>Dose</th>
<th>Side Effects/ Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Salbutamol (Short acting Beta2-agonist bronchodilator)</strong></td>
<td>1. Pressurised metered dose inhaler (100 mcg/ puff) <strong>Maintenance</strong>: 2 puffs as needed. Step up during a respiratory infection to 2 puffs twice per day or more frequently as needed. If needed more often than 4 hourly, the patient should seek medical review. <strong>Acute exacerbation</strong>: 6-12 puffs every 20 minutes or continuously 2. Solution for nebulisation (nebule: 1. 5 mg in 2.5 ml, 2.5 mg in 2.5 ml, 50mg in 10 ml) -Adults and child &gt; 5 years: 2.5 - 5 mg /nebulisation; -Child &lt; 5 years or &lt; 15 kg: 2.5 mg/nebulisation -Repeat every 20-30 minutes as needed</td>
<td><strong>Indication</strong>: Rapid relief of bronchoconstriction. Onset within minutes and duration of action approximately 4 hours. Clean the mouthpiece before and after each use. <strong>Side effects</strong>: may cause bad taste, headache, dizziness, muscle cramps, tremor, palpitations and tachycardia, arrhythmias, sleep and behaviour disturbance; Potentially serious lactic acidosis, hyperglycaemia or hypokalaemia may result from high dose administration. <strong>Contraindicated hypersensitivity to the ingredients</strong></td>
</tr>
<tr>
<td><strong>Ipratropium Bromide (anticholinergic bronchodilator)</strong></td>
<td>1. Pressurised metered dose inhaler (20mcg/puff) <strong>Maintenance in COPD</strong>: Adults: 1-2 puffs 3-4 times daily (some patients need up to 4 puffs). <strong>Acute Exacerbations (asthma / COPD)</strong>: see tables above. 2. Solution for nebulisation Adults and child 6+ years: 500 mcg nebul Child 0-5 years: 250 mcg nebul</td>
<td><strong>Indication</strong>: For rapid relief of bronchoconstriction. Used for maintenance treatment in COPD. May be added to Salbutamol in treatment of severe life-threatening asthma. Onset of action: 30-60 minutes; Duration &gt; 4 hours. <strong>Side effects</strong>: dry mouth, bad taste, gastrointestinal motility disorder (including constipation and diarrhoea), cough, headache, less commonly nausea, vomiting, gastro-oesophageal reflux disease, dysphagia, tachycardia, palpitations, atrial fibrillation, throat irritation, pharyngitis, dysphonia; brachosphasmus, urinary retention, angle-closure glaucoma, blurred vision, and nasopharyngitis. Rarely dental caries and dry skin rarely, stomatitis, laryngospasm, pruritis and rare immediate hypersensitivity reactions with urticarial/ anaphylaxis. <strong>Contraindicated hypersensitivity to the ingredients</strong> <strong>Caution</strong>: narrow-angle glaucoma, urinary tract obstruction, prostate hyperplasia, cystic fibrosis; avoid eye contact. <strong>Safety</strong> in pregnancy or breastfeeding has not been established.</td>
</tr>
<tr>
<td><strong>Salmeterol (long acting Beta2-agonist bronchodilator)</strong></td>
<td>Pressurised Metered dose inhaler (25 mcg/ puff). <strong>Asthma</strong>: Adult 50 micrograms (2 puffs) twice daily, up to 100 micrograms (4 puffs) twice daily in more severe cases. Child 5-12 years, 50 micrograms (2 puffs) twice daily. <strong>COPD</strong>: 50 micrograms (2 puffs) twice daily.</td>
<td><strong>Indication</strong>: Step 3+ in maintenance treatment of either asthma or Group B+ in COPD. In asthma, must be used with an inhaled corticosteroid. Can be given without inhaled corticosteroids in COPD patients. <strong>Side effects</strong>: See Salbutamol. <strong>Caution</strong>: Hyperthyroidism, cardiovascular disease, arrhythmias, susceptibility to QT-interval prolongation, and hypertension. Use with caution also with diabetes (risk of DKA). Can use in pregnancy or breastfeeding although the foetal/infant heart rate may increase.</td>
</tr>
<tr>
<td><strong>Beclometasone dipropionate</strong></td>
<td>Pressurised metered dose inhaler 100 mcg/puff. <strong>Asthma</strong>: Adult: 200-2000mcg twice daily according to severity Child: 100-400 mcg twice daily according to severity See management of chronic stable asthma chart <strong>COPD</strong>: 200 mcg twice daily. No need to increase steroid dose.</td>
<td><strong>Indication</strong>: Step 2 in maintenance treatment of asthma or patients in Group C for COPD (2 or more exacerbations in the last year OR breathless on walking 100 metres OR FEV1&lt;50% on spirometry). Rinse mouth after use <strong>Side effects</strong>: adrenal suppression, reduced bone mineral density, small risk of glaucoma, hoarseness, dysphonia, throat irritation, mouth or throat candida. Paradoxical bronchospasm very rarely. Anxiety, depression, sleep disturbances, behavioural changes including hyperactivity, irritability, and aggression, hyperglycaemia (usually only with high doses), cataracts, skin thinning and bruising reported. <strong>Contraindicated in untreated TB</strong> <strong>Can use in pregnancy or breastfeeding</strong></td>
</tr>
<tr>
<td><strong>Fluticasone propionate</strong></td>
<td>Aerosol inhaler 50mcg/ puff. <strong>COPD</strong>: 100-500mcg twice daily according to response.</td>
<td><strong>As for Beclometasone</strong></td>
</tr>
<tr>
<td><strong>Magnesium sulphate (bronchodilator)</strong></td>
<td>Solution for parenteral injection <strong>Adults</strong>: 2 g (20 mmol) <strong>Children 2 years and over</strong>: 0.1–0.2 mmol/kg</td>
<td><strong>Indication</strong>: Severe/life threatening asthma not responding to nebulisation <strong>Side effects</strong>: flushing, mild fatigue, burning sensation at IV site, headache, dizziness. Major toxicity tends to occur at serum levels of ≥ 9 mg/dL e.g. loss of reflexes, blurred vision, lethargy, muscle weakness, pulmonary oedema <strong>Caution</strong>: Bowel obstruction, renal impairment, use of other magnesium-containing medications</td>
</tr>
<tr>
<td><strong>Montelukast</strong></td>
<td>Tablet, asthma only: <strong>Adult (&gt;12)</strong>: 10mg daily <strong>Child (2-12)</strong>: 5mg daily</td>
<td><strong>Indication</strong>: Step 3 treatment of asthma in children under 5, or any patient not responding to LABA <strong>Side effects</strong>: abdominal pain, thirst, headache, hyperkinesia <strong>Caution</strong>: limited data in pregnancy and breastfeeding – avoid where possible</td>
</tr>
<tr>
<td><strong>Prednisolone</strong></td>
<td>Tablet, enteric coated, 5mg <strong>Acute exacerbation of asthma / COPD</strong>: see table above for dosing</td>
<td><strong>As for Beclometasone</strong></td>
</tr>
<tr>
<td><strong>Hydrocortisone</strong></td>
<td>Solution for injection, 100mg/ml, 1ml <strong>Acute exacerbation of asthma / COPD</strong>: see table above for dosing</td>
<td><strong>As for Beclometasone</strong></td>
</tr>
</tbody>
</table>
2. Chronic Obstructive Pulmonary Disease

Background
COPD is a common, preventable and treatable disease characterized by persistent airflow limitation that is usually progressive and associated with an enhanced inflammatory response in the airways and the lung. Cigarette smoking is the most common cause. Other types of tobacco smoking including exposure to second hand tobacco smoke are also risk factor as is smoking marijuana: High levels of indoor air pollution from burning biomass fuel for cooking in poorly ventilated housing, occupational exposure to dusts, chemicals, fumes, are also risk factors.

Clinical features
Consider in patients over 40, smoker or ex-smoker or exposed to indoor or outdoor air pollution.
Ask about common symptoms; 2 or more symptoms are suggestive of COPD:

- Chronic cough (daily for at least 3 months without features of TB)
- Chronic sputum production especially during wet/cold seasons
- Breathlessness and/or wheeze, especially on exertion; progressive and persistent
- Repeated chest infections requiring treatment (≥ 3 in the last 2 years suggests COPD)

- Cough and sputum may precede dyspnoea by many years
- Ask the patient how their symptoms affect their day to day activities, consider functional capacity, psychosocial impact and family supports.

Differential diagnosis
- Consider Asthma, TB, heart failure, lung cancer, pulmonary embolus, bronchiectasis, asbestosis, fibrosis.
- Differentiate between COPD and Asthma:

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>COPD</th>
<th>ASTHMA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age onset</td>
<td>Usually &gt;40</td>
<td>Usually early in life (often childhood)</td>
</tr>
<tr>
<td>Smoking history</td>
<td>Usually yes</td>
<td>Not causal</td>
</tr>
<tr>
<td>Sputum production</td>
<td>Frequent</td>
<td>Infrequent</td>
</tr>
<tr>
<td>Disease progression</td>
<td>Progressive</td>
<td>Stable (usually with exacerbations)</td>
</tr>
<tr>
<td>Symptoms</td>
<td>Persistent and progressive</td>
<td>Intermittent and variable from day to day. Worse at night and early morning.</td>
</tr>
<tr>
<td>Past History /family history</td>
<td></td>
<td>Asthma, allergies or atopy</td>
</tr>
</tbody>
</table>

Investigations
Diagnosis is clinical. Confirm diagnosis with spirometry if available. FEV1/FVC < 0.7 after bronchodilator use is diagnostic. Refer for CXR to exclude Tuberculosis. Chest X-ray in COPD may show hyperinflation.
Assessment and monitoring

**First Visit:** Assess severity to decide which treatment step to start with.

**Review visits:** Review at 1 month after any change to medications; Review every 6 months if patient is stable.

At the review appointment:
- Check symptoms, history of exacerbations and spirometry (if available) and adjust medication accordingly. Review smoking status, exercise, diet and weight; look for and treat anxiety / depression.
- Ask about symptoms and exacerbations; consider stepping up medications. In COPD (unlike in asthma) medication step-down is unlikely unless there are side effects.
- Review inhaler use and technique at each visit, especially if control is poor (see annex 5).

Management of Stable COPD

The aim of treatment is to reduce symptoms, improve quality of life, and reduce the frequency of exacerbations and disease progression.

**Patient education and self-management**

1. **Smoking cessation** is the most important measure to stop progression of disease. Combined drug treatment and behavioural interventions are the most effective strategies. Consider Nicotine replacement therapy if available. Can be used in < 18 years, pregnant / breastfeeding women. **Brief Intervention:** the 5 ‘A’s:
   - Ask - every patient at every visit re smoking and document.
   - Advise - strongly urge all smokers to quit.
   - Assess - readiness to make quit attempt in the next 30 days
   - Assist – practical counselling, refer to group/peer counselling/social support, pharmacotherapy and education materials
   - Arrange - follow up.

2. **Advise reducing exposure to indoor air pollution** if possible e.g ventilation, cooking outdoors, using alternatives to bio-mass fuels, using fuel-efficient stoves

3. **Medication and how to take it:** Check the patient understands why they are taking each medication, how and when they should take them and that they use the correct inhaler technique.

4. **Adherence:** Explain the importance of continuing to take their inhalers and medication as prescribed even when symptoms improve, are mild or infrequent.

5. **Self-monitoring:** Ensure the patient is able to recognise when they are having an exacerbation, which is when they have any two of the following:
   - Worsening breathlessness
   - Increased sputum
   - Discoloured sputum

   Advise what action they must take when this happens and check their understanding. i.e. taking rest, ensure adequate fluid intake, ensure adequate nutrition ( small meals often) increase dose of inhaled salbutamol or ipratropium to maximum dose if taking these , seek medical care if symptoms are persistent (see annex 4)

6. **Physical activity:** encourage activity such as walking; start slowly and gradually increase to a goal of 20 - 40 minutes 4 times per week (note feeling breathless is not harmful). Refer to a pulmonary rehabilitation programme if available.

7. **Weight management:** Look for and treat obesity or malnourishment. Check BMI.

8. **Check for symptoms of depression,** and treat if this is present. Refer for counselling support if required.
Pharmacological Therapy in COPD

<table>
<thead>
<tr>
<th>Group</th>
<th>Exacerbation Risk</th>
<th>Symptom Score</th>
<th>Treatment</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Low (&lt; 2 exacerbations per year, no hospitalisations in the last year)</td>
<td>Low (not breathlessness or only when hurrying or walking on slight hill) FEV1 &gt; 50% predicted</td>
<td>Inhaled salbutamol (100 mcg; 2 puffs as needed); if not improving after 1 month despite good inhaler technique, change to: Inhaled ipratropium (40 mcg; 2 puffs as needed) If still not controlled, treat as Group B.</td>
</tr>
<tr>
<td>B</td>
<td>Low (&lt; 2 exacerbations per year, no hospitalisations in the last year)</td>
<td>High (on flat ground, walks slowly or stops due to breathlessness or activity limited by breathlessness) FEV1 &gt; 50% predicted</td>
<td>- To improve lung function: Inhaled salmeterol (25 mcg; 2 puffs twice daily) - For acute symptom relief: Inhaled salbutamol (100 mcg; 2 puffs 4 times/day) OR Inhaled ipratropium (40 mcg; 2 puffs 4 times/day) if greater perceived benefit than with salbutamol; avoid if high CVD risk. If not controlled, treat as Group C</td>
</tr>
<tr>
<td>C</td>
<td>High (2+ exacerbations per year and/or 1+ hospitalisation in the last year)</td>
<td>Low (not breathlessness or only when hurrying or walking on slight hill) FEV1 &lt; 50% predicted</td>
<td>- To improve lung function and reduce exacerbations: Inhaled Fluticasone (^{11}) (100 mcg – 500 mcg 2 times/day) AND Inhaled salmeterol (25 mcg; 2 puffs twice daily) – usually given as a combination inhaler - For acute symptom relief: Inhaled salbutamol (100 mcg; 2 puffs 4 times/day) OR Inhaled ipratropium (40 mcg; 2 puffs 4 times/day) if greater perceived benefit than with salbutamol; avoid if high CVD risk. If not controlled, treat as group D</td>
</tr>
<tr>
<td>D</td>
<td>High (2+ exacerbations per year and/or 1+ hospitalisation in the last year)</td>
<td>High (on flat ground, walks slowly or stops due to breathlessness or activity limited by breathlessness) FEV1 &lt; 50% predicted</td>
<td>Consider adding: 1. Daily oral prednisolone (1-5 mg); monitor side effects (osteoporosis, Cushing’s syndrome, gastritis, mood changes, skin thinning, myopathy etc.) Stop if no clear benefit – wean over several months if stopping; REFER TO SPECIALIST for advice and consideration of long term oxygen therapy if available</td>
</tr>
</tbody>
</table>

Inhaler Technique:
This is essential for successful treatment in COPD. Even with correct technique, only 20-35% of the drug reaches the lungs. Always check technique before stepping up treatment. See Annex 5 for details of inhaler technique.

Indications for Referral to Specialist (if not available, discuss with medical co-ordinator / NCD advisor)
- Diagnostic uncertainty e.g. < 40 years, non-smoker, atypical symptoms
- Suspicion of TB or Lung Cancer (e.g. weight loss, night sweats, haemoptysis, TB exposure)
- Severe acute exacerbation not resolving with treatment.
- Requiring Step 4 treatment, for pulmonary rehabilitation or palliative care if available.

Management of acute exacerbation
Acute exacerbations of COPD are characterised by the acute onset of worsening of COPD symptoms (shortness of breath, quantity and colour of phlegm) that typically lasts for several days. Exacerbations may be triggered by an infection with bacteria or viruses or by environmental pollutants.

Assess severity
Measure vital signs: pulse, BP, respiratory rate, oxygen saturations, temperature. Assess for respiratory distress: patient’s ability to talk, colour (cyanosis most worrying), use of accessory muscles of respiration, level

\(^{10}\) Based on MMRC dyspnoea score
\(^{11}\) Where Fluticasone is not available, Beclometasone can be used [see table in asthma section for dosing].

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29
of consciousness. Peripheral oedema suggests heart failure. Any patient with pulse > 100 bpm, respiratory rate > 20 rpm, oxygen saturations < 92%, use of accessory muscles, inability to complete sentences, cyanosis or decreased level of consciousness should be transferred to the treatment room, treatment initiated and assessed immediately by a doctor.

**Treatment of acute exacerbation of COPD:**

*Initial treatment in primary care or emergency room:*

- **Oxygen:** If O2 saturation < 92% give 28% oxygen (2 L with nasal cannula is sufficient) to maintain sats of 92-94%. Higher oxygen concentrations may reduce respiratory drive.
- **Bronchodilators:** salbutamol via spacer (start with 10 puffs of salbutamol 100 mcg then 4-6 puffs every 2-4 hours). If very unwell, use nebulized salbutamol (5 mg as needed, air driven). Ipratropium is an alternative but not as effective.
- **Oral steroids:** prednisolone orally 30-40 mg for 7 days. There is no need to taper the dose down.
- **Antibiotics:** Give only if increased sputum purulence AND either increased sputum volume or increased dyspnoea: Amoxicillin 500 mg TDS for 7 days. If penicillin allergic, erythromycin 500 mg qds.

If patient’s condition is not improving after one dose of nebulised salbutamol, or if there is severe underlying COPD, respiratory distress (accessory muscle use, severe cyanosis, haemodynamic instability), serious comorbidities (e.g. arrhythmia), older age or insufficient home support, admit to hospital:

- **Sit upright and continue Oxygen 2-5L/minute if saturations <90% to maintain saturations of 90-94%**
- **Nebulised salbutamol 5 mg driven by air, not oxygen. Repeat 1-4 hourly. Add nebulised ipatropium bromide 500 μg (maximum qds) if there is poor response to initial therapy**
- **Prednisolone 40 mg once daily for 7 days. Hydrocortisone 200 mg i.v. ONLY if the patient is unable to take p.o., then convert to oral Predisolone to complete 7 days of treatment**
- **Exacerbation of COPD is often triggered by infection. If sputum purulence is increased, give co-amoxiclav 625mg tds p.o. Intravenous antibiotics are not necessary unless there is severe pneumonia clinically or on the chest X-ray. Chest physiotherapy may be useful for severe exacerbations with thick sputum**
- **Discharge when wheeze has resolved, normal respiratory rate, able to mobilise around the ward**

**COPD in HIV**

- Incidence of COPD is higher in the HIV-positive population compared to the HIV-negative population; prevalence increases with age.
- Avoid co-prescribing Ritonavir with inhaled corticosteroids due to the risk of hypercortisolism (fatigue, weight gain, truncal obesity, hirsutism, Cushing’s syndrome, osteonecrosis).
- If oral steroids are required to treat an acute exacerbation, be aware of increased glucocorticoid concentrations and side-effects as well as a potential reduction in blood levels of protease inhibitors.

**COPD in TB**

- COPD is one of the most common co-morbidities with TB.
  - In countries with moderate-high prevalence of TB, screen all patients with cough > 2 weeks for TB i.e. CXR and sputum smear
  - Have a high index of suspicion for COPD in patients with previous or active TB, especially if >40 years, current or former smoker or of low socio-economic status.
  - Avoid fluoroquinolone antibiotic use in infective exacerbations of COPD in patients with active TB.
  - Avoid long-term use of oral corticosteroids in patients with active TB if possible. If patients are taking Rifampicin, oral and inhaled steroid doses (for treating exacerbations or long-term) should be doubled as Rifampicin reduces the bioavailability of steroids.
3. Diabetes

Background
Diabetes Mellitus is a chronic metabolic disease characterized by elevated levels of blood glucose, caused either by a lack of or impaired utilisation of insulin. Diabetes increases cardiovascular risk and results in damage to large blood vessels of the heart, limbs and brain and small vessels of the kidneys, eyes and nerves.

Classification
Type 1 diabetes – Characterised by insulin deficiency that results from the destruction of the insulin-producing cells of the pancreas. It manifests as sudden and severe hyperglycaemia, diabetic ketoacidosis, and death unless treated with insulin. Onset of the disease is most common in childhood or adolescence, but it may appear later especially in Sub-Saharan African populations. Treatment consists of total replacement of endogenous insulin.

Type 2 diabetes – Characterized by progressive insulin resistance and a relative lack of insulin. May be asymptomatic and diagnosed several years after onset, once complications have already arisen. May present with hyperglycaemic symptoms, often less marked than in Type 1 Diabetes; ketosis is rare. Globally the most common type of diabetes, increasing prevalence is linked to obesity, high fat, salt and sugar diets and urbanisation; it usually occurs in those over 40 years but is now also occurring in children.

Pre-diabetes – Patients found to have raised blood sugar on random or fasting blood testing, but who do not fulfil WHO criteria for diagnosis of Diabetes (see below), are considered to have ‘Pre-Diabetes’. These patients are at increased risk of developing Diabetes.

Gestational diabetes (GDM) - Onset or first recognition during pregnancy; often resolves at the end of pregnancy. Usually develops in late pregnancy when insulin antagonistic hormones peak, leading to insulin resistance, glucose intolerance and hyperglycaemia. It does not include previously diagnosed diabetics who become pregnant. If diagnosed in 1st trimester this is considered pre-gestational diabetes.

Other types - Includes genetic forms of diabetes such as Latent Autoimmune Diabetes in Adults (LADA), which shares characteristics of type 1 and type 2 DM; patients often do not require Insulin at diagnosis, but progress to Insulin dependence over months or years; Mature Onset Diabetes of the Young (MODY); diabetes associated with drug use (e.g. HIV treatments, corticosteroid or thiazide), Malnutrition Related Diabetes, a controversial form thought to be due to pancreatic damage related to childhood malnutrition; Atypical Ketone-prone Diabetes found in the West African population and descendants.

Clinical features
Diabetes may present with the classic symptoms of hyperglycaemia (polyuria, polydipsia, fatigue and weight loss), or complications of hyperglycaemia. Diabetes may also present through identification of hyperglycaemia on screening of asymptomatic patients.

- Symptoms of Hyperglycaemia: thirst, polyuria, polydipsia, recent, often rapid weight loss, nocturia, bedwetting, dehydration. Confirm with fasting blood glucose (FBG) testing.
- Complications of hyperglycaemia: Neurological (lethargy, impaired consciousness or coma); Ketoacidosis (rapid or sighing respiration, sweet-smelling breath, abdominal pain, vomiting); Infections (UTI, candida, cellulitis, etc, signs of shock or septicaemia). Confirm with a FBG test.
• Asymptomatic hyperglycaemia (>200mg/dl) on screening. Confirm with a second FBG test:
  o Cardiovascular disease (heart attack, stroke or transient ischaemic attack)
  o > 40 years with one of the following risk factors: obesity (BMI > 30 kg/m2), hypertension > 160 mmHg systolic, smoker, first degree relative with diabetes, women with polycystic ovaries or history of GDM or who delivered a macrosomic baby (> 4kg),
  o Any pregnant women with one of these risk factors (all pregnant women in the Middle East)
  o Any patient taking medications that can induce Diabetes.

Note: Hypoglycaemia is not a clinical feature of diabetes. It is a complication of treatment with oral hypoglycaemic drugs or insulin. It occurs when blood sugar < 75mg/dL (4.2 mmol/L), and usually presents with:
• Autonomic symptoms: weakness, dizziness, shaking, palpitations, sweating, anxiety, hunger, nausea.
• Neuroglycopaenic symptoms: poor concentration, headache, confusion, lethargy, blurry vision, difficulty speaking, impaired consciousness, convulsions or coma.

Diagnosis (WHO criteria):
If symptomatic only a single test is needed for diagnosis. If asymptomatic, two tests must be performed on different days (ideally at least 2 weeks apart).

<table>
<thead>
<tr>
<th>Test</th>
<th>Diabetes</th>
<th>Pre-Diabetes</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fasting Glucose</td>
<td>≥126 mg/dL (7 mmol/L)</td>
<td>≥110-125 mg/dL (6.1-6.9 mmol/L)</td>
<td>Eat / drink only water for 8 hours before the test; most accurate test</td>
</tr>
<tr>
<td>Random Glucose</td>
<td>≥200 mg/dL (11.1 mmol/L)</td>
<td>n/a</td>
<td>Least accurate</td>
</tr>
<tr>
<td>Glycosylated Haemoglobin (HbA1c)</td>
<td>≥48 mmol/mol (6.5%)</td>
<td>≥38 – 47 mmol/mol (5.7-6.4%)</td>
<td>Reflects glucose control over the past 6-8 weeks. Don’t use in children/young people, pregnancy, acutely ill patients, suspected Type 1 Diabetes, haemolytic anaemia, haemoglobinopathy, Iron deficiency anaemia, HIV, pancreatic damage or renal failure.</td>
</tr>
<tr>
<td>Oral Glucose Tolerance Test (only reliable test in pregnancy)</td>
<td>≥200 mg/dL (11.1 mmol/L)</td>
<td>≥140-199 mg/dL (7.8-11.0 mmol/L)</td>
<td>Results given are 2 hours after a 75g glucose load. This is the ideal test for diagnosis of gestational diabetes. Fasting Glucose is an alternative but will miss up to 30% of cases of gestational diabetes.</td>
</tr>
</tbody>
</table>

Oral Glucose Tolerance Test
Patients must have normal carbohydrate intake and normal exercise levels for 3 days before the test. Patients must fast for 8-10 hours before the test, consuming water only. A fasting glucose sample is collected. 75g dose of glucose is given as a drink, which must be consumed within 5 minutes. (e.g. 394 ml of Lucozade original). The patient must sit quietly, must not smoke and may only consume plain water during these 2 hours. A second glucose sample collected exactly 2 hours after the glucose load is consumed.

Management of Pre-Diabetes
Inform the patient he/she is at risk of developing diabetes and that certain lifestyle changes should be made in order to reduce that risk:
1. Increase physical activity: 150 mins/week of exercise reduces risk of developing diabetes by 52%
2. Eat regular, healthy meals
3. Lose weight, if BMI > 25
4. Have an annual fasting glucose test.

Management of Newly Diagnosed Diabetes

**Severe:** If fasting glucose is > 500 mg/dL OR if > 200 mg/dL and either ketotic or with severe hyperglycaemic symptoms, admit and provide urgent/emergency treatment (see diabetic emergencies).

**Less severe:** If fasting glucose is > 126 mg/dL but < 500 mg/dL without ketosis/severe hyperglycaemic symptoms, initiate management as an outpatient:

1. **Patient Education**
   - Explain what diabetes is and how it affects the body.
   - Provide a setting where the patient feels comfortable to ask questions, discuss fears and concerns. This can be done in both a 1:1 or a group sessions
   - **Monitoring blood sugars:** Explain to the patient what blood sugar is, why it needs to be checked and how to check it, as well as how to correctly read the results, what they mean and the appropriate action that needs to be taken.\(^\text{12}\)
   - **Taking medication:** Explain their medication clearly, what it is for, when to take it and the importance of adherence
   - **Hyperglycaemia and hypoglycaemia** (if taking Sulphonylurea or Insulin): The signs and symptoms and the action that needs to be taken if the patient starts to feel them.
   - **Complications:** Explain the possible complications that can occur with diabetes; eye, foot, kidney, heart and nerve problems, but explain that good blood sugar control can help to prevent these

2. **Lifestyle change**

This is an important part of diabetes care. Changing lifestyle is difficult, but small changes are hugely beneficial. Discuss with the patient what he/she can do and how to do it; decide on targets and a timeline.

- **Smoking cessation:** Discuss the importance of the patient stopping smoking and how it will reduce the risk of vascular complications.
- **Physical activity:** any activity that causes slight breathlessness or light sweat reduces cardiovascular risk and helps weight loss; advise walking 30 minutes 5 times / week. Physical housework & gardening count.
- **Eat healthy and regular meals:** Daily portions: 5+ vegetable and 1 fruit; low fat; salt < 5 g; low sugar; minimal alcohol. Try to maintain 3 meals / day at regular times; if on insulin, should also plan 2 snacks / day. Include guidance on better carbohydrate choices and restriction on portion size.
- **Weight management:** Check BMI and if > 25 kg/m2, advise 5-10% weight loss reduces cardiovascular risk and helps blood sugar control.
- **Daily routine:** Patients need to get into a daily routine of taking their medication and checking their feet. This will take time, but once it becomes a habit patients will find their diabetes much easier to manage.
- **Be prepared:** To pre-empt hypoglycaemia, patients taking a sulphonylurea or insulin should always carry a sugary snack or drink (e.g. 5 candies; a small can of Coke)
- **Follow up appointments:** Patients need to understand the importance of the follow up visits and attend them regularly.

\(^{12}\) In most settings MSF does not advocate for home glucose monitoring as this tends to be unsustainable; but in some contexts it can be considered for patients on insulin (with approval of HA).
Remember this is a large amount of information for a patient to take in in their initial visit; try to share this information progressively over several visits to avoid overwhelming the patient. Reassure the patient that it will take time for them to get used to their diagnosis and taking their medication, but that they are able to come back to the clinic if they have any further questions or concerns or forget anything. Having a family member or friend present during the patient education can be very beneficial.

3. **Monitoring and Cardio-vascular risk management**

All adults, and all children >10 years of age with Diabetes for 5+ years, should undergo monitoring as follows:

<table>
<thead>
<tr>
<th>Review lifestyle</th>
<th>Every visit</th>
<th>Discuss: blood sugar monitoring, adherence to medication, any episodes of hypo and hyperglycaemia, foot care, diet, exercise, smoking.</th>
</tr>
</thead>
<tbody>
<tr>
<td>First visit and 6 month review</td>
<td>Calculate BMI</td>
<td></td>
</tr>
</tbody>
</table>

### Cardiovascular Risk Management

**Blood Pressure**

<table>
<thead>
<tr>
<th>Every visit</th>
<th>Target BP: &lt; 140/90 mmHg. Diagnosis is based on 3 readings &gt; 140/90 mmHg at weekly intervals. Individualised targets e.g. &lt; 150/90 are acceptable in the elderly. <strong>Start with ACEi</strong> unless contraindicated. Add a Beta-blocker if history of macrovascular disease or heart failure. See section on Hypertension (below)</th>
</tr>
</thead>
</table>

**Lipids**

| First visit and 6 month review – reassess risk | Measure total cholesterol / LDL at first visit to assess CVD risk. No need to repeat. If 10 year CVD risk> 20% per WHO risk charts, start Atorvastatin 20mg (or equivalent). However, give Atorvastatin 80 mg13 (or equivalent) **daily for secondary prevention** if: a) **Macrovascular** disease: history of heart attack, angina, peripheral arterial disease, stroke, transient ischaemic attack b) **Microvascular** disease: retinopathy, nephropathy, neuropathy |

**Aspirin**

| First visit and 6 month review | Aspirin 75 mg daily if history of macrovascular disease. |

### Diagnose and Manage Complications

**Nephropathy**

| First visit and 6 month review | Check kidney function: If microalbuminuria > 30 μg/ml (best test) OR rising creatinine OR proteinuria present on 3 occasions without evidence of UTI, this indicates nephropathy. **Start ACEi**; monitor creatinine 2 weeks later as ACEi may impair kidney function; stop if creatinine increases 30%. |

**Retinopathy**

| First visit and 6 month review | Check eyes: ask about poor night vision, visual impairment. Check visual acuity, look for cataract. See eye-screening guide below14. |

**Diabetic foot**

| First visit and 6 month review | Check feet: See diabetic foot screening guide below. Refer to a chiropodist (or whoever is providing this service) 6 monthly if available. |

**Autonomic Neuropathy**

| First visit and 6 month review | Ask about: bloating/nausea/vomiting after meals, sudden diarrhoea at night, erectile dysfunction, lack of hypoglycaemia awareness. These symptoms may also be caused by drug treatment and by associated vascular disease. Manage by improving blood sugar control, lifestyle changes and adjusting medications. See hypoglycaemia guide. |

### Blood sugar control

<table>
<thead>
<tr>
<th>Every visit and at least every 3 months.</th>
<th>Fasting glucose</th>
<th>Random glucose</th>
<th>HbA1C (best if available)</th>
</tr>
</thead>
<tbody>
<tr>
<td>75 – 150 mg/dL (4.2 – 8.3 mmol/L)</td>
<td>75 -180 mg/dL (4.2-10.1 mmol/L)</td>
<td>7 - 8 % but individualize (53 - 64 mmol/mol)</td>
<td></td>
</tr>
</tbody>
</table>

13 If LFT monitoring not available, give low dose statin (e.g. Atorvastatin 20mg)

14 If laser eye treatment is accessible and affordable to patients, all patients should be referred for annual diabetic retinopathy screening (see section on eye screening below).
4. **Blood Sugar Control in Diabetes**

- **Aims of diabetes control**: to avoid hyperglycaemic symptoms, to achieve near-normal glycaemic values, to avoid complications and unacceptable weight gain and to avoid hypoglycaemia.

4.1 **Blood Sugar Control in Type II Diabetes**

- In addition to lifestyle changes, medication is usually needed to control blood sugar. Medication requirements tend to increase with time. 40-50% of Type 2 Diabetics eventually require insulin.
- Adjust medication doses based on a minimum of 2 above-target readings or if complications develop, rather than on a single reading. Before **adjusting doses**, check patient **adherence**.
- Ask about symptoms of hyper- and hypoglycaemia and if present, seek a cause.
- **Hyperglycaemia** may be caused by inadequate treatment, non-adherence/missed doses, doses poorly timed with meals, inappropriate diet, infection or illness, drugs e.g., beta blockers, thiazide diuretics, corticosteroids, combined oral contraceptives, progesterone, pseudoephedrine, niacin, antipsychotics, phenytoin, thyroxin. Lack of access or inability to afford treatment is a key causative factor.
- **Hypoglycaemia** may be caused by over-treatment, missed meals, doses poorly timed with meals, autonomic neuropathy leading to poor awareness of hypoglycaemia, exercise, alcohol, renal or liver impairment, beta blockers, ACE inhibitors, Aspirin and NSAIDs, sulphonamides, quinine. Hypoglycaemia due to alcohol may last up to 24 hours.
- **Blood Sugar Targets**:

<table>
<thead>
<tr>
<th>Target</th>
<th>Patient Category</th>
<th>HbA1c</th>
<th>Equivalent Blood Glucose average over 24 hours</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stricter</td>
<td>Young people (&lt; 65 years) and/or with short disease duration, longer life expectancy and lower risk of hypos; Pregnant women; Children &lt; 18</td>
<td>7%</td>
<td>150-mg/dL (8.3mmol/L)</td>
</tr>
<tr>
<td>Modified</td>
<td>Older people &gt; 65 years (usually Type 2) and/or patients with significant morbidity: cardiovascular disease, advanced microvascular or macrovascular complications, cognitive impairment, risk of hypos/falls or end-stage illness.</td>
<td>8%</td>
<td>180 mg/dL (10.1 mmol/L)</td>
</tr>
</tbody>
</table>

**Pharmacological therapy**

Early initiation of Metformin reduces cardiovascular risk. If patients have mildly elevated fasting blood sugar (126 – 150 mg/dL), lifestyle changes alone are appropriate. Decide in consultation the patient; discuss motivation to change. If fasting blood sugar rises above 150mg/dL, start Metformin.
<table>
<thead>
<tr>
<th>Drug (Class)</th>
<th>Dose</th>
<th>Side Effects/ Comments</th>
</tr>
</thead>
</table>
| Metformin (Biguanide) | Start at 500 mg with breakfast; increase slowly to a maximum of 3000 mg/day in 2-3 divided doses with each meal (most patients require 2000 mg/day). | Reduces cardiovascular complications. **Side effects:** gastrointestinal effects are common and are reduced by dividing the dose and increasing slowly. Rarely causes lactic acidosis (when severely dehydrated/unwell). **Contraindicated:**  
  - Absolute: Hepatic or renal failure: ALT or AST > 3 x normal limit; creatinine > 2 mg/dL or > 175 μmol/L, or GFR < 45 ml/min.  
  - Relative: Impaired hepatic/renal function (creatinine 1.4-2.0 mg/dL or 123-175 μmol/L or GFR 45-60 ml/min; LFTs raised but <3x normal limit: reduce dose by 50% and recheck after one month and stop if threshold for absolute contraindication is reached. **Caution** in B12 deficiency, patients on anti-TB meds (Bedaquiline, Linezolid) with normal hepatorenal function → monitor LFTs and U&Es every 3 months. Stop before using contrast media or anaesthetics. |
| Glibenclamide (Sulphonylurea – 2nd choice) | Start at 2.5 mg with breakfast. Increase by 2.5 mg per week to a maximum of 15 mg daily as required. | **Side effects:** May cause hypoglycaemia and weight gain. Warn patients about hypoglycaemia, which may be prolonged for many hours. **Contraindicated** in ketosis, lactation, porphyria. **Caution** renal or hepatic impairment (see ‘Metformin’ for thresholds), elderly, Ramadan or other fasting periods; stop during surgery, 1st trimester pregnancy, breastfeeding, trauma. |
| Gliclazide (Sulphonylurea – 1st choice if available) | Start at 40 mg daily. Increase weekly according to response up to 160 mg as a single dose, with breakfast. If higher doses required, divide into twice daily up to a maximum of 320 mg per day. | **Side effects:** May cause hypoglycaemia and weight gain. Warn patients about hypoglycaemia. **Contraindicated** in ketosis, lactation, porphyria. **Caution** renal or hepatic impairment (see ‘Metformin’ for thresholds), elderly, Ramadan or other fasting periods; stop during surgery, 1st trimester of pregnancy and trauma. |
| Rapid acting Insulin Human (e.g. Actrapid) | **Onset of action:** 30 minutes; **Maximal action:** 2 to 4 hours; **Duration of action:** 4 to 6 hours (according to the dose). **Indication:** management of acute hyperglycaemia. | **Side effects:** Local: transient oedema, bruising, lipodystrophy at injection sites; rarely pain. Hypoglycaemia in overdose. **Caution:** insulin requirements may be decreased with hepatic and renal impairment. Compensatory response to hypoglycaemia may be impaired in renal impairment. Requirements may be increased by infection, stress, accidental or surgical trauma and during puberty. Increase monitoring during these periods is recommended. **Pregnancy and breastfeeding:** insulin requirements may alter and doses should be frequently monitored. Doses generally need to be increased during the 2nd and 3rd trimester. **Hypoglycaemic effects enhanced by:** Beta blockers, MAOIs, alcohol, fibrates; possibly ACEIs, anabolic steroids and testosterone. **Hypoglycaemic effects reduced by:** Corticosteroids, diazoxide, loop diuretics (e.g. furosemide), thiazide diuretics, oestrogens and progesterones. |
| NPH Insulin (intermediate-acting insulin) | **Onset of action:** 1-2 hours; **Maximal action:** 4 to 12 hours; **Duration of action:** 14 to 18 hours (according to the dose; may be longer in some patients). **Indication:** in Type 2 Diabetes when oral hypoglycaemic drugs do not provide adequate glucose control or are contraindicated. | Insulin in Type 2 Diabetes  
If fasting glucose is not well controlled (< 150 mg/dL or < 8.3 mmol/L) at the maximum tolerated doses of Metformin and Sulphonylurea, discuss initiating insulin with the patient and provide education. |
Single injection of NPH:
- Continue the maximum dose of Metformin; stop the Sulphonylurea.
- Start with a single evening injection of NPH (intermediate acting insulin) of 0.3 units/kg at bedtime.
- **NPH onset of action:** 1-2 hours. Duration of maximal action: 4-12 hours. Total duration of action: 16-18 hours (may be longer in some individuals).

**Dose adjustment:** If the patient has a glucometer, ask them to record **3 pre-meal and 1 bedtime glucose** level per day. Once stable, this may be reduced to testing before each injection and testing a pre-breakfast level several times per week. Otherwise, perform FRB at each clinic visit.

<table>
<thead>
<tr>
<th>Fasting glucose</th>
<th>Action</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low: &lt; 75 mg/dL (&lt; 4.2 mmol/L)</td>
<td>Treat for hypoglycaemia. Refer to the doctor for review. Reduce the dose by 4 units.</td>
</tr>
</tbody>
</table>
| **At target:** 75-150 mg/dL (4.2 – 8.3 mmol/L) | **Ask about symptoms of hypoglycaemia.**  
If present - reduce the dose by 2 units in the evening  
If not - maintain the same dose. |
| **High:** 151-500 mg/dL (8.4 – 27.8 mmol/L) | If >=200 mg/dL (11 mmol/L), check for ketones and ask about symptoms of hyperglycaemia. If either is present, treat urgently for hyperglycaemia (see hyperglycaemia section below). If not, increase total dose by 2-4 units; review in 1 week. |
| **Very high:** >500 mg/dL | See hyperglycaemia section below. |

BEFORE ADJUSTING INSULIN DOSES, look for a reason for the abnormality.
Single dose NPH nocte can be increased up to a maximum of **0.6 units/kg/day** until target HbA1c is achieved. However, if the patient starts to have hypoglycaemic episodes, change to a twice daily regimen.

**Twice daily NPH injections**
Convert the current insulin dose into two doses: **2/3 in the morning and 1/3 in the evening** 12 hours apart. E.g. If the patient was taking 30 units at bedtime (0.6 units/ kg in 50 kg woman), divide this into 20 units in the morning and 10 units in the evening.

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15 The morning pre-breakfast glucose reflects the action of the evening insulin dose (either NPH or Biphasic insulin) overnight – adjust the evening dose based on this reading. Persistent high morning sugars may reflect the "**dawn phenomenon**", a rebound hyperglycaemia in response to an overnight hypoglycaemia. If suspected, ask the patient to record several readings at 2 am. A snack at bedtime will reduce overnight hypoglycaemia.
– Patients with glucometers should record **3 pre-meal and 1 pre-bed blood sugar** until stable. This may be reduced to testing before each injection once stable. If patient does not have a glucometer, (s)he should still note episodes of hypo- or hyperglycaemic symptoms, together with the timing of symptoms.
– Insulin dose should only be adjusted by the health worker. Adjust one insulin dose at a time (either the morning or evening dose) according to the Insulin Adjustment Table above, and review weekly until stable.
– If the pre-breakfast blood sugar reading is abnormal, adjust the evening NPH dose
– If the pre-lunch, re-dinner or pre-bedtime readings are abnormal, adjust the morning NPH dose.
– 3 meals per day at regular times and 2 snacks (mid-morning and pre-bed) help to maintain good blood sugar control and avoid hypos.

If the patient still has not achieved their target HbA1c, despite careful adjustment, counselling and patient adherence, consider switching to a mixed insulin regime as for Diabetes Type 1 (below).

### 4.2 Blood sugar control in Type 1 Diabetes (or type 2 Diabetes not controlled on NPH insulin)

Type 1 Diabetes requires insulin therapy from diagnosis. After initial stabilisation a “honeymoon period” often occurs when the insulin requirements are initially low. After a few months, the insulin requirements usually increase.

**Fixed-combination Mixed Insulin (Biphasic)**
– Fixed combination of NPH (intermediate acting insulin) 70% and short-acting insulin 30%: **Biphasic insulin70/30**. NPH provides basal insulin action while short-acting insulin provides extra insulin to cover meal times.
– Start with **0.5 units/kg /day divided in two doses** 12 hours apart: 2/3 in the morning 15 minutes before the evening meal and 1/3 in the evening 15 minutes before the evening meal. (If changing from NPH insulin, maintain the same total daily dose when changing to mixed Insulin.)
– Short acting insulin onset of action: 30 minutes; Maximal action: 204 hours; Duration of action: 4-6 hours depending on the dose.

– It is essential for the patient to **eat at the same time** that the Biphasic insulin is given to avoid serious hypoglycaemia. While it is important to adapt to the patient’s home circumstances, three meals at regular times and a mid-morning and pre-bed snack will enable best sugar control and minimise hypos. Do not prescribe Biphasic insulin if the patient does not have access to morning and evening meals.
– Patients should record 3 pre-meal and 1 pre-bed blood sugar until stable. This may be reduced to pre-injection and pre-lunch once stable. If patient does not have a glucometer, (s)he should still note episodes of hypo- or hyperglycaemic symptoms, together with the timing of symptoms.
– Only the health worker should adjust the Insulin dose. Only adjust one insulin dose at a time and review weekly until stable.
– Adjust either the morning or the evening Biphasic insulin dose according to Insulin Adjustment Table
– If the pre-breakfast blood sugar reading is abnormal, adjust the evening Biphasic insulin dose.
– If the pre-lunch, pre-dinner or pre-bedtime readings are abnormal, adjust the morning Biphasic insulin dose
— Be aware of the dawn phenomenon and seek other reasons for the abnormality in glucose levels.

**Individualised mixed Insulin regimens**

In cases where patient remains poorly controlled on fixed-combination mixed Insulin (not achieving target HbA1c, hypos or erratic FBGs), a basal bolus regimen can be introduced (NPH insulin morning and night, with rapid-acting insulin bolus prior to each meal). This should only be considered if:

- patients highly motivated and very high treatment literacy
- evaluation by nurse / adherence officer suggests that patient is capable of long-term adherence
- patient has access to home glucose monitoring
- the prescribing doctor has experience of initiating basal-bolus regimens (or seeks advice from NCD advisor or paediatrician).
- benefits of better control are believed to greatly outweigh the risks from this complex regimen (e.g. hypoglycaemia due to accidental injection of fast acting insulin instead of NPH).

Initially, calculate the total number of units of mixed insulin that the patient receives each day, and give the same total as ½ NPH Insulin (split into morning and evening doses) and ½ rapid acting Insulin (split into doses prior to each meal). Patients should continue to record 3 pre-meal and 1 pre-bed blood sugars. If all readings remain high, increase an NPH Insulin dose according to the Insulin Adjustment Table (increasing the evening dose if morning FBGs are highest, and adjusting the morning dose if evening FBGs are higher). If some readings are fine, but one (or more) is elevated, increase the rapid-acting insulin dose that precedes the elevated FBG reading. Only alter one insulin dose at a time. Ideally this should be done in consultation with a specialist.

5. **Education for Patients on Insulin Therapy**

This requires one or more counselling sessions to determine if the patient is ready to start self-injecting and understands the risk and management of hypoglycaemia. Involve family/carer if possible and provide an information leaflet appropriate to the local setting. Ensure that the patient education and life style changes listed above have been covered and now focus specifically on:

1. **Monitoring blood glucose:** If the patient is on rapid-acting or mixed insulin, or has recurrent hypoglycaemic episodes, provide the patient with a glucometer, glucometer strips, lancets and a sharps bin (jar with a lid) and show the how to use it. Ask them to practice using it in front of you to ensure they have the right technique and disposing of the sharp safely. Explain that when taking the blood sugar, they should take the blood from different finger tips each time. Explain when patients should take their blood sugar and that they should always record it in their record book (provided by the clinic). Explain to the patient a normal, low and high blood sugar reading and what action must be taken for each reading.

2. **Insulin:** Explain what insulin is, how it works and its relationship with food intake. Explain the doses of insulin and why they may differ.

3. **Storage of insulin:** Explain that the vial they are using can be kept in a fridge or at room temperature until they have finished it or until it has been open for 28 days and then it must be discarded. If not refrigerated, Insulin should be kept in the shade in the coolest part of the house (maximum daytime temperature 37 degrees, maximum night-time temperature 25 degrees; unopened vials can be kept in a pot of cool water). Patients may require a travel letter to take the insulin home.

4. **Drawing up of insulin:** Provide the patient with their insulin and insulin syringe. Explain to them how to read the insulin needle and how to draw up the insulin, with no air in the syringe. Practice giving them different doses and asking them to draw up the dose for you using water for injection.
5. **Injection technique:** Explain to the patient how to administer the insulin.
   a. Wash hands.
   b. Check your vial of insulin has been open less than 28 days and mix it by rolling the vial of insulin between your palms.
   c. Remove the cap from the needle and place the needle into the vial.
   d. Draw up the appropriate dose and check there is no air in there.
   e. Find an appropriate site to inject the insulin, see image opposite and pinch a bit of skin between your thumb and forefinger.
   f. Place needle into pinched skin at a 90 degree angle and inject insulin. Leave needle in place for 10 seconds before removal.
   g. Remove and dispose of the needle into the sharps bin.

**Note:** Change injection sites regularly to avoid unsightly lipodystrophy and reduced absorption.

6. **Meal plan:** Provide specific advice for each patient based on home/work circumstances and target weight loss.

7. **Hypoglycaemia:** Explain the symptoms of hypoglycaemia and that action must be taken as soon as these symptoms are felt, blood sugar should be taken and a sugary drink or snack should be eaten (5 candies/ 150ml Coke. Follow with a normal meal otherwise hypo will quickly reoccur). It is important to always be prepared for a hypo and patients should always have a sugary snack or drink with them at all times, especially while driving. It is important not to drive if blood sugar is below < 90 mg/dL (5 mmol/L). Explain that the most common reasons for hypoglycaemia are: late or missed meal, extra or unplanned exercise, too much insulin or tablets, alcohol (especially on an empty stomach), hot weather and not drinking enough.

8. **Sick day rules:** Explain to the patient how infections will affect their diabetes, causing their blood sugar to increase even if they are not eating or vomiting and they must follow the instructions below:
   a. Never stop taking their insulin
   b. Check blood sugar levels every 2-3 hour.
   c. Drink 2-3 litres of non-sugary drinks between meals
   d. Try to eat even if you don’t feel like it – bread, crackers, plain biscuits, milky drinks. Avoid spicy food.
   e. Seek medical help if blood sugar is persistently > 300 mg/dL (16 mmol/L), if they cannot keep drinking and becomes thirsty, if persistent vomiting, if drowsy or breathing is deep and rapid.

9. **Exercise:** eat a snack before exercising to avoid hypoglycaemia.

10. **Alcohol:** if culturally appropriate. Drink minimal amounts of alcohol with food only. Double pre-bed snack if you have had alcohol and eat a larger breakfast. Hypoglycaemia may persist for 24 hours.

6. **Follow up**
   - **Monthly** if medication doses was adjusted or if blood sugar is poorly controlled (> 200 but < 500 mg/DL).
   - **Three monthly** if the fasting blood sugar is < 200 mg/dL (11.1 mmol/L) – check FBG and BP at each visit.
   - **Annual review** for diabetic complications.
   - **Admit to hospital** if the blood sugar is > 500 mg/dL (27 mmol/L) or if the patient is symptomatic or ketotic.
Management of Diabetic Emergencies

Triage: Any diabetic patient who feels unwell should have their blood sugar checked. Patients with signs or symptoms of hyperglycaemia or hypoglycaemia, chest pain, breathlessness, BP > 180/110, fasting glucose > 200 mg/dL (11 mmol/L) or < 75 mg/dL (4.2 mmol/L) should be moved to a treatment room and seen by Dr:

1. Hyperglycaemia
Check for urinary ketones if blood sugar is > 200 mg/dL (11 mmol/L).

A. Severe: If the patient has any ketones on urinary dipstick, severe symptoms (dehydration, vomiting or unable to drink, impaired consciousness, ketosis, shock or septicaemia) or a blood sugar > 500 mg/dL, urgently refer/admit to hospital and treat according to the table below

<table>
<thead>
<tr>
<th>Resuscitation</th>
<th>Oxygen if necessary; intravenous / interosseous access urgently. Place a urinary catheter and carefully note the fluid balance</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fluid Infusion</strong></td>
<td></td>
</tr>
<tr>
<td><strong>ADULT / CHILD&gt; 15 YEARS</strong></td>
<td>CHILDERN &lt;= 15 YEARS</td>
</tr>
<tr>
<td>1. NaCl 0.9% - 1 litre in 1 hour;</td>
<td>1. If signs of shock: 20 ml / kg bolus NaCl 0.9%; repeat until signs of shock resolve (max 3 times) then progress to step B</td>
</tr>
<tr>
<td>2. NaCl 0.9% - 1 litre in 2 hr</td>
<td>2. If decreased peripheral perfusion without signs of shock: 10 ml / kg 0.9% NaCl in 1 hour and progress to step C</td>
</tr>
<tr>
<td>3. NaCl 0.9% - 1 litre in 4 hr</td>
<td>3. Careful rehydration over 48 hours: start NaCl 0.9% and replace with NaCl / glucose mix (see below) when blood glu &lt;= 250 mg/dL:</td>
</tr>
<tr>
<td>4. NaCl 0.9% - 1 litre in 6 hr</td>
<td>- 4-9 kg: 6 ml / kg / hr</td>
</tr>
<tr>
<td>5. NaCl 0.9% - 1 litre in 8 hr</td>
<td>- 10-19 kg: 5 ml / kg / hr</td>
</tr>
<tr>
<td></td>
<td>- 20-39 kg: 4 ml / kg / hr</td>
</tr>
</tbody>
</table>

**INSULIN**
- Re-check blood sugar after one hour of fluid infusion, before giving insulin
- Adults and children > 5 years: Rapid-acting Insulin 0.1 unit / kg subcut in the thigh. In children <5 years: 0.05 unit / kg
- Aim to reduce blood sugar 60-70 mg / dl per hour. Faster = risk of cerebral oedema.
- Check blood sugar and urine every 2 hrs, followed by injection of insulin according to the blood glucose levels:
  - blood glucose > 250 mg / dl: Increase insulin dose by 2 units compared to last dose. (in children 5-15 years, increase by 0.1 units / kg; in children <5 years, increase by 0.05 units / kg). Continue NaCl at same rate
  - blood glucose 90-250 mg / dl: Repeat same dose of insulin. Replace NaCl by NaCl / glucose 10% (take a new NaCl 1000ml pouch, remove 200 ml of NaCl and throw it away, replace with 200 ml of 50% dextrose)
  - blood glucose <90 mg / dl: Stop insulin. Give 50 ml glucose 10% IV (in children <15, give 5 ml / kg of 10% dextrose IV). Replace NaCl by NaCl / glucose 10%.
- Continue until the patient is stabilized: blood glucose <250, no urinary ketones, conscious and breathing normally, asymptomatic, can eat and drink normally and can urinate
- Change to twice daily Insulin dose (as above) and titrate gradually to achieve target blood sugar level

**POTASSIUM**
Once blood sugar levels began to decrease and the patient is passing urine: Add 20 mmol Potassium Chloride (15 mL of 10% KCl) to each 1000 ml fluid pouch. Check potassium at each blood draw until patient is eating.

**Other**
Prevent complications: thrombosis, aspiration, shock, cerebral oedema-see outpatient guide
Look for the cause of hyperglycaemia. Find a source of infection and treat it. In case of fever > 38 Degree in children, treat with Ceftriaxone 75 mg/kg/day IV or IM.
Lab investigations: FBC, creatinine (urinalysis / stools if applicable)

B. Less Severe: If the patient is unwell but does not have severe symptoms, encourage them to drink 500 ml (10ml/kg in children < 15 years) over one hour and recheck the blood glucose.
- If Glucose still > 200 mg/dL (11 mmol/L), give 2 units of short-acting insulin (Actrapid) subcutaneously (0.5 units/kg in children aged 5 to 15 years; 0.25 units/kg in children < 5 years).
- Look for infection and treat as appropriate.
- Continue oral fluids and recheck blood sugar in one hour.
- If stabilised, increase baseline total insulin by 2 units, if total dose is 20 units or less; increase baseline total insulin by 4 units if total daily dose is more than 20 units. If patient is not on Insulin, consider increasing dose of oral hypoglycaemic drugs.
- If Glucose persistently > 200 mg/dL, consider admission and treat as category A (severe).
2. Hypoglycaemia (Blood sugar < 75 mg/dL (4.2 mmol/L) with or without symptoms.

A. Conscious patients - lucid and able to eat and drink
- Give 15 g of simple sugar - 200 mls of fruit juice, (non-diet) cola or fizzy sweet drink OR 25 ml of 50% dextrose by mouth.
- Recheck in 10 minutes – a) If still < 75 mg/dL (4.2 mmol/L), repeat step 1 and recheck in 10 minutes, repeating as needed; b) If >= 75 mg/dL (4.2 mmol/L) give the next meal or snack that is due or a source of slow-release carbohydrate (2 biscuits, bread or fruit).
- Recheck in 1 hour
- Look for a cause: too much insulin (incorrect insulin dose or type or recent weight loss, missed or delayed meal, alcohol, extra or unplanned exercise, other medications).

B. Unconscious patient or unable to drink safely
- IV access and give 25 ml of 50% Dextrose followed by a flush of NaCl (children < 15 years, give 2 ml/kg of 10% Dextrose IV).
- Recheck in 10 minutes
  - If still < 75 mg/dL (4.2 mmol/L) and unconscious or unable to drink, repeat step 1. If still < 75 mg/dL (4.2 mmol/L) but lucid and able to drink, give 200 m of sugar drink or 25 ml of 50% by mouth. Recheck in 10 minutes.
  - If >= 75 mg/dL (4.2 mmol/L), conscious and able to eat, give the next meal or snack due or some slow-release carbohydrate. Recheck in 1 hour.
  - If >= 75 mg/dL (4.2 mmol/L) and consciousness is still impaired, start an IV infusion of 10% Dextrose 1L over 2 hours (Children < 15 years: 4-9 kg: 6 ml/kg/hr, 10-19 kg: 5 ml/kg/hr, 20-39 kg: 4 ml/kg/hr, 40-59 kg: 3.5 ml/kg/hr, 60-80 kg: 3 ml/kg/hr) and recheck in hour. Stop when conscious and able to drink safely.

Hypertension treatment in Diabetes

<table>
<thead>
<tr>
<th>Blood Pressure (mmHg)</th>
<th>ACTION</th>
</tr>
</thead>
<tbody>
<tr>
<td>115/75 - 139/89</td>
<td>Lifestyle intervention</td>
</tr>
<tr>
<td>140/90 - 179/109</td>
<td>No History of cardiovascular disease*</td>
</tr>
<tr>
<td>1. ACEI: (e.g. Enalapril 5 mg) in the morning</td>
<td>1. B Blocker (e.g. Bisoprolol 2.5mg) + ACEI (e.g. Enalapril 5 mg)</td>
</tr>
<tr>
<td>2. CCB: (e.g. Amlodipine 5 mg)</td>
<td>(ARB (e.g. Losartan 50 mg) if not tolerated)</td>
</tr>
<tr>
<td>3. Diuretic: (e.g. Hydrochlorothiazide 25mg)</td>
<td>2. Diuretic (e.g. Hydrochlorothiazide 25mg)</td>
</tr>
<tr>
<td>4. B – Blocker (e.g. Bisoprolol 5 mg)</td>
<td>3. CCB (e.g. Amlodipine 5 mg)</td>
</tr>
</tbody>
</table>

*Cardiovascular disease: history of heart attack, angina, peripheral arterial disease, stroke, transient ischaemic attack or cardiac failure of presumed CV aetiology.

- Review every 4 weeks. Increase the dose of the first medication until the target (<140/90) is reached or side effects occur. Add a second agent and increase slowly in the same way until the target is reached or side effects occur.
- Check creatinine before starting ACEi and 2 weeks after initiation of ACEi or diuretic. ACEi contraindicated in renal impairment (creatinine > 2 mg/dL). Stop if creatinine increases > 30% after initiation.

> 180/110 Admit to hospital, bed rest and treat as a hypertensive emergency.

Diabetic Foot Screening

Key Patient Education Messages:
- Examine the feet daily looking for redness, irritation or wounds – use a mirror.
Wear well-fitting, closed-in shoes with socks if possible. Check shoes don’t contain small stones etc. before putting them on. Ideally shoes should be made from micro-cellular rubber, especially if the patient has neuropathy.

Protect feet from extreme heat or cold. Don’t use hot water bottles or hot water to warm up cold feet.

Don’t walk in bare feet, even at home.

Wash feet and use moisturiser (any oil will work) daily; dry carefully between toes. Cut nails regularly (straight across, not arched and not too short).

Visit nurse or doctor annually for foot examination. Attend to small injuries promptly

Stop smoking.

**Screening for the high risk diabetic foot:**

1. History of ulcer or amputation: yes/no
2. Deformity or absent pedal pulse: yes/no
3. Current wound (active ulcer, in-grown toenail, callus, blister or fissure): yes/no
4. Neuropathy (Absent sensation at 4 out of 10 sites examined by Monofilament on either foot): yes/no

If “no” to all questions, review in 6 months.

If “yes” to ANY of the above questions on EITHER foot, this patient has a high-risk diabetic foot.

2. **Wound management**

   a. Size, depth and location
   b. Colour: black skin is necrotic tissue
   c. Odour: an infected wound will smell
   d. Slough or pus: meaning there is an infection
   e. Is their local pain?

   - If infected use antibiotics as early as possible and admit for IV antibiotics if the wound is deep, osteomyelitis is suspected, if cellulitis is extensive or if the patient is systemically unwell.

   - Clean and dress the wound and note when the next dressing change is due.

   - Rest the foot and “off-load” (reduce pressure on the affected areas).

   - Note all findings in the patients file to ensure that if the wound isn’t seen by the same healthcare worker, it is still possible to identify if the wound show signs of improvement or deterioration.

3. **Neuropathic pain:** Amitriptyline 12.5-50 mg at night may be useful. Increase the dose every 4-6 weeks as needed. Side effects include: dry mouth, drowsiness, constipation, urinary retention and visual disturbance. Amitriptyline is contra-indicated in patients with known cardiac disease – Gabapentin can be considered (with HA approval).

4. Refer for chiropody and review in 6 months.

**Neuropathy screening by monofilament:**

Neuropathy screening is important not only for identifying a ‘high-risk diabetic foot’; it also demonstrated chronic poor glycaemic control, thus indicating the need for optimisation of anti-diabetic medication. The procedure:

1. Show the monofilament to the patient and demonstrate by touching their arm
2. Ask the patient to close his/her eyes and say “yes” each time he/she feels the touch of the monofilament and where they feel it on their foot.

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16 Sce: “Best Practice Guidelines: Wound Management in Diabetic Foot Ulcers”, in the OCA Medical Treasury
3. Touch the monofilament to the skin of the foot with enough pressure to form a “C” shape.
4. Evaluate 10 sites per foot. Avoid areas with very hard skin where sensation will be reduced. Do NOT use needle (test for sensation to TOUCH, not pain) or cotton wool (too light, may overdiagnose neuropathy). Lack of sensation at 4 out of 10 sites on either foot = neuropathy.

**Diabetic Eye Check**

If laser treatment for diabetic retinopathy is part of the package of care, patients should undergo annual ophthalmology review (ophthalmoscopy can be done by the MSF doctor, if (s)he is confident in this). Patients with proliferative retinopathy, or deterioration since last review, should be referred for laser therapy.

Where laser treatment is not available, it is still worth checking visual acuity annually, since deteriorating visual acuity is a sign of poor glycaemic control, which should prompt a review of treatment. The procedure is:

1. Ask the patient about visual disturbance, night blindness and examine for cataract.
2. Use a 3 metre small Snellen Chart (use the illiterate tumbling E-chart for patients who cannot read). If the patient wears glasses or contacts for distant vision they should leave them on. Place the patient 3 metres from the chart. Ask the patient to cover one eye and read the letters out loud to you, starting with the top (biggest) line. The smallest line successfully read (with maximum of 2 errors) corresponds to the visual acuity for that eye. Mark as e.g.. VA Left 3/12 (i.e. at 3 metres, using the left eye, the patient read the line marked on the chart as 12 with a maximum of 2 errors) Repeat with the opposite eye covered. If using the tumbling E-chart, the patient should indicate in which direction each “E” is pointing.
3. If the patient cannot read any of the lines, test the number of fingers he/she can see. While you cover one of his/her eyes, hold up the fingers of your other hand about ½ metre from his/her face. Ask the patient how many fingers he/she can see (repeating twice more while holding up different numbers of fingers). If unable to count fingers, test light/dark differentiation by shining a light up to the eye with the other eye covered. Repeat for the other eye.

**Gestational Diabetes (GDM)**

- Placental hormones increase insulin resistance during pregnancy. If the pancreas can't counterbalance these hormones, diabetes occurs.
- **Symptoms**: asymptomatic, excess fatigue, polyuria, polydipsia or headache.
- **Results in risk of significant maternal and foetal/neonatal complications** including an increased risk of developing diabetes in the future for both mother and baby.
- **Screen all women at increased risk (between 24-28 weeks)**: women who are overweight, over 35 years, have a family history of diabetes or a history of delivering a macrosomic baby (> 4 kg). In high prevalence areas, e.g. the Middle East, screen all women for gestational diabetes using an oral glucose tolerance test.
- **Treatment**: once GDM is diagnosed, introduced a strict diet for 2 weeks. If sugars are still uncontrolled, commence **Mixtard Insulin 0.5 units/kg/day** divided into two doses: 2/3 in the morning 15 minutes before meals and 1/3 in the evening 15 minutes before dinner. Continue the strict diet. If insulin is not tolerated or patient not willing to use it, start Metformin unless contraindicated. Add **Folic acid 5 mg** daily, and 150 minutes of **physical activity** per week in 4-5 sessions.
- **During delivery**, encourage fluid intake and monitor blood sugars of diet-controlled GDM patients and start insulin if readings are > 150 mg/dL. Start an insulin sliding scale and continuous fluid infusion.

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17 Visual Acuity is usually expressed as Distance from Chart/ Number of the Smallest Line Read. It is expressed as 6/ number of metres at which you should see this line if you had perfect vision. Perfect vision is 6/6 in metres (20/20 in feet).
- **Post-partum**, women should breastfeed immediately after delivery to avoid neonatal hypoglycaemia. If the mother has been using Sulphonylureas or Insulin, monitor the infant’s blood sugar 4 hourly for the first 48 hours or longer if there have been hypos. Treat hypos with immediate breast feed, dextrose water or dextrose IV if severe < 36 mg/dL (2 mmol/L).

- Recheck the mother’s FBG for diabetes 6 weeks post-partum and every year thereafter because she has a high risk of developing Type 2 diabetes.

- Women who are known to have Diabetes and become pregnant should be given a glucometer (if available) for home monitoring, and should try to achieve strict blood sugar control. She should continue her normal treatment (but stop Sulphonylureas in 1st trimester), but may need to adjust treatment to achieve control.

### Diabetes and HIV

Chronic inflammation and/or ART in HIV increases the risk of developing diabetes. HIV-mediated disease may aggravate complications of diabetes: HIV-related cardiovascular disease and cardiomyopathy, nephropathy, neuropathy, CMV retinopathy, increased insulin resistance and increased infection risk due to immunosuppression.

- Metformin is the first line oral anti-hypoglycaemic agent. May worsen lipoatrophy. Caution in renal impairment as ART may increase risk of lactic acidosis. Add a Sulphonylurea as second-line.

- Atorvastatin: if patient is taking a PI, start at 10mg dose and increase to maximum of 40 mg. If LFT monitoring not available, use 10mg dose. Can consider a higher dose (80mg) if taking NNRTIs.

- PI-based regimes should be avoided in patients at high risk of developing diabetes, e.g. those with a history of gestational diabetes, a positive family history of diabetes or impaired glucose tolerance on screening. PIs increase insulin resistance and reduce insulin secretion. Indinavir should be avoided.

### Diabetes and TB

- Diabetes increases risk of developing active TB and is associated with increased rates of smear positivity and symptoms if glycaemic control is poor. Diabetes-related comorbidities negatively influence TB treatment outcomes. Good glycaemic control may reduce impact of diabetes on TB.

- In settings with high diabetes prevalence, e.g. the Middle East, screen newly diagnosed TB patients aged over 18 years for Diabetes using HbA1c if available or fasting glucose; be aware that hyperglycaemia in the setting of TB may be transient so repeat (and may require repeated glucose testing). 2 tests should always be done for diagnosis if patient is asymptomatic. If negative, repeat 1 month after initiating TB treatment.

- Have a high suspicion for TB in any Diabetic patient who presents with 2 weeks of cough, night sweats and/or weight loss. Screen according to local protocols.

- TB drugs may exacerbate Diabetes complications or interact with medications used to treat Diabetes. Monitor closely because patients with (any degree of) diabetic nephropathy are at much greater risk of TB drug toxicity. Ethambutol is associated with retinopathy and Isoniazid with neuropathy, which may be prevented with pyridoxine. **Rifampicin** may reduce BP lowering effect of Enalapril and Losartan; it may reduce glucose-lowering effect of Sulphonylureas; it may reduce lipid-lowering effect of Atorvastatin. Monitor BP, glycaemia and lipids three monthly.

- Be aware that statins and anti-TB drugs (Linezolid and Bedaquiline are potentially hepatotoxicity. This is particularly a problem for patients on Metformin, who are consequently at higher risk of lactic acidosis. Monitor LFTs every 3 months; if levels of liver enzymes are increasing, stop Statin and reduce Metformin dose by 50% and recheck at 3 months, stopping Metformin then if required.

- In general, monitor renal function more closely when patients are taking both anti-diabetic and anti-TB drugs e.g. every 3 months or after dose changes.
4. Hypothyroidism

Background
Hypothyroidism affects 1-2% of the population worldwide. Almost one third of the world’s population live in areas of iodine deficiency which may lead to thyroid dysfunction. Autoimmune disease is another important cause of hypothyroidism. Maternal hypothyroidism is associated with congenital hypothyroidism in the newborn. If left untreated, the condition is associated with impaired cardiac function, an increased risk for cardiovascular disease. In extreme cases if left untreated can be fatal. Normalising thyroid hormone levels reverses cardiovascular abnormalities and reduces morbidity; it is important to initiate treatment early.

Causes: iodine deficiency, idiopathic hypothyroidism, primary hypothyroidism, Hashimoto’s thyroiditis, post-partum thyroiditis, secondary to pituitary disease, irradiation or surgical removal of thyroid gland, invasive fibrous thyroiditis, drug therapy e.g. lithium. Hypothyroidism is 10 times more common in women than men.

Clinical features
These are nonspecific and may be confused with other conditions, especially in the elderly.

Symptoms: fatigue, depression, daytime sleepiness, weight gain, bloating, hair thinning, dry skin, constipation, excessive sensitivity to cold, muscle weakness, subfertility, irregular or heavy periods, cognitive impairment in the elderly.

Signs: Weight gain, bradycardia, hair thinning, cool dry skin, facial puffiness (myxoedema facies)
Some patients with hypothyroidism have a goitre, but in others no goitre is present.

Investigations
Have a low threshold for testing in the following risk groups: history of or first-degree relative with autoimmune disorders (e.g. diabetes), first-degree relative with hypothyroidism, elderly, pregnant or post-partum women, history of thyroid surgery or upper chest irradiation, patients with goitre.

Diagnosis of hypothyroidism is based on a raised Thyroid Stimulating Hormone (TSH) TSH has a 30% diurnal variation, If TSH is raised, repeat the TSH level, and request T4 at that time.

Management

Triage
Any patient with tachycardia, bradycardia, palpitations, chest pain or dyspnoea should be transferred to the treatment room, ABCs assessed and treatment initiated with urgent doctor review.

Treatment
Treatment is with L-thyroxine. Treatment is usually recommended only in patients who are symptomatic where the TSH is ≥10mU/L

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>TSH</th>
<th>T4</th>
<th>Treat with levothyroxine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes or no</td>
<td>≥10 mU/L</td>
<td>low</td>
<td>Yes</td>
</tr>
<tr>
<td>Yes</td>
<td>≥10 mU/L</td>
<td>normal</td>
<td>Yes</td>
</tr>
<tr>
<td>No</td>
<td>≥4.5 and &lt;10mU/L</td>
<td>normal</td>
<td>Check TSH in 3 months Treat if TSH≥10 mU/L, symptoms develop or planning a pregnancy Monitor TSH yearly if TSH is persistently raised but &lt;10mU/L</td>
</tr>
</tbody>
</table>
- Start Levothyroxine at 1.6 mcg/kg body weight (usually 50-100 mcg) daily.
- In patients over 60 years or with ischaemic heart disease, start at a low dose and titrate slowly: start at 25 mcg daily, increasing every 3-6 weeks until euthyroid.
- Usual maintenance dose is 100-200 mcg daily.

Once levothyroxine has been started, it may take months for symptoms to resolve.

<table>
<thead>
<tr>
<th>Drug</th>
<th>Dose</th>
<th>Side Effects/ Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Levothyroxine</td>
<td>Start Levothyroxine at 50-100 mcg per day</td>
<td>Reduces cardiovascular complications.</td>
</tr>
<tr>
<td></td>
<td>(approximately 1.6 mg/kg daily).</td>
<td>Side effects: usually only at excess doses; diarrhoea, vomiting, anginal pain, arrhythmias, palpitation, tachycardia, tremor, restlessness, excitability, insomnia, headache, flushing, sweating, fever, heat intolerance, weight loss, muscle cramp, and muscular weakness; hypersensitivity reactions including rash, pruritus and oedema</td>
</tr>
<tr>
<td></td>
<td>In patients over 60 years or with ischaemic heart disease, start at a low dose and titrate slowly. Start at 25 mcg daily, increasing every 3-6 weeks until euthyroid. Levothyroxine should be taken at least 30 minutes before breakfast, caffeine-containing liquids (e.g. coffee, tea) or other medication. Usual maintenance dose: 100-200 mcg once daily.</td>
<td>Cautions: panhypopituitarism or predisposition to adrenal insufficiency (initiate corticosteroid therapy before starting levothyroxine), elderly, cardiovascular disorders, long-standing hypothyroidism, diabetes insipidus, diabetes mellitus (dose of antidiabetic drugs including insulin may need to be increased).</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Contraindicated: thyrotoxicosis</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Pregnancy: may cross placenta; either too much or too little maternal thyroid hormone is harmful to the foetus. See “pregnancy” below.</td>
</tr>
</tbody>
</table>

Assessment and monitoring
- Aim: improve symptoms and TSH in lower range: 0.4-2.5 mU/L
- Repeat TSH 6-8 weeks after initiation of treatment or after any dose change
- Once stable, TSH should be checked once a year
- Avoid TSH <= 0.1 mU/L. A TSH of 0.1-0.4mU/L acceptable in younger patients but not those > 60 years. Reduce dose of levothyroxine if TSH is too low
- Older people may need a dose reduction with time, as their metabolism and body weight changes.
- If patients fail to improve clinically, consider other autoimmune causes of their symptoms.

Pregnancy
- If a woman with established hypothyroidism becomes pregnant, increase the dose by 25-50 mcg per day (increase total weekly dose by approximately 30-50%). Check TSH every 4 weeks in the first trimester and then once per trimester if stable. Aim: TSH 0.4-2.0 mU/L.
- Treat subclinical hypothyroidism in a woman planning to conceive or who has just become pregnant.

Hypothyroidism and HIV/TB
HIV: Subclinical hypothyroidism and isolated low T4 seem to be more common in patients with HIV than in the general population and is associated with use of antiretroviral drugs including Stavudine. Overt hypothyroidism has a similar prevalence to that of the general population. Onset of hyperthyroidism has been associated with Immune Reconstitution Syndrome and may cause weight loss. Check TSH and free T4 in HIV patients with symptoms of thyroid disease.
TB: Increased rates of hypothyroidism have been associated with MDR-TB treatment with p-aminosalicylic acid (PAS), ethionamide and prothionamide. Check TSH in all patients on MDR-TB treatment which includes these drugs.
5. Epilepsy

Background
Epilepsy is a chronic disorder, the hallmark of which is recurrent, unprovoked seizures. Recurrent seizures occur as a result of spontaneous paroxysmal discharges of neurons due to a genetically determined or acquired brain disorder. Epilepsy affects 40 million people worldwide. Incidence is higher in low income countries than elsewhere due to higher rates of infection that cause brain injury as well as higher rates of traumatic head injury. It is often under-diagnosed and inadequately managed and may be associated with significant stigma.

Causes of seizures
Most seizures are not due to epilepsy. A seizure is an event. Acute seizures may occur as part of an infectious illness or a metabolic imbalance. Causes of seizures include: febrile seizures, meningitis, cerebral malaria, shigellosis, eclampsia, hypoglycaemia, hyponatraemia, alcohol withdrawal, drug effects.

Epilepsy on the other hand is a condition characterised by recurrent seizures – hence a diagnosis of epilepsy should never be based on a single seizure. In 70% of cases of Epilepsy no cause is found and the epilepsy is denoted as ‘idiopathic’. In 30%, a cause can be identified, including:
- Previous intra-cerebral infection: neurocysticercosis, tuberculoma, schistosomiasis, paragonimiasis, toxoplasmosis, hydatid cyst, toxocariasis, cerebral malaria, cerebral amoebiasis, syphilitic gumma, HIV;
- Meningitis or encephalitis
- Brain injury – violent or accidental head injury e.g. road traffic accident or antenatal brain injury; unknown;
- Inherited, metabolic & degenerative disorders (e.g. inborn errors of metabolism)
- Brain tumour or metastases;
- Cerebro-vascular disease

There are also a number of conditions that cause attacks that can be mistaken for seizures: syncope (including arrhythmias), TIA and CVA, sleep disorders, drop attacks, migraine can all cause sudden collapse, sometimes associated with abnormal movements, which must be differentiated from seizures.

Stress and emotional states can induce psychogenic non-epileptic seizures (pseudoseizures), which can easily be confused with epilepsy. It can be difficult to distinguish pseudoseizures from seizures but a careful history may help.

Types of seizures
Some seizures are generalised (affecting the whole cerebral cortex), resulting in immediate alteration of consciousness. This may take the form of an absence seizure, myoclonic jerking, generalised tonic-clonic seizures.

Many seizures are focal (involving only part of the cerebral cortex) resulting in localised symptoms such as twitching of one part of the body. Consciousness may not be affected, but often seizures that start focally do become generalised, resulting in an altered state of consciousness.

It is important to be aware that people with epilepsy may face significant stigma. It may well be ascribed to spirit possession or mental illness. A person with epilepsy can be ostracised by their community- loss of work, marriage prospects etc. Making the diagnosis of epilepsy thus carries the risks of stigma and inappropriate treatment, and should never be made after a single seizure episode.
Clinical features

History of seizure
A clear **history from the patient and an eye witness** to the attack gives the most important diagnostic information and is key to diagnosis, together with medication history, past medical history and family history.

<table>
<thead>
<tr>
<th>Ask the patient:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What were you doing at the time? Being in an upright position is a potential trigger for postural hypotension.</td>
</tr>
<tr>
<td>2. Any warnings symptoms? Dizziness or <strong>visual</strong> warnings are unusual in epileptic seizures.</td>
</tr>
<tr>
<td>3. Any loss of consciousness? Definite loss of consciousness excludes simple falls or TIA. Tongue biting or incontinence</td>
</tr>
<tr>
<td>4. What happened afterwards?</td>
</tr>
<tr>
<td>5. Do they take any medications, alcohol or drugs and any recent change?</td>
</tr>
<tr>
<td>6. Any witness to the event?</td>
</tr>
<tr>
<td>7. What time did it happen?</td>
</tr>
<tr>
<td>8. How long did it last and how did you feel afterwards?</td>
</tr>
<tr>
<td>9. Any previous history of seizures?</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Ask the witness:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. What was the person doing at the time?</td>
</tr>
<tr>
<td>2. Did you notice anything, or did the person complain of anything before it happened?</td>
</tr>
<tr>
<td>3. Did they lose consciousness, become unresponsive, or seem unaware that you were there? How long for?</td>
</tr>
<tr>
<td>4. Were they still, or did they twitch, jerk or move around? Did their head turn to one side, if so, which? Did they twitch or move more on one side of the body than the other?</td>
</tr>
<tr>
<td>5. What happened after the event? Were they confused, nauseated or aggressive? Was their speech altered? Did they know who you were and where they were? Was there incontinence, vomiting, biting the inside of their mouth or tongue?</td>
</tr>
<tr>
<td>6. Did anyone try to take the patient’s pulse?</td>
</tr>
</tbody>
</table>

- There may be an identifiable trigger of the seizure: sleep deprivation, fevers or other illnesses, flashing bright lights or patterns, alcohol or drug use, stress, menstrual cycle (women) or other hormonal changes, low blood sugar, specific foods, excess caffeine or other products
- There may be a warning (‘aura’) at the start of the seizure, such as seeing flashing lights, or jerking movements in one part of the body. If this settles without alteration of consciousness, this is considered to be a focal seizure without impairment of consciousness.
- Often a focal seizure will evolve into a state of impaired consciousness (focal seizure with impairment of consciousness. Typically the patient will appear to be awake but not in contact with others (absence state). They will not respond to questions, and may show automatisms such as grimacing, repeating words. Alternatively, the focal seizure may evolve into any other generalised seizure type (below)
- Occasionally, the patient may enter immediately into a state of altered consciousness, without a warning (aura) – this is referred to as a generalised seizure. This may be an absence state (as above); generalised tonic-clonic seizure (sudden loss of consciousness with jerking tonic-clonic movement of all four limbs, sometime tongue-biting and incontinence of urine or faeces); clonic seizure (rhythmic jerking movements of arms, neck and face); myoclonic seizures (sudden jerks of one limb); tonic seizures (sudden muscle stiffening) or atonic seizures (sudden loss of control of muscles).
- After a seizure affecting consciousness, the patient may be confused, drowsy, fail to remember the onset, have a headache, myalgia and a tendency to sleep.
Examination and Investigations

- After a first seizure, examine cardiac and neurological systems including fundi. Look for raised intracranial pressure. Assess mental state; in children, carry out a developmental examination.
- **Blood biochemistry**: electrolytes, glucose and calcium
- **ECG** is recommended in adults to exclude non-seizure phenomena of cardiac origin.
- **Electroencephalography (EEG)** is not needed routinely to diagnose epilepsy and a normal EEG does not out-rule epilepsy. EEG can support the classification of seizure type/syndrome when there is doubt.
- If seizure appears focal, look for a treatable underlying cause, particularly infection. MRI is best (CT second choice) if an intracranial cause is suspected. MRI is also recommended in children who develop epilepsy under the age of 2 or in patients of any age whose seizures continue despite first-line medications.

Triage and immediate management of the patient with a seizure

Most seizures are brief and self-limiting, generally stopping within 5 to 10 minutes. If in the community and the individual is known to have epilepsy, and shows none of the signs that warrant immediate treatment (below), place them in recovery position away from danger and transfer to a medical facility if seizure lasts > 5 mins. In all other cases, transfer immediately to the treatment room of a medical facility.

- Check blood glucose with glucometer
- If seizures are **prolonged** (lasting 5 minutes or more) or **repeated** (3 or more in one hour)\(^{18}\), patient is actively fitting and the duration and cause is unknown, or if there is a known cause requiring urgent treatment e.g. cerebral malaria, meningitis, hypoxic injury, trauma or cardio-respiratory compromise, organise assessment by doctor and give treatment according to the table below.
- Take blood for electrolytes and calcium
- A careful history of the seizure should be taken from the patient and/or witness if possible.

In addition, consider the causes of the seizure, and treat the cause if identified:

- **Febrile seizures**: A seizure in a child 6 months to 6 years, in the setting of an acute febrile illness, with generalized tonic-clonic seizures without focal features, lasting less than 15 minutes, without a history of non-febrile seizures or a previous neurological illness or evidence of CNS infection, may be classified as a simple febrile seizure. There is usually no risk of later complications and no further treatment is required. Advise parents to give paracetamol PO in future febrile illness for symptomatic treatment only. A complex febrile seizure: focal features at onset, duration of more than 15 minutes, recurrence within the same febrile illness, incomplete recovery within 1 hour → paediatric referral.
- **Infectious causes requiring specific treatment**: e.g. severe malaria, meningitis, meningo-encephalitis, cerebral toxoplasmosis, cysticercosis etc. **Management**: Give paracetamol and antimicrobial therapy.
- **Metabolic causes**: Hypoglycaemia: administer glucose by slow IV injection to all patients who do not regain consciousness, to patients with severe malaria and to newborns and malnourished children. When possible, confirm hypoglycaemia (reagent strip test).

<table>
<thead>
<tr>
<th>Stages</th>
<th>General measures</th>
<th>Emergency AED Therapy</th>
</tr>
</thead>
</table>
| 1 (0-10 minutes) | Protect from injury, Place the patient in 'recovery position' to maintain the airway. | **Diazepam rectally #**  
**Child**: 0.5 mg/kg, maximum 10 mg. |

\(^{18}\) Several distinct seizures without complete restoration of consciousness or an uninterrupted seizure lasting more than 10 minutes = Status Epilepticus
<table>
<thead>
<tr>
<th>Pre-hospital</th>
<th>Loosen clothing, remove eye glasses. Most seizures are quickly self-limiting. If generalized seizures last more than 5 minutes, use diazepam rectally.</th>
<th>Adult: 10 mg If seizure continues for 10 minutes after 1st dose, repeat the dose and transfer to hospital. If 2 appropriate doses fail to stop the seizure, further doses are unlikely to work and increase the risk of respiratory depression.</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 (0-30 minutes)</td>
<td>Hospital care: assessment and management need to occur at the same time.</td>
<td>If the patient has not yet had diazepam give: <strong>Diazepam IV/IO</strong> IV is preferable but PR can be used if rapid IV access cannot be achieved. Dilute 10 mg (2 ml) of Diazepam in 8 ml of 5% glucose or 0.9% sodium chloride. <strong>Child:</strong> 0.3 mg/kg over 2 or 3 minutes only if means of ventilation are available (Ambu bag and mask). Otherwise, rectal dose as above. <strong>Adult:</strong> 10 mg. If seizure continues after 1st dose, repeat dose after 5 minutes if IV dose or 10 minutes if oral/IO. If seizure continues after 2nd dose, treat as status epilepticus: <strong>Glucose</strong> <strong>Child:</strong> 5 ml/kg of 10% glucose slowly <strong>Adult:</strong> 50 ml of 50% glucose with NaCl flush (And IV Thiamine (250 mg) if alcohol abuse or malnutrition suspected). Continue usual AED medication if already on treatment. Any recent dose reduction should be reversed</td>
</tr>
<tr>
<td><strong>Early Status Epileptics</strong></td>
<td>Assess and manage ABCs-Start high flow oxygen Check capillary blood glucose Establish IV access and start regular monitoring^ History – duration of seizure, any pre-hospital treatment, significant past history including history of seizures, focal features, fever, use of anticonvulsant medication. Emergency investigations: <strong>Blood</strong> - glucose, electrolytes, calcium, full blood count (and magnesium and blood clotting, AED drug levels and if available). <strong>Consider</strong> Chest X-Ray if aspiration is suspected. Brain scan, lumbar puncture as appropriate to the clinical situation.</td>
<td>If seizure continues after 2 doses of diazepam, give: <strong>Phenobarbital IV /IM</strong> 200 mg in 1 ml ampoule (200 mg/ml) for IV perfusion or deep IM injection in the absence of venous access. DO NOT GIVE DIRECT RAPID IV INJECTION. <strong>Child under 12 years and neonates:</strong> 20 mg/kg (max. 1 g). If necessary, a second dose of 10 mg/kg may be administered 15 to 30 minutes after the first dose if given IV or 60 minutes after the first dose if given IM. <strong>Children over 12 years and adults:</strong> 10 mg/kg (max. 1 g). If necessary, a second dose of 5 to 10 mg/kg may be administered 15 to 30 minutes after the first dose. <strong>For IV use:</strong> Patients weighing ≥ 20 kg or more, dilute the required dose in a 100 ml pouch of 0.9% sodium chloride or 5% glucose. Children weighing &lt;20 kg, dilute the dose in 5 ml/kg of 0.9% sodium chloride or 5% glucose. Administer over at least 20 minutes. (no more than 1 mg/kg/minute) If the required dose is less than 1 ml, use a 1 ml syringe graduated 0.01 ml. <strong>For IM use:</strong> May be used undiluted. If the required dose is less than 1 ml, use a 1 ml syringe graduated 0.01 ml.</td>
</tr>
<tr>
<td><strong>Established Status Epileptics</strong></td>
<td>Try to establish aetiology and consider the possibility of non-epileptic status. Alert anaesthetist if available Identify and treat medical complications</td>
<td></td>
</tr>
<tr>
<td>3 (0-60 minutes)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Refractory Status Epilepticus</strong></td>
<td>Transfer to ICU if available under care of senior staff confident with airway management. Establish intensive care and EEG monitoring if available Initiate long-term, maintenance AED therapy</td>
<td>Rapid Sequence Induction using: <strong>Propofol</strong> <strong>Child:</strong> 2.5mg/kg stat followed by infusion at 1-3mg/kg/hr for no longer than 48 hours. Beware of potential hypotension <strong>Adult:</strong> 1–2 mg/kg bolus, then 2–10 mg/kg/hour titrated to effect</td>
</tr>
<tr>
<td>4 (30-90 minutes after the initial therapy)</td>
<td></td>
<td>^Monitoring: neurological observations (level of consciousness, pupil size, pulse, blood pressure and temperature). Repeat ECG, blood biochemistry, blood gases, clotting, full blood count and drug levels as required. EEG monitoring in refractory status, if available. <strong>#Diazepam rectally:</strong> Use a syringe without needle or 2-3 cm of CH 8 nasogastric tube attached to tip of syringe. Once the seizure has stopped, look for a cause, evaluate the risk of recurrence and keep diazepam and glucose available in case patient seizes again. Consider Pyridoxine (100 mg IV) in young infants with seizures refractory to standard anticonvulsants</td>
</tr>
</tbody>
</table>
Management of epilepsy

Patient Education for Self-Management:

**Explaining epilepsy:** Provide the patient with information on what epilepsy is, how it is treated and how with the medication and information you are giving them they should be able to live a normal life. Allow the patient to talk about any fears they may have regarding their condition and provide them with the information below.

**Reducing the risk of seizures:** Provide the patient with a seizure diary and ask them to write down the date, time and possible trigger of each seizure they have. This will help the patient learn what triggers their epilepsy and avoid that trigger. Encourage them also to reduce alcohol intake; find a way of ensuring they take their medication as prescribed; attend follow up appointments to ensure they do not run out of medication.

**Safety:** Inform the patient he/she may be at risk of further seizures and possible injury. Avoid high risk situations: cycling on busy roads, working at heights, being near open fires/flames, swimming alone, taking baths (shower is safer), standing too close to pavement/platform edges, operating dangerous machinery, working alone, driving.

**First Aid for convulsive seizures** (teach to friends and family): Protect the person from injury (remove harmful objects from nearby), cushion their head, place in the recovery position once the seizure has finished and stay with them until the recovery is complete. Don’t: restrain the person OR put anything in the person’s mouth OR move them unless they are in danger OR give them anything to eat or drink until they are fully recovered.

**Medication and adherence:** Explain to the patient that they are likely to be on medication for the rest of their life (although AEDs can sometimes be discontinued if the patient remains seizure-free for 2 years). Explain the medication prescribed to the patient and when and how to take it, the possible side effects and the importance of adhering to their medication.

**When to seek medical attention:** Ensure the patient understands the importance of attending all follow up appointments and when to seek medical attention for example: if their seizures become more frequent. Following a first seizure, provide information to patient and family about how to recognise a seizure, first aid and the importance of reporting a further attack to a doctor.

**Women of childbearing age:** all women of childbearing age with epilepsy should take Folic acid 5mg daily to reduce the risk of congenital malformations. See below for detailed advice regarding contraception and advice to be given to women if planning a pregnancy.

**Pharmacological treatment**

- It is recommended to **start Anti-Epileptic Drugs (AEDs) after a second epileptic seizure**. Initiate AEDs in discussion with patient and carer/family after a full discussion of risks and benefits; take into account the patient’s predominant seizure type, prognosis and lifestyle. See table below for choice of AED.
- **Start AED after first** unprovoked tonic-clonic seizure if the patient has had a history of previous myoclonic, absence or focal seizure OR has positive EEG findings or a structural brain disorder or if the patient/family finds the risk of a repeat seizure unacceptable.
- **Provoked seizures: metabolic disturbances or drugs**: correct or withdraw the provoking factor; **alcohol or substance misuse**: refer to addiction support services if available; **acute brain injury, neurosurgery or concussive convulsions**: no need for long-term AEDs.
### Anti-Epileptic Drugs by predominant seizure type

<table>
<thead>
<tr>
<th>Classification</th>
<th>Origin and Spread of the Seizure</th>
<th>Clinical Features</th>
<th>AED 1st Line</th>
<th>AED 2nd Line</th>
<th>Consider</th>
<th>Avoid – may worsen</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Focal Seizure without impairment of consciousness</strong></td>
<td>Remains localised to area of origin.</td>
<td>Fully conscious e.g. focal motor seizures start in one toe, finger, corner of mouth</td>
<td>Carbamazepine</td>
<td>Sodium Valproate (Levetiracetam)</td>
<td>Phenytoin</td>
<td>Phenobarbital</td>
</tr>
<tr>
<td><strong>Focal seizure with impairment of consciousness</strong></td>
<td>Spreads from area of origin to involved the whole brain</td>
<td>Gradual onset of impaired consciousness following an aura (e.g. flashing lights, strange smell, automatisms of facial expression, hallucinations). Impaired consciousness may take any form (below)</td>
<td>Sodium Valproate*</td>
<td>(Levetiracetam)</td>
<td>Carbamazepine</td>
<td>Phenytoin Phenobarbital</td>
</tr>
<tr>
<td><strong>Generalized seizure</strong></td>
<td>Seizure activates all parts of the brain simultaneously.</td>
<td><strong>Absences</strong> (&quot;petit mal&quot;): brief (10 second) pauses e.g. stops talking mid-sentence then takes on where left off. Classic 3Hz activity on EEG.</td>
<td>Sodium Valproate*</td>
<td>(Levetiracetam)</td>
<td>Carbamazepine</td>
<td>Phenytoin Phenobarbital</td>
</tr>
<tr>
<td>OR</td>
<td></td>
<td><strong>Tonic-Clonic</strong> (&quot;grand mal&quot;): sudden onset, loss of consciousness, body stiffens then repeated rhythmic jerking of all limbs, post-ictal drowsiness.</td>
<td>Sodium Valproate*</td>
<td>(Levetiracetam)</td>
<td>Carbamazepine</td>
<td>Phenytoin Phenobarbital</td>
</tr>
<tr>
<td><strong>Unclassified Epilepsy</strong></td>
<td></td>
<td><strong>Myoclonic, tonic and clonic seizures.</strong></td>
<td>Sodium Valproate*</td>
<td>(Levetiracetam)</td>
<td>Carbamazepine</td>
<td>Phenytoin Phenobarbital</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Atonic seizures</strong></td>
<td>Sodium Valproate*</td>
<td>(Levetiracetam)</td>
<td>Phenobarbital</td>
<td>Carbamazepine Phenytoin</td>
</tr>
</tbody>
</table>

- AEDs in brackets require special approval
- **Women of childbearing age:** Women of childbearing age with epilepsy should have seizures controlled as well as possible with the minimum dose of antiepileptic drug taken in monotherapy, wherever possible. Levetiracetam is the drug of choice if available. If not available, Carbamazepine is an option. Antiepileptic drug polytherapy should be avoided. Sodium Valproate should be avoided if possible. All women of childbearing age with Epilepsy should take Folic acid 5mg daily.
- If seizure appears focal, look for a treatable underlying cause, particular infectious. If available use CT, or better MRI
- **Persist with a first line** drug until it has been used at its maximum dose before considering a change.
- **Re-evaluate the diagnosis** of epilepsy if events/attacks continue despite an optimal dose of first-line AED.
- **Changing AED:** introduce the new drug at its starting dose and slowly increase to its mid-range, then start to slowly decrease the dose of the old drug.
- **Combination therapy** should be considered when treatment with two first line AEDs has failed or improved control occurs during the process of phased substitution.
- The choice of drug combination should match the patient’s seizure type(s) and should be limited to 2 or maximum 3 AEDs.
- Measurement of AED blood levels is not needed routinely. It may be useful in adjustment of phenytoin dose, assessment of adherence or toxicity or if metabolism may change e.g. during pregnancy, if unexplained loss of seizure control.
- **Stopping AEDs:** consider in patients seizure-free for 2 years. Ideally stopping AEDs is done under specialist supervision. Discuss risks and benefits with patient and carer/family. Withdraw slowly over 3 months. If taking barbiturates or benzodiazepines, withdraw over 6 months. If seizures recur at home, ask patient to reverse the last dose reduction and seek medical care.
<table>
<thead>
<tr>
<th>Anti-epileptic Drug</th>
<th>Dose</th>
<th>Side Effects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carbamazepine</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Child</strong></td>
<td>initially 5 mg/kg once daily or in 2 divided doses, increase every 2 weeks up to 10 to 20 mg/kg/day in 2 to 4 divided doses</td>
<td>Allergic skin reactions, including urticaria, which may be severe. Accommodation disorders, for example blurred vision, diplopia, ataxia and nausaea. Particularly at the start of treatment, or if the initial dose is too high, certain types of adverse reaction occur very commonly or commonly.</td>
</tr>
<tr>
<td><strong>Adult</strong></td>
<td>initially 100 to 200 mg once daily or in 2 divided doses, then increase by 100 to 200 mg increments every 2 weeks up to 800 to 1200 mg/day in 2 to 4 divided doses.</td>
<td></td>
</tr>
<tr>
<td>Levetiracetam</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>1. Monotherapy of focal seizures: Adult and child &gt; 16 years:</strong></td>
<td>initially 250 mg once daily increased after 1–2 weeks to 250 mg twice daily; thereafter, increased according to response in steps of 250 mg twice daily every 2 weeks; max. 1.5 g twice daily.</td>
<td>Gastrointestinal side effects, cough, nasopharyngitis, vertigo, drowsiness, ataxia, convulsion, dizziness, headache, tremor, malaise, aggression, depression, insomnia, anxiety, irritability, rash; less commonly weight changes, paraesthesia, agitation, confusion, psychosis, suicidal ideation or rare suicide, haemato poetic complications including anaemia and agranulocytosis, myalgia, blurred vision, diplopia, alopecia, eczema, pruritus; rarely pancreatitis, hepatic failure, dyskinasia, hyponatraemia, toxic epidermal necrolysis, Stevens-Johnson syndrome, erythema multiforme. In severe hepatic impairment, halve the dose. In renal impairment adjust dose according to GFR if available, maximum 2 g per day in mild, 1.5 g per day in moderate and 1 g per day in severe renal impairment.</td>
</tr>
<tr>
<td><strong>2. Adjunctive therapy of focal seizures: Adult and child over 12 years, weight &gt; 50 kg, initially 250 mg twice daily, increased by 500 mg twice daily every 2–4 weeks; max. 1.5 g twice daily; Child &gt; 6 months, weight &lt; 50 kg, initially 10 mg/kg once daily, increased by max. 10 mg/kg twice daily every 2 weeks; max. 30 mg/kg twice daily; Child 1–6 months, initially 7 mg/kg once daily, increased by max. 7 mg/kg twice daily every 2 weeks; max. 21 mg/kg twice daily.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>3. Adjunctive therapy in myoclonic or tonic-clonic seizures: Adult and child over 12 years, weight &gt; 50 kg, initially 250 mg twice daily, increased by 500 mg twice daily every 2–4 weeks; max. 1.5 g twice daily; Child 12–18 years, weight &lt;50 kg, initially 10 mg/kg once daily, increased by max. 10 mg/kg twice daily every 2 weeks; max. 30 mg/kg twice daily.</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phenobarbital</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Child</strong></td>
<td>initial dose of 3 to 4 mg/kg once daily or in 2 divided doses, increase to 8 mg/kg/day if needed. <strong>Adult</strong>: initial dose of 2 mg/kg once daily at bedtime (up to 100 mg maximum) then increase gradually until the optimal dose is reached, usually 1–2 g/day in 2 to 3 divided doses.</td>
<td>Drowsiness, lethargy and mental depression. In addition, allergic skin reactions and hyperkinesia. Do not administer in patients with severe respiratory depression. Do not administer by SC route (risk of necrosis). Administer with caution in the elderly, children and patients with respiratory insufficiency. May cause: • dose dependant respiratory depression (enhanced by diazepam), drowsiness; cutaneous and allergic reactions; sometimes severe. • hypotension, apnoea, laryngospasm, shock, especially if administered too rapidly by IV route. Monitor respiration and blood pressure closely during and after administration. Ensure that respiratory support (Ambu bag via face mask or intubation) and IV solutions for fluid replacement are ready at hand. Avoid combination with central nervous system depressants (opioid analgesics, sedatives, H1 antihistamines, etc.). Pregnancy and breast-feeding: risks linked to status epilepticus appear greater than risks linked to phenobarbital. Do not mix with other drugs in the same syringe or infusion bag. Phenobarbital is subject to international controls: follow national regulations.</td>
</tr>
<tr>
<td><strong>Status Epilepticus: Neonates and children under 12 years; one dose of 20 mg/kg (max. 1 g). If necessary, a second dose of 10 mg/kg may be administered 15 to 30 minutes after the first dose (administered by IV infusion) or 60 minutes after the first dose (administered by IM injection). Children over 12 years and adults; one dose of 10 mg/kg (max. 1 g). If necessary, a second dose of 5 to 10 mg/kg may be administered 15 to 30 minutes after the first dose. For administration by IV infusion: Dilute the required dose in a 100 ml pouch of 0.9% sodium chloride or 5% glucose for patients weighing 20 kg or more and in 5 ml/kg of 0.9% sodium chloride or 5% glucose for children weighing less than 20 kg. Administer over at least 20 minutes. Do not administer more than 1 mg/kg/minute. If the required dose is less than 1 ml, use a 1 ml syringe graduated 0.01 ml. For administration by IM injection: May be used undiluted. If the required dose is less than 1 ml, use a 1 ml syringe graduated 0.01 ml.</strong></td>
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<tr>
<td>Phenytoin</td>
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<tr>
<td><strong>Child:</strong></td>
<td>3 to 8 mg/kg/day in 2 to 3 divided doses. <strong>Adult</strong>: 2 to 6 mg/g/kg/day in 2 to 3 divided doses; do not exceed 500 to 600 mg/day</td>
<td>Hypersensitivity reactions including skin rash. Drowsiness, ataxia and blurred speech common, dose related. In children, coarsening of facial features, gingival hyperplasia and hirsutism rare. Some haemopoietic complications including anaemias (usually respond to folic acid). Motor twitches, dyskinasia, tremor and mental confusion rare.</td>
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<tr>
<td>Sodium valproate</td>
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<tr>
<td><strong>Child under 20 kg:</strong></td>
<td>20 mg/kg/day in 2 divided doses–<strong>Child over 20 kg:</strong> initially 400mg (irrespective of weight) in 2 divided doses, then increase the dose gradually until the optimal dose is reached, usually 20 to 30 mg/kg/day in 2 divided doses. <strong>Adult:</strong> initially 600 mg/day in 2 divided doses (not exceed 500 to 600 mg/g/kg/day in 2 divided doses) the optimal dose is reached, usually 1 to 2 g/day in 2 divided doses (20 to 30 mg/kg/day)</td>
<td>Sedation and tremor. Transient hair loss, sometimes dose related. Regrowth normally begins within 6 months. Weight gain. Gastric disorders frequently at the start of treatment. Occasionally, hyperactivity, aggression and behavioural deterioration. Severe liver damage is rare. Most at risk are aged under 3 years. Transient liver enzymes increases common, particularly at the beginning of therapy. Encephalopathy and pancreatitis rare. Blood dyscrasias may occur frequently; reverts on drug discontinuation. Associated with amenorrhoea and irregular periods. Sodium valproate is associated with a higher risk of foetal malformations if taken in pregnancy.</td>
</tr>
<tr>
<td>Diazepam</td>
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<tr>
<td><strong>Benzo diazepine for use in the management of acute seizures. Rectally:</strong></td>
<td>Initially 0.5 mg/kg, maximum 10 mg Adult: 10 mg stat IV or IO Use: Dilute 10 mg (2 ml) of Diazepam in 8 ml of 5% glucose or 0.9% sodium chloride. Child: 0.3 mg/kg over 2 or 3 minutes if means of ventilation are available (Ambu bag and mask). Adult: 10 mg. If seizure continues after 1st dose, repeat dose after 5 minutes if IV dose or 10 minutes if oral/IO. If seizure continues after 2nd dose, treat as status epilepticus</td>
<td>May cause: a feeling of inebriation, drowsiness (administer with caution when driving or operating machinery); dependence and tolerance when used for more than 10–15 days. At the end of treatment, reduce doses gradually to avoid withdrawal syndrome or rebound effect. In the event of overdose: ataxia, muscular weakness, hypotension, confusion, lethargy, respiratory depression, coma. Reduce the dose by one half in elderly patients and in patients with renal or hepatic impairment. – Risk of increased sedation when combined with alcohol and drugs acting on the central nervous system: opioid analgesics, neurolitics (chlorpromazine, haloperidol, etc.), anti-histamines (chlorphenamine, promethazine), antidepressants (clomipramine, fluoxetine, etc.), phenobarbital, etc.</td>
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<tr>
<td><strong>Diazepam</strong></td>
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54
Assessment and Monitoring

- Record seizure frequency and type; review seizure diary if available.
- Give information on common, avoidable triggers and advise patients about seizure prevention. Consider other precipitating factors for break-through seizures (lifestyle, diet, alcohol intake, non-adherence, comorbidity, other medications).
- Check patient’s understanding about medication dose and frequency and monitor their adherence.
- Adjust dosages based on efficacy and tolerability.
- Assess medication side effects: especially drowsiness/concentration/visual/weight/hair loss/headache/ataxia/agitation/tremor/menstrual disturbance/gum swelling etc.

Special Circumstances:

HIV / TB: Patients on ART or treatment for TB should be treated with Levetiracetam where available, since it has the fewest interactions. When not available, Sodium Valproate is the best alternative.

Women of childbearing age: Women of childbearing age with epilepsy should have seizures controlled as well as possible with the minimum dose of antiepileptic drug taken in monotherapy, wherever possible. Levetiracetam is the drug of choice if available. If not available Carbamazepine is an alternative. Antiepileptic drug polytherapy should be avoided. Sodium Valproate should be avoided if possible. All women of childbearing age with Epilepsy should take Folic acid 5mg daily.

Pregnancy: Discuss pregnancy planning with women of childbearing age. With pre-conception planning and good seizure control, 95% of women with epilepsy have successful pregnancy outcomes. Advise women to inform their doctor before starting to try to conceive, commence Folic acid 5 mgs daily if not already taking this and seek specialist advice to optimise treatment. Treatment should be optimised before contraception is stopped. Aim for seizure control with the minimum dose of a drug taken in monotherapy. Some AEDS are associated with congenital malformations such as neural tube defects. If possible use Levitiracetam. AED polytherapy should be avoided. Sodium Valproate should be avoided if possible. A child born to a woman taking enzyme-inducing AEDs in pregnancy should be given 1 mg of Vitamin K IM at birth.

Breast Feeding: Breast feeding is safe and appropriate for women with epilepsy on phenytoin, carbamazepine and valproic acid as these AEDs are not secreted to any significant extent in breast milk. Phenobarbital in breast milk may cause neonatal drowsiness and apathy. Close monitoring is advised. Although levitiracetam is secreted into breast milk, neonatal concentrations are low. Breastfeeding is probably acceptable in full-term neonates, but close clinical monitoring is advisable. In low-income countries risks and benefits of breast feeding should be balanced.

Menopause: Discuss menopause with women before its onset as the frequency of seizures may change (increase or decrease) and the dose of AEDs may need adjustment. Osteoporosis risk is increased with phenytoin, carbamazepine, phenobarbital and valproate. Consider calcium and Vitamin D supplementation in at risk patients.

Contraception counselling: All women of childbearing age with Epilepsy should take Folic acid 5mg daily regardless of whether they are planning a pregnancy or not. Women of childbearing age should be encouraged to use contraception. However, many AEDs interact with oral hormonal contraception. Levonorgestrel intra-uterine device or depot provera injections are good options for women with epilepsy. The Combined Oral Contraceptive Pill (COCP): If taking an enzyme-inducing AED (Carbamazepine, Phenobarbital, Phenytoin), if the COCP is prescribed it should contain 50 mcg or more of oestrogen daily. A combination of COCPs can be prescribed to ensure the oestrogen dose is 50 mcg or more (e.g. levonorgestrel/ethinylestradiol 30mg pill, two daily). If breakthrough bleeding occurs this suggests that this method is ineffective. Women who are not taking an enzyme inducing AED, can be prescribed the COCP as usual.
6. Cardiovascular disease and Hypertension

**TRIAGE**
Any patient who has acute chest pain, breathlessness, palpitations, signs of acute stroke (new facial or limb weakness, slurred speech) or decreased level of consciousness should be moved to the treatment room and have their ABCs assessed. Call doctor immediately, and manage according to algorithm below, if:

A. Airway compromise
B. Breathing: RR > 20 rpm, O2 Saturations < 93%, (or abnormal respiratory rate for age in children),
C. Circulation: HR > 100 or < 60 bpm, BP > 180/110 or < 90/50 mmHg (or abnormal heart or BP for age in children)
D. Disability: Any signs of stroke, decreased level of consciousness, blood sugar > 200 or < 75

From: European Resuscitation Council Guidelines for Resuscitation 2010
ANGINA AND ISCHAEMIC HEART DISEASE

Background
Angina is a term used for chest pain caused by reduced blood flow to the heart muscle. Angina is most commonly a symptom of coronary artery disease. Angina is typically described as squeezing, pressure, heaviness, tightness or pain in the chest.

Clinical Features
Suspect angina if chest pain brought on by activity, eating, cold or emotion. Often described as a tight band (belt) around chest/ heaviness/ burning or choking sensation/ patient may indicate pain by placing hand on sternum. Pain may go up to jaw, back or down left arm. May be associated with breathlessness, nausea, sweating, palpitations. Pain goes away within a few minutes of resting. May present as breathlessness alone or decreased exercise tolerance.

Note that women, elderly patients, and patients with Diabetes are more likely to present with atypical symptoms (pain in neck or arm, nocturnal pain, breathlessness without pain).

Investigations
Exclude acute MI with ECG (if available) – refer to hospital if in doubt.
- Exercise ECG can help diagnose suspected angina, but may be normal between attacks; if unavailable do ‘trial of treatment’.
- Check for anaemia, thyrotoxicosis, CXR only if suspected pulmonary oedema.

Management (adapted from PCI field guide 2014)
Provide secondary prevention of cardiovascular disease, see next section. For symptom relief:
- Start glyceryl trinitrate (0.5mg) sublingual when pain occurs OR take before taking part in activity likely to cause pain. Warn patient may cause flushing, headache or light-headedness.
- If attacks occur every week, add beta-blocker (e.g. bisoprolol). Start at 2.5mg and increase slowly to maximum of 10mg once daily. Not in severe asthma (may trigger an attack). Use a calcium channel blocker if beta-blocker contraindicated.
- If still getting pain regularly: add in a non-rate limiting calcium channel blocker: (e.g. amlodipine) daily. (Avoid Verapamil and Diltiazem – may cause heart failure).
- If still getting pain: add in long acting nitrate (e.g. isosorbide dinitrate start at 5mg twice daily, increase to a maximum of 40mg three times a day).

ACUTE CORONARY SYNDROMES
Acute coronary syndrome is a spectrum comprising ST elevation MI (STEMI), non ST elevation MI (NSTEMI) or unstable angina. There is either infarction or ischaemia in ACS. They are treated the same way

Initial assessment
- AIRWAY
- BREATHING – give oxygen
- CIRCULATION: BP, pulses, IV (draw bloods), heart monitor
- FOCUSED HISTORY
  - Targeted for chest pain description
    - Classic cardiac pain is diffuse, central, dull ache/squeeze lasting >15 minutes. Associated with radiation to 1 or 2 arms and the jaw
    - Associated sweatiness, nausea and vomiting.
    - Can be associated with dizziness.
    - May be an atypical presentation in women, older adults and diabetic patients.
- Review risk of CVD (smoking, hypertension, diabetes) or prior CVD
- Consider other life threatening, non ischaemic causes of chest pain – acute aortic dissection, pulmonary embolus, oesophageal rupture

**FOCUSED EXAM**
- Cardiovascular system, respiratory exam – look for hemodynamic compromise and left heart failure (do CXR if heart failure suspected)
- ECG – if normal – repeat every 10-15 minutes (initial ECG often NOT diagnostic). Look for and document clearly in the notes. The type of ischaemic changes:
  - STEMI: ST segment elevations ≥1 mm (0.1 mV) in two anatomically contiguous leads or ≥2 mm (0.2 mV) in leads V2 and V3 OR new left bundle branch block and presentation consistent with ACS.
  - Non-STEMI or unstable angina: ST segment depressions or deep T wave inversions without Q waves or possibly no ECG changes.
- The location of the ECG changes can help confirm the diagnosis of ischaemia: Anterior = V1-4; Inferior = II, III, aVF; Lateral = I, aVL, V5-6; Posterior = reciprocal ST depression in V1-4 with tall R wave in V1, signifying an inverted posterior Q wave (hold the ECG paper backwards and upside down and it looks like ST elevation in V1-4). Note: Any arrhythmia may cause secondary ischaemia or may be due to cardiac ischaemia. A previous infarct may cause Q waves or Poor R wave progression in the anterior leads

**TREATMENT (ongoing during the assessment)**
- Aspirin 300 mg chew and swallow – unless prior anaphylaxis or has just taken
- Oxygen 2-5L/min by nasal cannulae – maintain an oxygen saturation ≥94%
- Glyceryl trinitrate 0.5 mg sublingual if systolic BP >90 mmHg, give every 5 minutes up to 3-4 doses if required and tolerated. DO NOT use a response (relief of pain) to make a diagnosis of acute coronary syndrome. Alternative: Isosorbide dinitrate 5-10 mg sublingual every 2-4 hours if ongoing angina
- Morphine 2.5 – 5 mg IV every 5-15 minutes if needed for pain or anxiety

**Diagnosis**
Diagnosis is based on 2 out of 3 of:
- a raised Troponin level (>99th percentile of the upper reference limit for that assay)
- Cardiac chest pain and / or related symptoms suggestive of ischaemia
- ECG changes suggestive of new ischaemia (new ST changes or new LBBB) or development of pathological q-wave changes

So initial management MUST be started while the diagnosis is being made to reduce myocardial damage.

**Ongoing management**
1. If Diagnosis is ACS, admit to hospital and give the medication outlined above (if not already done).
2. Is this a STEMI?
   - For NSTEMI / Unstable Angina: Enoxaparin 1 mg/kg subcutaneously twice daily. Review bleeding risk prior to use. Use reduced dose in renal impairment.
   - For STEMI: Streptokinase 1.5 million units over 60 mins if no absolute contraindications:
     i. Haemorrhagic stroke or stroke of unknown origin at any time
     ii. Ischaemic stroke in the preceding 6 months
     iii. Central nervous system damage, neoplasms or structural vascular lesions
     iv. Recent major trauma/surgery/head injury (within the preceding 3 weeks)
     v. Gastro-intestinal bleeding within the last month
     vi. Known bleeding disorder (excluding menses)
     vii. Aortic dissection
If Streptokinase is not available, give Enoxaparin as for NSTEMI. Note: if patient has previously received Streptokinase, (s)he is at risk of an anaphylactic reaction when receiving it for 2nd time. Ensure Adrenalin and resus facilities are available nearby.

3. **Bisoprolol 2.5 mg po od.** and increase to 10 mg po od as tolerated. Do NOT give if low output state, risk of cardiogenic shock, hypotension, heart block, bradycardia (heart rate persistently under 50) or active severe asthma. Continue for 1 year unless has left heart dysfunction. In this case, continue indefinitely. However, if acute heart failure at presentation, may need to wait until stable to start.

4. If ACS is low probability and the patient is stable, admit to hospital, perform ECG twice daily to check for evolving changes, give aspirin and Bisprolol **but not** enoxaparin/ nitrates. Discharge after 24-48 hours if there are no new ECG changes and the patient remains stable.

5. Monitor vital signs every 4 hours. Further investigations: Daily ECG to check for new arrhythmias, CXR if heart failure suspected, Hb, urea, creatinine and electrolytes, fasting cholesterol and LFTs; check **fasting** blood glucose to look for undiagnosed diabetes.

6. **Continue Oxygen to Maintain oxygen saturation ≥94%**

7. **Stop Enoxaparin** after 48 hours if the patient is stable; Continue only if there is ongoing convincing cardiac chest pain with dynamic ECG changes: Use a maximum of 5 days.

8. **Stop Isosorbide dinitrate** after 24-48 hours: Continue only if there is ongoing convincing cardiac chest pain with dynamic ECG change.

9. **Long term treatment:**
   - **Aspirin:** 300 mg for 1 month, then 150 mg lifelong
   - **Bisoprolol** 2.5 mg po od. and increase to 10 mg po od as tolerated
   - **Enalapril:** 2.5 mg po od increasing to 20 mg po od and continue indefinitely – need initial electrolytes, renal function and BP done and then repeated within 1-2 weeks of starting and making changes. Provide secondary prevention for CV disease (see section below)
   - **Start a statin** (e.g. ATORVASTATIN 80mg 19)
   - **Mobilise the patient** after 48 hours and discharge after 5 days if the patient is stable and there are no complications (offer 2 week review). The patient must understand that he/she has had a heart attack and must comply with medical advice and lifelong medications in order to protect the heart and to reduce the chance of a future cardiac event.

10. **Provide cardiac rehabilitation and secondary prevention for CV disease** (see section below). A useful way to remember the steps is ABCDE:
   - **A** = aspirin and ACEi
   - **B** = B blocker and , BP control
   - **C** = cholesterol, cessation of smoking
   - **D** = depression, diet, diabetes
   - **E** = exercise (against resistance!!)

### Complications

1. **Ongoing or recurrent ischaemia/infarction**
   - There must be a good history of cardiac sounding chest pain. Exclude musculoskeletal pain and pericarditis
   - **Plus** ECG changes: Differentiate new changes from resolving/evolving changes as the heart recovers from the MI
   - Continue or restart enoxaparin until the patient’s clinical condition and ECG changes improve
   - increase the dose of Bisoprolol
   - Add or continue isosorbide dinitrate

19 If no LFT testing available, give low dose statin (e.g. Atorvastatin 20mg)
2. Dysrhythmias
   - complete heart block Develops early in the post-MI period
     - Often transient and resolves spontaneously after 2-3 days
     - Keep the patient on bed rest
     - Stop Bisoprolol if heart block develops but do not withhold Bisoprolol to 'prevent' heart block
     - Give atropine only if there is significant bradycardia
   - VT/VF is the major cause of sudden death in the post-infarct period
     - The most vulnerable time is the first 48 hours after onset of symptoms
     - Patients require supervision and should not be left alone for at least 48 hours
     - Give Bisoprolol which is cardioprotective to all patients with acute MI
     - Do NOT give other prophylactic anti-arrhythmics, such as lignocaine, which have been shown to increase mortality
     - Do NOT attempt to treat ventricular ectopic beats
     - If VT is diagnosed on ECG - treat as according to ‘emergency management of arrhythmias’ (below)

3. Circulatory compromise
   - Cardiogenic shock: this has a very poor prognosis
   - Pulmonary oedema: Treat as per heart failure protocol

4. Pericarditis: May be seen in 12-20% of patients after MI
   - Continue Aspirin but avoid other NSAIDs for 7-10 days after acute MI: give paracetamol

5. Evolving ECG changes: do ECG changes mean ongoing ischaemia or are they part of the healing process of the myocardium?
   - STEMI: Q waves develop after several hours; ST changes may resolve, or may persist (fixed ST elevation); Persistent ST elevation does NOT always signify an LV aneurysm
   - ST depression is usually transient and should resolve as ischaemia improves. Persistent anterior ST depression: Consider posterior STEMI (dominant R wave in V1). Persistent lateral ST depression: Consider LV strain pattern (tall high voltage QRS complexes)
   - T wave inversion: After infarction, T waves often deepen and sharpen. May remain inverted or may return to normal.

SECONDARY PREVENTION OF CVD (adapted from PCI field guide 2014)
These treatments reduce the risk of further cardiovascular events in those who already have cardiovascular disease. Treat in this way even if no symptoms.

FOR ALL with known CARDIOVASCULAR DISEASE (except possible haemorrhagic stroke):
   - Lifestyle: advise smoking cessation at every visit and reduce alcohol intake + caffeine rich drinks.
   - Diet: Reduce salt intake to < 6 g/day: salt is a major cause of hypertension. Advise a low fat and sugar diet for all to reduce cardiovascular risk. Weight: Try to lose 5-10% if over-weight (BMI > 25 kg/m²). Aim for BMI between 20-25. Exercise: 2.5 hours/week of activity that causes shortness of breath/light sweat. Encourage walking.
   - Aspirin 75mg-100mg once daily. Newer antiplatelet drugs (e.g. clopidogrel) are expensive and only a little better. Use only if aspirin not tolerated (or for 12 months following cardiac stenting).

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20 The ideal diet for cardiovascular health is a Mediterranean style diet with mainly plant-based foods: fruit, vegetables, whole grains, legumes and nuts and pulses; replace unhealthy fats (butter, palm oil) with healthier oils e.g. olive oil, sunflower oil if available; use herbs and spices instead of salt; limit red meat to a few times per month; eat oily fish twice a week and lean meat e.g. poultry or vegetarian meal at other times.
• Blood pressure control (see section 2).
• Cholesterol lowering. Measure baseline serum Cholesterol and LFTs if available, and give a statin (e.g. ATORVASTATIN 80mg), whatever the level of cholesterol. Regular cholesterol checks are not needed. If Statins are not available, encourage dietary modification.

FOR Angina, myocardial infarction, heart failure, Peripheral Arterial Disease, treat as above + to prevent further events:
• ACE inhibitor (e.g. ENALAPRIL 20mg daily). Start with low dose (5mg) and increase at 2 weekly intervals to maximum tolerated dose. Monitor BP, side effects and renal function at each dose increase. Use angiotensin receptor blockers (ARBs) only if ACE not tolerated (no better and more expensive).
• Beta-blockers (e.g. BISOPROLOL: Usual dose 10mg). Start at 2.5mg and increase slowly (at monthly intervals) to maximum tolerated dose. NEVER use in severe asthma (can trigger an attack), but can be used in COPD. After myocardial infarction: Use for first 12 months only (no benefit beyond this) unless heart failure (continue lifelong) or needed for angina control.

After suspected HAEMORRAGHIC stroke:
• Lifestyle and diabetes screening, blood pressure control, thiazide diuretics and ACE inhibitor prevent further strokes.
• Do NOT offer aspirin (increased risk of further event) or Statins (no benefit). Worldwide, 80% of strokes are thrombotic, so if unsure whether the stroke is haemorrhagic or thrombotic, it is better to treat as thrombotic. See section on stroke for more details.

Disease monitoring: Review every 6 months if stable (more frequently if not stable).
• Behavioural change: At every review: Discuss with patient what further changes in lifestyle can be made? Try to elicit ideas from the patient as to how he/she can incorporate changes in to his/her life; encourage to join a group if available e.g. weight loss or exercise group.
• Symptoms: Ask about palpitations, angina, heart failure and peripheral arterial disease e.g. calf pain, decreased exercise tolerance compared to past or to people of same age.
• Tablets: Side effects of tablets? Statins may cause muscle aches, if persistent and painful, reduce dose. ACEi may cause a dry cough, if persistent and bothersome to the patient, change to Losartan. Is the patient compliant with medication?
• BP and pulse: Measure BP every 6 months if stable, monthly if not controlled. Ask if dizziness on standing or any falls (suggests postural hypotension: may need to reduce BP drugs). Check if pulse regular or irregular (?atrial fibrillation), not too slow (too much B-blocker?) or too fast (over 100).
• If heart failure: ask if breathlessness stops activities. Listen to the lungs and look for ankle swelling. Manage in accordance with the section on cardiac failure (below)
• Once yearly: Check blood sugar and kidney function. Check Cholesterol level if available (although this is not essential for patients on Statins).

21 If no LFT testing available, give low dose statin (e.g. Atorvastatin 20mg)
HYPERTENSION

Background
Hypertension is one of the most important and preventable causes of cardiovascular disease, stroke and renal disease. Reducing high blood pressure reduces the risk of cardiovascular death and disability. Most people with high blood pressure have no symptoms. However if left untreated, hypertension is usually associated with a progressive rise in blood pressure.

Primary or essential hypertension. 90% of cases. No known cause. Incidence increases with age. There may be a family history of hypertension

Secondary Hypertension: 10% of cases. May occur as a result of renal disease, adrenal gland tumours Medication e.g. COCP, illegal drugs, such as cocaine and amphetamines, alcohol abuse or chronic alcohol use

Diagnosis of Hypertension
Make sure the patient is seated, relaxed, hasn’t smoked in the last hour and doesn’t talk! Talking makes blood pressure rise. Try to put cuff onto bare arm. One layer of clothing is acceptable but more than one layer makes the reading less accurate. Use the correct size cuff or you may over or underestimate the blood pressure. Upper arms over 33cm circumference need a larger cuff. (Large cuff has a bladder (part that fills with air) 12x40cm, standard cuff bladder is 12x26cm).

If first BP reading is raised (140/90 or more), repeat BP at least 1 minute after the first measurement. If still elevated or if the second measurement is substantially different from the first, take a third measurement after the patient has sat quietly for 30 minutes. If blood pressure remains elevated, repeat blood pressure measurements on at least 3 further occasions in order to confirm the diagnosis e.g. once a week for three weeks. Use the average value of the measurements to confirm a diagnosis of hypertension:

- BP < 140/90 = Normotensive. Re-check BP in 5 years, or sooner if clinically indicated.
- BP 140/90 to 159/99 = Stage 1 hypertension
- BP 160/100 to 179/109 = Stage 2 hypertension
- BP > 180 / 110 = SEVERE HYPERTENSION: Treat immediately as below

NOTE: if either the systolic or diastolic are elevated, treat them according to the higher number – for example, someone with a blood pressure of 165/115 would fall into the severe hypertension group (180/110 or more).

Initial assessment
- Assess for other risk factors for cardiovascular disease
- Assess for end organ damage
- Determine if secondary hypertension (especially if patient is < 40 years)
- Ask about smoking, alcohol intake, diet and exercise.
- Medical history (diabetes, cardiovascular disease, renal disease) , Medication history
- Family history of hypertension or other disease
- Check pulse: an irregularly irregular pulse suggests atrial fibrillation
- Cardiovascular examination: check for signs of congestive heart failure.
- Check weight and height to determine BMI

22 This section does NOT apply to pregnant women: in pregnancy BP 140/90 or more can be a sign of pre-eclampsia which can be fatal: follow MSF Obstetric guideline for this
**Investigations**
- Screen for diabetes: see Diabetes section for diagnostic thresholds.
- Renal function and urine test for protein (to look for renal disease). If proteinuria, ensure no UTI and repeat on two further occasions. Diagnose chronic kidney disease if positive.
- CRP or ESR (not both) in case of suspicion of inflammatory causes (e.g. vasculitis).
- ECG if available to look for left ventricular hypertrophy or arrhythmia if irregular pulse or palpitations.
- Cholesterol and LFTs if available (baseline assessment for risk calculation – see below).

**Management of confirmed hypertension**

**Patient Education and Self-Management**
Give lifestyle advice (see ‘secondary prevention’ above). Advise smoking cessation, Reduce alcohol intake, Diet: Reduce salt intake to < 6 g/day: salt is a major cause of hypertension; Weight: If BMI > 25, Try to lose 5-10% if over-weight (if BMI > 25 kg/m2). Advise a low fat and sugar diet for all to reduce cardiovascular risk; Advise Exercise: 2.5 hours/week of activity that causes shortness of breath/light sweat. Encourage walking. If on medication, ensure patients understand when and how to take them. Ensure that follow up appointments are attended. Advise regarding side effects of medication and to seek medical advice.

**Assess Cardio-vascular risk (at diagnosis and then annually)**
If the patient has known Cardio-vascular disease, they are automatically at high risk → refer to section above on secondary prevention of CVD. If the patient has no evidence of Cardio-vascular disease:
- use the WHO/ISH Cardiovascular Risk Prediction Chart for that region.
- If PoC Cholesterol testing is available, check cholesterol and use the risk prediction chart that includes Cholesterol quantification.
- If you do not have PoC Cholesterol testing, use the chart that does not require cholesterol quantification. DO NOT DELAY CALCULATING THE CV RISK FOR A CHOLESTEROL RESULT!
- If 10 year cardiovascular risk 20% or more offer a STATIN (Atorvastatin 20mg). Do NOT offer aspirin (no evidence of benefit).

**Pharmacological therapy**
- Treat if Stage 2 hypertension OR Stage 1 Hypertension with known cardiovascular disease OR diabetes OR 10 year cardiovascular risk > 20%. Target blood pressure is below 140/90. Start with a single drug, step up monthly if BP above 140/90, but check first: are they taking their drugs regularly? Following diet/lifestyle? If BP above 140/90 on single drug: ADD 2nd drug (then 3rd then 4th as required) of different class. Do not stop 1st drug.
- Drug choice: Most people need 3 drugs to achieve control. Better control may be reached by adding a second agent rather than increasing a single drug to its maximum recommended dose. At diagnosis, explain to patient the progressive nature of HTN and probable need for increased doses and additional medications.
- Order of prescribing:
  1. ACE INHIBITORS (ACEi): e.g. Enalapril 5mg, increase to maximum of 40mg daily. Common side effects: Cough may start at any time, can take months to settle; Renal impairment - check kidney function before starting, two weeks after starting, and at every dose increase. Contraindicated in aortic stenosis, arterial stenosis, previous hypersensitivity.

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21Unless the patient’s cholesterol is already known, use the chart that does not require a cholesterol result. If the patient’s cholesterol level is known, use the chart that requires a cholesterol result. Do not delay risk calculation because you are waiting for a cholesterol result.
22Not first choice in women of child-bearing age unless they have good contraception (harmful in pregnancy). Choose CCB or BBlocker instead.
Exceptions: in patients > 55 years and sub-Saharan Africans without DM, start CCB then add ACEi; in patients with known CVD, start B-blocker at the same time. If ACEi is contraindicated, or patient develops a cough which persists for 4 weeks, change to an ANGIOTENSIN II RECEPTOR BLOCKER (e.g. losartan) if available.

2. CALCIUM CHANNEL BLOCKERS (e.g. Amlodipine): usual dose 10mg daily. Start at 10mg unless frail/old (start at 5mg). Common side effects: ankle swelling.

3. DIURETICS (e.g. Hydrochlorothiazide): Start at usual dose (12.5-25mg daily). Avoid loop diuretics (furosemide) as less effective. Common side effects: Urinary frequency, electrolyte imbalance, gout. Diabetes may get worse. Avoid in women of childbearing age unless they have reliable contraception. The patient should now be on ACEi + CCB + Diuretic

4. BETA-BLOCKERS (e.g. Bisoprolol): usual dose 10mg daily. Start at 2.5mg and increase every 2-4 weeks to 10mg daily. Common side effects: Lethargy, erectile dysfunction. NEVER use if history of severe asthma (may trigger attack), uncontrolled heart failure, bradycardia, 2nd and 3rd degree AV block. Safe in COPD. If still not achieving target, seek specialist advice.

Assessment and Monitoring

- It may take up to 6 weeks for maximal effect of anti-hypertensive. Review 6 weeks after initiating new antihypertensive or altering dose.
- Once BP is well controlled (under 140/90), review every 6 months
  - Diet and lifestyle: As above.
  - Blood pressure: Target: 140/90. Measure every 6 months if stable. Monthly if not controlled. Ask if dizziness on standing or any falls (suggests postural hypotension: may need to reduce BP drugs).
  - Examination: check pulse for atrial fibrillation
  - Medication: Check compliance. How often do they forget their tablets? Ask about side effects. Check for other symptoms that may affect compliance e.g erectile dysfunction.
  - Review cardiovascular risk yearly. Use the WHO/ISH Cardiovascular Risk Prediction Chart for that region. Check kidney function, cholesterol and fasting blood glucose for diabetes annually and. If on statin, no need to test cholesterol.

Immediate management of severe hypertension (BP 180/110 or more)

- Repeat blood pressure after patient has sat quietly for 30mins. Make sure patient is not in significant pain or severe psychological distress (both can make BP rise).
- BP still 180/110 or more: Is the patient having a stroke/cerebrovascular accident (CVA)? Do the FAST test: (Face: ask the person to smile. Does one side of the mouth or face drop? Arms: ask the person to raise both arms. Can they do this? Does one drift down? Speech: Ask the person to repeat a sentence. Can they repeat it correctly? Do they slur their words? If yes to any question: this may be a stroke: Time to admit to hospital). DO NOT REDUCE BLOOD PRESSURE. Lowering BP immediately after a stroke can make it worse: wait 1-2 weeks before starting drugs to lower blood pressure (unless haemorrhagic stroke is suspected, in which case treat as “Hypertensive Crisis”)
- If there is no sign of a stroke/CVA: Look for end organ damage: 1. Chest pain from acute coronary syndrome? 2. Pulmonary oedema (are they breathless)? 3. Renal failure (check renal function if possible)? 4. Hypertensive encephalopathy (headaches, lethargy, convulsions, coma)? 5. Papilloedema/retinal haemorrhages if able to view retina with ophthalmoscope?
- Hypertensive CRISIS: BP 180/110 or more WITH end organ damage: Admit for monitoring. Aim to lower BP by 20-25% within 2 hours (if heart failure present, try to reduce by larger amount). Use intravenous drugs as below. If not available, treat as for hypertensive urgency using tablets. Remember to treat any end organ damage (such as acute pulmonary oedema at the same time).
- **Hypertensive URGENCY** BP 180/110 or more **WITHOUT** end organ damage. Admit for monitoring if unwell. Aim to reduce BP over 24-48 hours. Treat as below.
- Once BP controlled: Consider possible causes. Do investigations for all with new hypertension. Monitor weekly until stable, then manage as essential hypertension unless underlying cause needs additional monitoring.

- **Drugs for HYPERTENSIVE CRISIS**: BP 180/110 or more **WITH** end organ damage. Aim to lower BP by 20-25% within 2 hours (if heart failure present try to reduce BP by larger amount). Reducing the blood pressure too much, too quickly can cause myocardial infarction, cerebral infarction or renal failure. Remember to watch fluid balance and treat any end organ damage (such as acute pulmonary oedema). Use intravenous drugs below if available. If these drugs are unavailable, use oral drugs as outlined in the section on ‘hypertensive urgency’ below.
  - **Hydralazine**: Slow intravenous injection: 5–10mg diluted with 10ml sodium chloride 0.9%; may be repeated after 20–30 minutes. Do not use if acute myocardial ischaemia: may make ischaemia worse.
  - **Labetalol**: Never in asthma (may trigger attack). Not recommended for phaeochromocytoma: use alpha-blockers if available. Slow intravenous injection (use only if infusion equipment not available): 20 mg slow intravenous injection over 1 minute, then 20-80mg every 10 minutes until BP falls. Total dose given must not be more than 200mg. If infusion equipment available, 2mg/minute until good response and then stop. Usual total dose 50-200 mg.

- **DRUGS FOR HYPERTENSIVE URGENCY** (no end organ damage, or hypertensive crisis if intravenous drugs (above) are not available): aim to reduce BP over 24-48 hours. Use ORAL (tablet) medication.
  - **Amlodipine**: 5mg initially, maximum 10mg daily. Other calcium channel blockers including sublingual nifedipine should NOT be used (avoid due to negative effect on myocardium, can worsen heart failure).
  - **Bisoprolol**: Start at 10mg daily. Never in severe asthma (may trigger attack).
  - **Methyldopa**: Start at 250mg 2-3x daily, maximum 3g/day.
CONGESTIVE HEART FAILURE

Background
Congestive Heart failure occurs when the heart is unable to pump sufficiently to provide adequate blood flow to other organs, such as the brain, liver, and kidneys. **Causes:** Ischaemic heart disease, valvular heart disease including rheumatic heart disease, untreated congenital heart disease, chronic anaemia, hypertension, atrial fibrillation, cardiomyopathy including alcoholic cardiomyopathy, thyrotoxicosis.

Clinical Features

Symptoms and signs:
Main symptom is breathlessness with activity or when lying flat (caused by fluid in lungs). Other symptoms include:
- Persistent coughing or wheezing
- Build-up of excess fluid in body tissues (oedema)
- Unusual fatigue
- Lack of appetite or nausea
- Increased heart rate

Examination: look for
- tachycardia, gallop rhythm, raised JVP
- cardiac murmurs (rheumatic or congenital heart disease).
- Oedema: ankles may swell in right heart failure; may have ascites if severe.
- Fine crepitations especially in lower zones of the lungs. Wheeze may be present.

Investigations
Gold standard test is echocardiogram, but not widely available.
- CXR may show an enlarged heart (cardiomegaly) or pulmonary oedema. CXR can help exclude other diseases that cause breathlessness, especially COPD, TB, lung cancer
- Blood tests for anaemia, renal failure, diabetes and thyroid disease.

Management

*Patient education and self-management*
Give smoking cessation advice; Reduce alcohol intake if excessive; Restrict salt in diet
Explain the condition to the patient and the importance of taking medication and when to seek help if symptoms worsen.

*Pharmacological treatment*
For symptom relief: Diuretics: **Furosemide** 40mg daily, increasing if needed to maximum of 80 mg (monitor renal function). When stable, can stop or change to **hydrochlorothiazide**. In severe disease, add **spironolactone**. Start with 25mg once daily and increase to 50mg once daily if needed.

Manage underlying cause if possible
- if anaemic, transfuse
- If diabetic, treat to improve glucose control and give ACEi (e.g. Enalapril)
- if hypertensive or suspected ischaemic heart disease, manage cardiovascular risk, give ACEi (e.g. Enalapril) and B-Blocker (e.g. Bisoprolol).
• if atrial fibrillation, give ACEi (e.g. Enalapril) and treat as described in the ‘Atrial Fibrillation’ section below.

Assessment and Monitoring
Review 3-6 monthly or more frequently if required.
• Lifestyle advice as above. For secondary prevention: see risk factor reduction section
• Review symptoms and check for tachycardia, raised JVP, peripheral oedema and lung crepitations
• Check weight. Increase in weight may indicate fluid retention/oedema
• Encourage gentle aerobic exercise: tailor to patient’s functional ability. Monitor renal function 3 monthly in patients on long-term diuretics. Patients on high-dose Frusemide may become potassium-depleted, and may require dietary supplementation (e.g. Bananas or Potassium tablets if available). In potassium-depleted patients on a combination of Spironolactone and Frusemide, try reducing the Frusemide and increasing the Spironolactone (Spironolactone is potassium-sparing).

ACUTE DECOMPENSATED CARDIAC FAILURE

Presentation
Typically sudden onset of severe symptoms in the early hours of the morning
• Acute pulmonary oedema is the major feature, with acute severe dyspnoea, tachypnoea and respiratory distress, hypoxia, orthopnoea and inability to lie flat, bilateral fine lung crackles, extending to the apices in severe cases, Occasionally wheezing may be present ('cardiac wheeze')
• Raised venous pressures: Dilated neck veins and elevated JVP, Hepatoglycjugular reflex
• May have reduced cardiac output and impaired systemic perfusion: cold and clammy, weak pulse, gallop rhythm (third heart sound), hypotension, cool hands and feet, reduced urine output
• Signs of chronic heart failure may or may not be present: peripheral oedema: document extent of oedema - mid tibia, knee, thigh, anasarca, pleural effusions
• There may be evidence of a precipitating event: Arrhythmia (see below for management), acute coronary syndrome
• Medical history of previous MI, cardiac failure, diabetes, hypertension

Management
➔ Sit upright + Oxygen to maintain saturations >95%
➔ ECG to look for Acute ischaemia. Evidence of previous MI (Q waves, poor R wave progression), Arrhythmia. NB: LVF is unlikely with an entirely normal ECG
➔ Insert urinary catheter and note hourly urine output
➔ Initial management:
  ▪ If systolic BP < 90 mmHg: Morphine 2.5-5 mg iv ± metoclopramide 10 mg iv, Frusemide 20 mg iv by slow injection, Do not give nitrates, Recheck BP every 15-30 minutes
  ▪ If systolic BP ≥ 90 mmHg: Morphine 2.5-5 mg iv ± metoclopramide 10 mg iv, Frusemide 40 mg iv, Glyceryl trinitrate 0.5 mg sublingual
➔ Ongoing management:
  ▪ Frusemide 40 mg iv od or bd
  ▪ Isosorbide dinitrate 10-20 mg tds for 1-3 days
  ▪ Daily ECG: If there is evidence of acute ischaemia give: Aspirin 300 mg + Enoxaparin 1 mg/kg bd for 2 days
  ▪ If SBP > 100 mmHG Start enalapril 5 mg od or 2.5 mg od if low BP
  ▪ CXR to confirm pulmonary oedema (Fluffy interstitial shadowing, Upper lobe diversion, May be pleural effusions, especially if chronic, Cardiomegaly)
  ▪ Check urea and creatinine: Do not give iv fluids
ARRHYTHMIAS

Emergency Management of Tachyarrhythmias

Assessment:
- Install in a quiet area and semi-reclined position. Survey diuresis + 12 lead ECG
- Place the patient on monitor: blood pressure on two arms (with reevaluation every 15 min), pulse, O2 saturation.
- Set an IV catheter (18-20 Gauge) and take a blood sample.

Management
- Unstable patient (Myocardial ischaemia, shock, syncope, heart failure)
  - Synchronised DC shock upto 3 times under sedation
  - Amiodarone 300 mg 10-20 min, then repeat shock, and then 900 mg/24 hrs
- Stable patient with Narrow QRS (<0.12 ms) – patient may still have breathlessness & chest pain. Treat according to rhythm:
  - Regular = Supra-ventricular tachycardia
  - Irregular = Atrial fibrillation

  Use vagal manoeuvres (with ECG monitoring):
  - Sino-carotid massage
  - Ocular pression
  - If no results: Adenosine
    - 6 mg rapid bolus
    - Then 12 mg if no effect
    - Then again 12 mg in still no effect

  Look for a cause of fast atrial fibrillation (pneumonia, myocardial infarction):
  - Treat heart failure with high dose diuretics (e.g. frusemide 80mg oral or iv).
  - If patient has minimal symptoms, treat heart rate with Bisoprolol 1.25 mg increasing as tolerated to 10mg daily.
  - If patient is compromised (unwell, short of breath, chest pain): ORAL digoxin: start with 0.5mg then use doses of 0.125mg-0.25mg if no response after 6-8hrs; maximum dose 1.5 mg over 24 hours. Aim for <90bpm; <70bpm in HF; no less than 60bpm. Do NOT use verapamil.

- Stable patient with Broad QRS (>0.12 ms) – patient may still have breathlessness & chest pain. Treat according to rhythm

<table>
<thead>
<tr>
<th>Regular: Ventricular tachycardia</th>
<th>Irregular: Atrial fibrillation with left bundle branch block</th>
<th>Irregular: Polymorphic VT</th>
</tr>
</thead>
<tbody>
<tr>
<td>Give Amiodarone 300 mg over 20 min and then 900 mg/24h</td>
<td>Same management as atrial fibrillation</td>
<td>Magnesium 2g in 10 min</td>
</tr>
</tbody>
</table>
**Chronic Atrial fibrillation**

Atrial fibrillation is the most common sustained cardiac arrhythmia. If left untreated atrial fibrillation is a significant risk factor for stroke and other morbidities. Men are more commonly affected than women and the prevalence increases with age.

**Causes of Atrial Fibrillation**

- Hypertension
- Ischaemic heart disease
- Valvular heart disease
- Congenital heart disease
- Cardiomyopathy
- Thyrotoxicosis
- Excess alcohol intake and exposure to other stimulants
- Viral infections
- Stress due to pneumonia, surgery or other illnesses

**Symptoms and signs**

- May cause no symptoms: irregular pulse found when checking as part of routine clinical assessment
- Very rapid (usually around 120bpm) irregular pulse and patient may have symptoms and feel unwell: lightheaded, breathless or chest pain or heart failure (= fast AF – treat as above)
- Differentiate from Ventricular Tachycardia which may cause similar symptoms but pulse rate usually around 140 and rhythm is regular.

**Investigations:**

- ECG is very helpful to confirm diagnosis. Atrial flutter can be managed in the same way as AF. If paroxysmal AF (sometimes in AF, sometimes in normal rhythm) treat as AF.
- Check thyroid function
- Check for co-morbidities and cardiovascular risk factors: Fasting glucose, cholesterol, renal function

**Management of stable Atrial Fibrillation**

Refer new cases of AF to a specialist if available. The aim of treatment is to prevent complications, particularly stroke, and alleviate symptoms.

- **Rate control:** prevent fast AF using B-blocker (e.g. bisoprolol - start low dose and increase slowly to 10mg daily) but not in severe asthma (use Digoxin), aiming for a pulse <100.
- **Assess Stroke risk:** calculate ‘CHA2DS2 – VASc’ score

### CHA2DS2-VASc Score Calculator

<table>
<thead>
<tr>
<th>Feature</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congestive Heart Failure</td>
<td>1</td>
</tr>
<tr>
<td>Hypertension</td>
<td>1</td>
</tr>
<tr>
<td>Age &gt;75 years</td>
<td>2</td>
</tr>
<tr>
<td>Age between 65 and 74 years</td>
<td>1</td>
</tr>
<tr>
<td>Stroke/TIA/TE</td>
<td>2</td>
</tr>
<tr>
<td>Vascular disease (previous MI, peripheral arterial disease or aortic plaque)</td>
<td>1</td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td>1</td>
</tr>
</tbody>
</table>
• If CHA2DS2-VASc score 2 or more, the patient is at high risk of stroke and can benefit from warfarin. First, calculate **Bleeding risk** using HAS-BLED Score: If score ≥3, the patient would be at significant risk of bleeding if receiving Warfarin. Try to correct potential reversible risk factors e.g. uncontrolled hypertension, alcohol intake; if this is not possible, Warfarin should not be given unless an experienced clinician advises that the benefits outweigh the likely risks.

**HAS-BLED Calculator for bleeding risk for those with Atrial Fibrillation**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Score if present</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension (Systolic &gt;= 160mmHg)</td>
<td>1</td>
</tr>
<tr>
<td>Abnormal renal function</td>
<td>1</td>
</tr>
<tr>
<td>Abnormal liver function</td>
<td>1</td>
</tr>
<tr>
<td>Age &gt;= 65 years</td>
<td>1</td>
</tr>
<tr>
<td>Stroke in past</td>
<td>1</td>
</tr>
<tr>
<td>Bleeding</td>
<td>1</td>
</tr>
<tr>
<td>Labile INRs</td>
<td>1</td>
</tr>
<tr>
<td>Taking other drugs as well</td>
<td>1</td>
</tr>
<tr>
<td>Alcohol intake at same time</td>
<td>1</td>
</tr>
</tbody>
</table>

• If CHA2DS2-VASc score 2 or more, and HAS-BLED score is 2 or less, refer for Warfarin initiation. If there is no specialist to initiate anticoagulation therapy but INR monitoring is available, Warfarin can be initiated by the MSF MD (Medco / NCD advisor can give guidance). See Annex 6 (Warfarin Initiation). If monitoring is not available, do not give Warfarin.

• If CHA2DS2-VASc score is 1 or 0, or HAS-BLED score is 3 or more, do not give Warfarin.

**Assessment and Monitoring**

If on Warfarin, check INR regularly (see Annex 6).
Review every 6 months once stable:
Ask about symptoms, medication adherence, side effects
Check blood pressure, pulse rate, examine for and treat comorbidities.

**Emergency Management of Bradyarythmias**

**Assessment:**
Instal in a quiet area and semi-reclined position. Survey diuresis + 12 lead ECG. Monitor blood pressure on two arms (with reevaluation every 15 min), pulse, O2 saturation. **Set an IV catheter** (18-20 Gauge) and take a blood sample. Identify and treat reversible causes (drugs, electrolyte abnormalities). Treatment is only required for Persistent brady-arrhythmia causing hypotension, acutely altered mental status, shock, acute chest pain or acute heart failure.

**Management:**

• Give **atropine**: 0.5mg bolus, repeat until maximum dose: 3mg.
• If atropine ineffective: **Epinephrine** IV infusion: 2-10µg/kg/min
• Consider others treatments: Dopamine IV infusion: 2-10µg/kg/min
STROKE AND TRANSIENT ISCHAEMIC ATTACK (TIA)

Clinical features

- Acute stroke: Acute loss of function persisting or progressing at time of assessment. Acute onset of: asymmetrical facial weakness, asymmetrical arm weakness, speech disturbance or visual field defect make stroke likely.
- TIA: History of acute loss of function (as described above) that lasted <24 hours, and has completely resolved at the time of assessment.

Causes of Stroke

Globally the causes are as follows:

- cerebral infarction (84%)
- primary intracerebral haemorrhage (10%)
- subarachnoid haemorrhage (6%)

However, there is substantial regional variation in the proportion of strokes attributable to each of these categories; for example in Ethiopia, up to 50% of strokes may be haemorrhagic.

Acute management of suspected stroke:

- Exclude hypoglycaemia, if carotid surgery / thrombolysis are available within 3 hours, arrange urgent hospital admission and ensure follow-up after discharge.
- If thrombolysis is not available, give Aspirin 300mg STAT (but do not give if haemorrhagic stroke suspected: gradually worsening deficit (sudden onset with fluctuating course and occasional improvements would suggest thrombembolic cause), heavy alcohol consumption, no previous history of diabetes, cardio-vascular disease or smoking, age<40, patients taking medication that increases bleeding risk (e.g. Warfarin))
- Thereafter, aspirin 300 mg daily should be continued until 2 weeks after the onset of stroke symptoms, at which time definitive long-term antithrombotic treatment (Clopidogrel 75mg is first line if available, Aspirin 75mg is an alternative) should be initiated. Anticoagulation treatment should not be used routinely for the treatment of acute ischemic stroke. If a person has a further ischemic stroke or TIA whilst taking antiplatelet therapy, then they should be fully investigated for potential causes.
- Patients should not routinely be admitted to hospital unless they require a specific treatment that is available. In some contexts no care is available; but in some, all patients should be admitted.
- If BP > 180/110, consider cautious lowering of BP (see ‘Severe Hypertension’ section).
- Exclude atrial fibrillation: check pulse and carry out ECG.
- Patient is automatically at high CV risk. Start statin and antihypertensive medications for all patients (unless hypotensive). Start BP lowering 2 weeks post stroke (may be started sooner in hospital). See “cardiovascular risk reduction” (above).

Ongoing management when condition is stable

- Counsel on lifestyle change: abstaining from alcohol and tobacco, limiting dietary sodium, reducing weight if appropriate, exercising regularly; the need for lifelong treatment with medication: Statin, antihypertensive medication, antiplatelet agent etc; the need for regular review: BP, pulse, weight, lifestyle review, monitoring of lipids, glucose, renal function, medication review.
- Counsel family about risks of complications: pressure sores, contractures, swallowing difficulty, aspiration pneumonia, depression, etc, etc.
- If AF is present, offer treatment including Warfarin if indicated (see section on AF and Annex 6).
Management of suspected TIA:

- Exclude atrial fibrillation: check pulse and carry out ECG.
- Patient is at high CVD and stroke risk. Treat according to “Secondary prevention of CVD” (above).
- Counsel on lifestyle change: abstaining from alcohol and tobacco, limiting dietary sodium, reducing weight if appropriate, exercising regularly.

PERIPHERAL ARTERIAL DISEASE (adapted from PCI Field guide)

- Symptoms: Easily missed! Ask about claudication pain: pain in the calves on walking, worse if walks fast or up a hill. Relieved within a few minutes of resting.
- Examination: Absent or weak leg/foot pulses (suggestive but not diagnostic) and cool, pale feet. Capillary refill >3 seconds. Ulcers may be present. Loss of hair on lateral part of lower leg.
- Treatment: Walk to the point of pain and a little beyond, as this encourages new blood supply to develop. To prevent further damage: see “secondary prevention of CVD” (above).
- Refer if critical ischaemia (pain at rest/ulcers/gangrene).
- Refer if persistent symptoms despite above measures.

DEEP VENOUS THROMBOSIS AND PULMONARY EMBOLUS

These are not chronic diseases as such, but are more frequently seen in patients with CVD.

Deep Venous Thrombosis

All suspected DVTs should have a Wells score calculated. If Well’s score is ≥ 2 urgent referral for Doppler scanning and anticoagulation should be arranged. If referral for assessment and anticoagulation is not available, Heparin can be initiated by the MSF MD with subsequent transition to oral Warfarin (contact the Medco / NCD advisor for guidance if required).

<table>
<thead>
<tr>
<th>Factor</th>
<th>Points</th>
</tr>
</thead>
<tbody>
<tr>
<td>active cancer (treatment within last six months or palliative)</td>
<td>1</td>
</tr>
<tr>
<td>calf swelling ≥3 cm compared to asymptomatic calf (measured 10 cm below tibial tuberosity)</td>
<td>1</td>
</tr>
<tr>
<td>collateral superficial veins (non-varicose)</td>
<td>1</td>
</tr>
<tr>
<td>pitting oedema (confined to symptomatic leg)</td>
<td>1</td>
</tr>
<tr>
<td>swelling of entire leg</td>
<td>1</td>
</tr>
<tr>
<td>localised tenderness along distribution of deep venous system</td>
<td>1</td>
</tr>
<tr>
<td>paralysis, paresis, or recent cast immobilisation of lower extremities</td>
<td>1</td>
</tr>
<tr>
<td>recently bedridden ≥3 days, or surgery under regional / general anaesthetic in last 12 weeks</td>
<td>1</td>
</tr>
<tr>
<td>previously documented deep-vein thrombosis</td>
<td>1</td>
</tr>
<tr>
<td>alternative diagnosis at least as likely as DVT</td>
<td>-2</td>
</tr>
</tbody>
</table>

Clinical Features of Pulmonary Embolism

Symptoms include: acute or gradual onset chest pain, SOB, haematemesis. If symptoms and a recent history of DVT or PE, recent surgery / lower limb fracture/immobility (within the last 30 days)/ cancer
(active or treated within the last 6 months) or known coagulopathy, should be treated as a suspected PE and referred to hospital acutely. However, the first priority is to exclude cardiac ischaemia. Clinical signs include: tachycardia (heart rate > 100 bpm most predictive; respiratory rate > 16 rpm is most common sign).

Emergency Management of Pulmonary Embolism

Treatment is with anticoagulant therapy:
- Enoxaparin 1.5 mg/kg (150 units/kg) every 24 hours until adequate oral anticoagulation established
- Warfarin oral anticoagulation to be started at same time (see Annex)

Following discharge from hospital following DVT or PE, or counter-referral from the specialist:
- Counsel on lifestyle change: abstaining from tobacco, reducing weight if appropriate, exercising regularly.
- Risk factor modification – see “secondary prevention of CVD” above.
- Continue anticoagulation treatment if prescribed, provided INR monitoring is available.
- If hospital-based initiation of anticoagulant treatment is not available, Enoxaparin can be initiated in primary care with subsequent transition to oral Warfarin (see Annex)
- Patients with DVT or PE should be treated for at least 3 months (3 months for DVT confined to calf\(^\text{25}\), 6 months for proximal DVT, or PE)
- Patients with DVT or PE provoked by surgery should not be on long-term Warfarin
- Patients with unprovoked proximal DVT\(^\text{26}\) or PE (but not those with DVT confined to the calf) should be considered for long-term anticoagulation, taking into account risk of recurrence and bleeding.

<table>
<thead>
<tr>
<th>Drug (Class)</th>
<th>Dose</th>
<th>Side Effects/ Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hydrochlorothiazide (thiazide diuretic)</td>
<td>By mouth, 12.5 mg - 25 mg (in one or two doses)</td>
<td>Antihypertensive medication. Side effects: gastrointestinal disturbance, orthostatic hypotension, hypokalaemia, hyponatraemia, hypoglycaemia, hyperuricaemia, gout. Cautions: metabolic syndrome, pregnancy, hypercalcaemia, hypokalaemia. Contraindicated: Gout, oliguria/anuria, severe electrolyte abnormalities.</td>
</tr>
<tr>
<td>Bisoprolol (Beta-blocker) Alternative: Atenolol</td>
<td>By mouth, 1.25 mg – 10 mg (in the morning)</td>
<td>Antihypertensive medication. Indicated in MI/angina, heart failure. Side effects: gastrointestinal disturbance, bradycardia, bronchospasm, heart failure, headache, weakness, vasoconstriction, cold peripheries, erectile dysfunction. Cautions: metabolic syndrome, COPD, physically active patients, diabetes (monitor glucose) Contraindicated: asthma, (^2\text{25}) or (^3\text{25}) degree AV block, acute cardiac failure, bradycardia. Pregnancy: safe in pregnancy.</td>
</tr>
<tr>
<td>Labetolol (Beta-blocker)</td>
<td>20 mg iv injection over 1 minute, then 20-80 mg every 10 minutes. Max total dose = 200mg.</td>
<td>Antihypertensive medication. For use in management of hypertensive crisis. Side effects, cautions and contraindications: see Bisoprolol.</td>
</tr>
<tr>
<td>Amlodipine (calcium channel blocker)</td>
<td>By mouth, 5-10 mg in the morning</td>
<td>Antihypertensive medication. Side effects: lower limb oedema, headache, fatigue, nausea, abdominal pain, vertigo. Cautions: women of child bearing age, heart failure, liver failure. Contraindicated: pregnancy and breastfeeding, hypersensitivity</td>
</tr>
<tr>
<td>Enalapril (angiotensin converting enzyme inhibitor)</td>
<td>By mouth, 20 – 40 mg (in one or two divided doses)</td>
<td>Antihypertensive medication. Side effects: hypotension, renal failure, dry cough, angioedema, pruritis, urticarial rhinitis, sinusitis, angina. Cautions: women of childbearing age, peripheral arterial disease (monitor renal function). Contraindicated in pregnancy, hyperkalaemia, bilateral renal artery stenosis hepatic or renal failure (creatinine &gt; 2 mg/dL or &gt; 175 μmol/L). If creatinine is 1.4 - 2.0 mg/dL (123-175 μmol/L) recheck one month after starting Metformin and stop if creatinine increased by 30%.</td>
</tr>
</tbody>
</table>

\(^{25}\) If anatomical location of DVT is unknown, treat as proximal DVT

\(^{26}\) If anatomical location of DVT is unknown, treat as proximal DVT
<table>
<thead>
<tr>
<th>Drug</th>
<th>Route/Contraindications/Side Effects</th>
<th>Pharmacological Action</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Losartan</strong> (angiotensin II receptor blocker)</td>
<td>By mouth, start 50 mg once daily, (25 mg in elderly) increase gradually to max 100 mg</td>
<td>For hypertension when ACEI contraindicated. <strong>Side effects:</strong> usually mild, dizziness, particularly if hypovolemic, hyperkalaemia, angioedema. <strong>Caution:</strong> renal artery stenosis, mitral and or aortic valve stenosis or HO CM. <strong>Contraindicated:</strong> Pregnancy and breastfeeding: avoid.</td>
</tr>
<tr>
<td><strong>Atorvastatin</strong> (statin – HMG coA reductase inhibitor)</td>
<td>By mouth, 20-80 mg in the evening. Normal dose = 80 mg. For primary prevention, or if LFT testing not available, give 20mg.</td>
<td>Lipid regulating drug. Reduces cardiovascular risk. <strong>Side effects:</strong> myalgia (common), myositis, rhabdomyolysis, hepatitis, jaundice, rare pancreatitis or hepatic failure, gastrointestinal disturbance, sleep disturbance, headache, depression, fatigue, peripheral neuropathy, sexual dysfunction, hypersensitivity, hyperglycaemia (monitor glucose in diabetics). <strong>Cautions:</strong> liver disease, high alcohol intake, risk factors for myopathy or rhabdomyolysis. <strong>Contraindicated:</strong> active liver disease (check LFTs before initiation – if amino trans ferases &gt; 3x normal limit, do not start Statin, re check LFTs after 3months; if no progression, it is safe to start Statin), pregnancy (stop 3 months before trying to conceive), breast feeding</td>
</tr>
<tr>
<td><strong>Acetylsalicylic acid</strong> (Aspirin) (anti-platelet)</td>
<td>By mouth, 75-100 mg with food</td>
<td>Secondary prevention of thrombotic stroke or cardiovascular disease. <strong>Side effects:</strong> bronchospasm, gastro-intestinal irritation or haemorrhage, other haemorrhage. <strong>Cautions:</strong> asthma, uncontrolled hypertension, previous peptic ulceration, renal impairment, G6PD deficiency. <strong>Contraindicated:</strong> children &lt; 16 years, active peptic ulceration, haemophilia or other bleeding disorders, history of hypersensitivity to aspirin or other NSAIDs, severe hepatic or renal impairment <strong>Pregnancy:</strong> use with caution during 3rd trimester, high doses may cause closure of ductus arteriosus in utero and persistent pulmonary hypertension of the newborn, kernicterus in jaundiced neonate. Avoid in breastfeeding</td>
</tr>
<tr>
<td><strong>Clopidogrel</strong> (anti-platelet)</td>
<td>By mouth, 75 mg daily</td>
<td>Secondary prevention of thrombotic stroke if aspirin contraindicated or cardiovascular disease; for 12 months post coronary artery stenting. <strong>Side effects:</strong> dyspepsia, abdominal pain, diarrhoea; bleeding disorders (including gastro-intestinal and intracranial); constipation, gastric and duodenal ulcers, headache, dizziness, paraesthesia, blood disorders, rash, and pruritus; rare pancreatitis, hepatitis, vasculitis. <strong>Cautions:</strong> renal and hepatic impairment, patients at risk of increased bleeding from trauma, surgery, or other conditions; use of drugs that increase risk of bleeding; discontinue 7 days before elective surgery if antiplatelet effect not desirable; history of hypersensitivity reactions <strong>Contraindicated:</strong> active bleeding</td>
</tr>
<tr>
<td><strong>Hydralazine</strong> (Vasodilator)</td>
<td>Slow intravenous injection: 5–10mg diluted with 10ml sodium chloride 0.9%; may be repeated after 20–30 minutes</td>
<td>Antihypertensive for use in hypertensive crisis or preeclampsia. <strong>Side effects:</strong> tachycardia, palpitations, flushing, hypotension, fluid retention, gastro-intestinal disturbances; headache, dizziness; systemic lupus erythematosus-like syndrome, rare arthralgia, myalgia, nasal congestion, dyspnoea, agitation, blood disorders, abnormal liver function, jaundice, renal impairment <strong>Cautions:</strong> reduce dose in hepatic or renal impairment or severe renal impairment, coronary artery disease, cerebrovascular disease <strong>Contraindicated:</strong> SLE, severe tachycardia, or heart failure, acute ischaemia, dissecting aortic aneurysm; acute porphyria <strong>Pregnancy:</strong> may cause neonatal thrombocytopenia. May use in breastfeeding</td>
</tr>
<tr>
<td><strong>Methyldopa</strong></td>
<td>By mouth, 250mg 2-3x daily, maximum 3g/day.</td>
<td>For use in hypertensive crisis. <strong>Side effects:</strong> gastro-intestinal disturbances, dry mouth; bradycardia, exacerbation of angina, postural hypotension, oedema; headache, dizziness, hepatitis, pancreatitis; blood disorders; hypersensitivity; rashes; nasal congestion, impotence, decreased libido, amenorrhoea; <strong>Caution:</strong> do not cause hepatic or renal impairment, history of depression <strong>Contraindicated:</strong> active liver disease, depression, phaeochromocytoma; acute porphyria. <strong>Pregnancy and breastfeeding:</strong> may use.</td>
</tr>
<tr>
<td><strong>Glyceryl Trinitrate (GTN) (short acting nitrate)</strong></td>
<td>Sublingually, 0.3–1 mg, repeated as required</td>
<td>For use in acute angina or angina prevention pre-activity. <strong>Side effects:</strong> tachycardia (bradycardia possible); throbbing headache, dizziness; nausea, vomiting, heartburn, flushing, syncope <strong>Cautions:</strong> severe hepatic or renal impairment, hypothyroidism; malnutrition; hyperthermia; recent history of myocardial infarction; heart failure due to obstruction; hypoxemia, risk angle-closure glaucoma. <strong>Contraindicated:</strong> hypersensitivity; hypotension, hypovolaemia; hypertrophic cardiomyopathy; aortic or mitral stenosis; mitral; toxic pulmonary oedema; raised intracranial pressure, severe anaemia. <strong>Pregnancy and breastfeeding:</strong> may use.</td>
</tr>
<tr>
<td><strong>Isosorbide Dinitrate</strong> (long-acting nitrate)</td>
<td>By mouth, 5mg twice daily, max 40mg tds</td>
<td>Prevention and treatment of angina. <strong>Side effects, Cautions, Contraindicated:</strong> see glyceryl trinitrate <strong>Pregnancy:</strong> may cross placenta avoiding benefit outweighs risk</td>
</tr>
<tr>
<td><strong>Frunoside (Loop diuretic)</strong></td>
<td>By mouth. For oedema, start 40 mg mane; maintenance 20–120 mg daily; Resistant high BP, 40–80 mg daily</td>
<td>For resistant hypertension or acute heart failure. <strong>Side effects:</strong> mild gastro-intestinal disturbances, pancreatitis, hepatic encephalopathy, postural hypotension, hyperglycaemia, acute urinary retention, electrolyte disturbances, metabolic alkalosis, blood disorders, visual disturbances, tinnitus and deafness, hypersensitivity. <strong>Cautions:</strong> correct hypovolaemia and hypotension before use, monitor electrolytes exacerbate diabetes, ensure there is urinary output before using. <strong>Contraindicated:</strong> severe hypokalaemia, hyponatraemia or anuria, comatose associated with liver cirrhosis, drug-induced renal failure. Avoid in pregnancy.</td>
</tr>
<tr>
<td><strong>Spironolactone</strong> (diuretic-aldosterone</td>
<td>By mouth. Initially 25 mg once daily, increased</td>
<td>For severe heart failure with oedema in addition to other treatments. <strong>Side effects:</strong> gastro-intestinal disturbances, hepatotoxicity, malaise, confusion, drowsiness, dizziness, breast, menstrual, libido or hair growth disturbances, hyperkalaemia (discontinue) and</td>
</tr>
</tbody>
</table>
antagonist) according to response to max. 50 mg once daily hyponatraemia, acute renal failure, hyperuricaemia, blood disorders, leg cramps, rash. **Caution**: monitor electrolytes in elderly. Monitor potassium and creatinine 1 week after initiation and after any dose increase; then every 3 months; acute porphyria. **Contraindicated**: hyperkalaemia; anuria; Addison's disease **Pregnancy**: only if benefit outweighs risk; may use in breastfeeding (small amounts in milk).

**Digoxin** (Cardiac glycoside)  
**By mouth. Start with 0.5mg then use doses of 0.125mg-0.25mg if no response after 6-8hrs. Maximum dose 1.5 mg over 24 hours.**  
For rate control in symptomatic atrial fibrillation/flutter; may take hours to work. **Side effects**: gastrointestinal disturbance; arrhythmias, conduction disturbances; dizziness; blurred or yellow vision; rash, depression; anorexia, intestinal ischaemia and necrosis, psychosis, confusion, headache; **Caution**: reduce dose in renal impairment/elderly; recent myocardial infarction; thyroid disease; severe respiratory disease; hypokalaemia, hypomagnesaemia, hypercalcaemia, and hypoxia (risk of digitalis toxicity); monitor serum electrolytes and renal function; **Contraindicated**: conduction block; supraventricular arrhythmias a with accessory conducting pathways e.g. Wolff-Parkinson-White syndrome; VT or VF; hypertrophic cardiomyopathy; myocarditis; pericarditis. **Pregnancy and breastfeeding**: may need to adjust dose in pregnancy. May use in breastfeeding.

**Warfarin** (coumarin – vitamin K antagonist)  
**By mouth. 5–10 mg on the first day (elderly patients 2mg); subsequent doses depend upon INR monitoring.**  
**Usual daily maintenance dose 3–9 mg**  
Should be initiated by specialist. For stroke prevention in atrial fibrillation; treatment/prevention in PE or DVT; mechanical prosthetic heart valves. **Side effects**: haemorrhage; nausea, vomiting, diarrhoea, jaundice, hepatic dysfunction, pancreatitis, pyrexia, alopecia, purpura, rash, skin necrosis **Caution**: mild-moderate hepatic or renal impairment, monitor INR more often if severe renal impairment; conditions/drugs which increase bleeding risk, e.g. gastro-intestinal bleeding, peptic ulcer, recent surgery, recent ischaemic stroke, postpartum; uncontrolled hypertension; avoid cranberry/grapefruit juice; **Contraindicated**: severe hepatic impairment; haemorrhagic stroke; significant bleeding; avoid use within 48 hours postpartum. **Pregnancy**: avoid in pregnancy; warn women of childbearing age and assess carefully risk/benefit of use. Safe for use in breastfeeding.

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**Special considerations for HIV and TB**

**Patients with HIV** are at greater cardiovascular risk due to chronic inflammation associated with HIV infection. These patients represent a particularly vulnerable group, with a much higher risk of Acute Myocardial Infarction, Atrial Fibrillation, and sudden cardiac death. Furthermore, the metabolic side effects of ARVs may exacerbate this risk. Management of patients with known CVD should focus on (1) immediate initiation of ART if not already done and (2) secondary prevention of cardiovascular events through aggressive control of modifiable risk factors. Educate and encourage lifestyle changes (smoking, diet, exercise). Estimate the underlying risk of CVD and consider ARV modification if 10 year risk >= 20%: replace Ritonavir with another PI known to cause less hyperlipidaemia e.g. Saquinavir. Replace Stavudine, Zidovudine or Abacavir with Tenofovir, which carries less risk of cardiovascular events.

**ARV Drug Interactions with drugs used in cardiovascular disease:**
- **NRTIs** – no clinically significant interaction suspected;
- **NNRTIs** may interact and require careful monitoring- Efavirenz (with Atorvastatin, Warfarin (risk of bleeding), Clopidogrel, Ag2antagonists, Ca-channel blockers); Nevirapine (with Atorvastatin, Warfarin, Clopidogrel, Ca-channel blockers);
- **PIs** may interact and require careful monitoring: (ARBs, Ca-channel blockers, B-blockers, Warfarin (risk of bleeding), Clopidogrel, Digoxin). Thiazide diuretics are not recommended; Indapamide, Chorthalidone may be used if available. PIs interact with statins: start with low dose statin (e.g. Atorvastatin 40mg).

**Patients with TB**: Rifampicin may reduce BP lowering effect of ACEi and ARBs and may reduce lipid-lowering effect of Statins. Monitor BP lipids more often. Statins and anti-TB drugs both cause hepatotoxicity - monitor LFTs more often. Rifampicin will interact with Warfarin.
7. Renal Impairment

There are an increasing number of NCD patients with renal impairment detected by high creatinine levels. This increases with duration of time patients have spent away from medical care.

1. **ASSESSMENT**

   **Screening for patients with hypertension and/or diabetes**
   
   ➢ Albuminuria and creatinine every year

   **When creatinine is detected outside the normal range:**
   
   1. Recheck age
   2. Calculate eGFR using electronic calculator
      
      ➢ First choice is CKD-EPI (eg QXMD app)
      ➢ If not possible, use Cockroft-Gault for creatinine clearance
   3. Repeat serum creatinine and K, and check albuminuria
   4. Check haemoglobin
   5. Assess and treat cardiovascular risk factors (HT, smoking) and comorbid conditions

   **Refer patients for USS KUB if:**
   
   - clinical suspicion of obstruction on history (eg pain consistent with obstruction)
   - haematuria detected
   - patient with repeated symptoms of pyelonephritis
   - calculated GFR less than 30 (stage 4 CKD)
   - accelerated deterioration of renal function

   **A2 = ‘microalbuminuria’; A3= ‘macroalbuminuria’**
   
   A1 <3mg/mmol; A2 3-30mg/mmol; A3 > 30mg/mmol

2. **MANAGEMENT**

   **If calculated GFR is between 30 and 90:**
   
   - Review all medications and adjust doses where necessary
   - Optimise BP control (target 140/80): ACEI first line up to 10 mg enalapril twice a day
   - Optimise diabetes control
   - Dietary advice: how to avoid salt; ensure cholesterol has been checked
   - Consider a glucometer for all patients on insulin with evidence of renal impairment
- Advise patients of preference for paracetamol over NSAIDs when simple analgesia required. (very important, as patients obtain medications from other providers, neighbours etc. Especially emphasise to not use NSAIDs with intercurrent illness.)

If calculated GFR is 30 or less:
1. Arrange USS KUB & request UMCS in addition to the tests above
2. Review patient with results:
   a. Refer on to Urologist if evidence of obstruction (then likely also nephrology involvement pending outcome of urology referral)
   b. All others refer directly to nephrologist

Follow up investigations
Using CKD stage (according to above table):
1. No CKD: usual review
2. Moderate-risk CKD: repeat creatinine and albuminuria once a year
3. High risk CKD: repeat creatinine, albuminuria and potassium every 6 months, haemoglobin once a year.
4. Very high risk CKD: repeat creatinine, albuminuria and potassium every 3 months, haemoglobin every 6 months

Medications in renal impairment:

Diabetic medications
- CKD stage G2 or greater, cease Glibenclamide
- CKD stage G3, adjust Metformin to maximum 1000mg/day
- CKD stage G4, cease Metformin

Antihypertensive medication
1. ACE inhibitors (eg enalapril) - ACE inhibitors are renoprotective and should be used, but the risk in renal failure is hyperkalaemia
   o If patient already on ACEI, continue to give in renal impairment, but monitor potassium according to CKD stage (see above).
   o If patient not yet on ACEI, introduce with care (eg enalapril 5 mg twice a day) but monitor for deterioration in renal function after introduction:
     - if reduction <25% from baseline and stabilises within 2 months, continue ACEI
     - if reduction >25% from baseline, stop ACEI
2. Diuretics
   - give to most patients with CKD: they lower blood pressure, potentiate the effects of ACE inhibitors and other antihypertensive agents; and reduce the risk of CVD in CKD.
     - mandatory when GFR is less than 30.
       - HCTZ – once a day
         - less effective once CrCl<10ml/min; consider augmenting with frusemide
       - Frusemide – twice a day
         - half-life increases with severity of CKD - consider increasing dosage as creatinine increases (from 20 mg twice a day to 100mg twice a day)
3. Other antihypertensives
   o Amlodipine – once CrCl <30ml/min, max 5mg daily
   o Atenolol – once CrCl<10ml/min, max 50mg daily
   o Bisoprolol – use as usual

Iron supplementation
- If Hb < 100g/L, start oral iron
- If Hb < 80g/L, consider other options and referral
8. Cancer

At present, cancer care is only provided in pilot projects in MSF. The focus on (1) prevention measures that can be integrated into primary care (2) identifying and managing suspected Cervical and Breast Ca, (3) identifying and managing HIV related cancers, (4) identifying and referring other suspected lesions where facilities are available (5) palliative care. Recommended interventions for pilot cancer projects:

All cancers:
- Education on tobacco hazards, value of HPV and HBV vaccination and importance of seeking early treatment for common cancers; palliative care including, at a minimum, opioids for pain relief

Tobacco-related cancers (oral, lung, and oesophagus)
- Smoking cessation advice and services (mostly without pharmacological therapies)

Liver cancer
- HBV vaccination including birth dose (primary health clinic or mobile outreach)

Breast cancer
- Clinical breast examination (possibly FNA) and treatment for early-stage cancer (Specialised cancer centre or unit, can be at district general hospital level)

Colorectal cancer
- Emergency surgery for obstruction (district general hospital)

Cervical cancer
- School-based HPV immunisation; opportunistic screening through visual inspection or HPV DNA testing; treat precancerous lesions; treat early-stage cancer; (primary health clinic or district general hospital)

Childhood cancers
- Treat selected cancers in paediatric cancer units or hospitals

The Access Campaign publication “Options for MSF operational response to the cancer epidemic” outlines the key programmatic components of provision of care for these cancers.

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27 Gelbrandt et al 2015: Table 3: Essential cancer intervention package recommended by DCP-3
References

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Annex 1: Example of NCD clinic SOPs

MSF OCA Irbid NCD service SOPs

1. **At reception, who should be referred to the MSF nurse for screening?**

   Patients who meet the socio-economic criteria, and have one or more of the following, should be referred to the nurse for screening:
   - Known COPD
   - Known Asthma
   - Known Cardiovascular disease (including Hypertension / previous Stroke / Ischaemic Heart Disease / Peripheral Vascular Disease / Cardiac Failure / Arrhythmias)
   - Known Diabetes (Type 1 or Type 2) or Hypothyroidism
   - Chronic or recurrent shortness of breath (exertion, at rest or at night)
   - Chronic or recurrent cough / sputum production
   - Chronic or recurrent chest pain or palpitations
   - Chronic swelling of the legs
   - Chronic polyuria and polydipsia
   - Other chronic unexplained symptoms

2. **Who should be included in the NCD programme after medical review?**

   Patients with the following diagnoses should be included in the NCD programme:
   - COPD & Asthma
   - Cardiovascular disease (including Hypertension / previous Stroke / Ischaemic Heart Disease / Peripheral Vascular Disease / Cardiac Failure / Arrhythmias)
   - Diabetes (Type 1 or Type 2)
   - Hypothyroidism.

   Patients who do not meet these criteria should be offered appropriate management (+/- referral) then discharged → record as “Screened Negative” in the ‘Diagnosis’ section of the patient file.

3. **Who is eligible for 3 month appointments?**

   All new patients are seen monthly (or more often, according to MD decision). Appointment frequency can be reduced to 3 monthly when the patient fulfils the following criteria:
   - On NCD medication for > 6 months, with no change in dose the last 3 months.
   - Age>18
   - If hypertensive, BP < 150/100
   - If diabetic, HbA1c<8%
   - No history of selling medication
4. What to do when patients miss appointments?

- Any patient missing a scheduled appointment is recorded in the “Missed Appointment register”.

- Every morning, the receptionist should phone patients who missed appointments on the previous day. If the patient
  o Says that they would still like an appointment, they should be rebooked and their file should be put back to its normal location
  o Says that they are leaving our service (e.g. changing region), they should be coded as ‘Voluntary Exit’ on the file, and the file should be returned to the data entry operator who will transfer it to the archive.
  o Is uncontactable, the file should be placed in the missed appointments draw and their name should be highlighted in the missed appointments register

- Every morning, the receptionist should phone any patient who is highlighted in the register as having missed an appointment > 1 month previously. If the patient:
  o Says that they would still like an appointment, they should be rebooked and their file should be put back to its normal location
  o Says that they are leaving our service (e.g. changing region), they should be coded as ‘Voluntary Exit’ on the file, and the file should be returned to the data entry operator who will transfer it to the archive
  o Has died (i.e. the phone is answered by a relative, who gives this information), they should be coded as “dead” on the file, and the file should be returned to the data entry operator who will transfer it to the archive.
  o Is uncontactable, they should be coded as ‘defaulter’ on the file, and the file should be returned to the data entry operator who will transfer it to the archive

Annex 2: Example of Patient entry & follow-up form
<table>
<thead>
<tr>
<th>DIAGNOSIS:</th>
<th>Diabetes 1</th>
<th>Diabetes 2</th>
<th>Hypertension</th>
<th>Asthma</th>
<th>COPD</th>
<th>CVD</th>
<th>Thyroid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Screened Negative</td>
<td></td>
<td>Other: ________________________________</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>NAME:</th>
<th>Date of Birth:<strong>/</strong>/______ (dd/mm/yyyy)</th>
<th>Gender: □ M □ F</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>MOBILE PHONE NO:</th>
<th></th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Country of origin:</th>
<th>□ Syria □ Jordan □ Palestine □ Other: ________________________________</th>
</tr>
</thead>
<tbody>
<tr>
<td>If Syrian:</td>
<td>□ Refugee □ Not a refugee</td>
</tr>
<tr>
<td>If Jordanian:</td>
<td>□ Insured □ Uninsured</td>
</tr>
<tr>
<td>Living in:</td>
<td>□ Irbid governorate: District: ________________________________</td>
</tr>
<tr>
<td></td>
<td>□ Other governorate: Specify: ________________________________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FOR SYRIAN REFUGEES ONLY:</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>UNHCR Registration:</td>
<td>(in-date) □ YES, □ NO, Reason: Expired, waiting renewal appointment</td>
</tr>
<tr>
<td></td>
<td>Expiry date:_________________________</td>
</tr>
<tr>
<td>MOI Services Card:</td>
<td>□ YES, location:______________________</td>
</tr>
<tr>
<td></td>
<td>□ NO, □ Other: ______________________</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>LIFESTYLE</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>SMOKING:</td>
<td>□ Yes, current smoker □ No, quit. How long ago: ________ year(s) □ No, never smoked</td>
</tr>
<tr>
<td>If current/ex-smoker:</td>
<td>Cigarettes/day for: ________</td>
</tr>
<tr>
<td>ALCOHOL:</td>
<td>□ Yes □ No □ Not asked/answered</td>
</tr>
<tr>
<td></td>
<td>If yes:__________ units/week</td>
</tr>
<tr>
<td>EXERCISE:</td>
<td>According to questionnaire</td>
</tr>
<tr>
<td></td>
<td>□ Active □ Moderately Active □ Moderately Inactive □ Inactive</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>SOCIAL HISTORY</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>How many people in the household: ________</td>
<td>How many &lt;12 years in the household: ________</td>
</tr>
<tr>
<td>Living with a treatment supporter: Yes □ No □</td>
<td>Impaired mobility: Yes □ No □</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>FAMILY HISTORY</th>
<th>(Choose Yes if diagnosed in a parent, brother, sister, uncle, aunt or child)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diabetes Type 1:</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>Cardiovascular disease (below 60 years):</td>
<td>□ Yes □ No</td>
</tr>
<tr>
<td>Hypertension:</td>
<td>□ Yes □ No</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>VITAL SIGNS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Height: ________ cm</td>
<td>Weight: ________ kg</td>
</tr>
<tr>
<td>WAIST CIRCUMFERENCE: ________ cm</td>
<td>BLOOD PRESSURE: ________</td>
</tr>
<tr>
<td>PULSE: ________</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>EXIT</th>
<th>Default</th>
<th>Death</th>
<th>Voluntary exit</th>
<th>Other: ______________________</th>
</tr>
</thead>
</table>
**HISTORY**

**EXAMINATION**

**HEART:**

**LUNGS:**

**ABDOMEN:**

**FEET:**

**OTHER:**

**MEDICAL HISTORY/NEW DIAGNOSIS** – Verified if doctor agrees with diagnosis via history/exam/documentation

<table>
<thead>
<tr>
<th>DIAGNOSIS</th>
<th>Old Verified</th>
<th>New</th>
<th>Diagnosis date/duration</th>
<th>DIAGNOSIS</th>
<th>Old Verified</th>
<th>New</th>
<th>Diagnosis date/duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>□ Diabetes I</td>
<td></td>
<td></td>
<td></td>
<td>□ Angina (□ Stable □ Unstable)</td>
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<td></td>
<td></td>
</tr>
<tr>
<td>□ Diabetes II</td>
<td></td>
<td></td>
<td></td>
<td>□ Angioplasty/CABG</td>
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<td></td>
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</tr>
<tr>
<td>□ Hypertension</td>
<td></td>
<td></td>
<td></td>
<td>□ Myocardial Infarction</td>
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<tr>
<td>□ Asthma</td>
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<td></td>
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<td>□ Stroke</td>
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<tr>
<td>□ COPD</td>
<td></td>
<td></td>
<td></td>
<td>□ Congestive Heart Failure</td>
<td></td>
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<td></td>
</tr>
<tr>
<td>□ Hypothyroidism</td>
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<td></td>
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<td>□ Peripheral vascular disease</td>
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<td>□ Respiratory</td>
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<td>□ Cardiovascular Other</td>
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</tr>
<tr>
<td>Upper/Lower</td>
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<td></td>
<td></td>
<td>(DVT, PE, Valve, Arrhythmia.. etc)</td>
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</table>
### CVD Risk Score Assessment

- **Male** □ □ Smoker □ Obese (BMI>30) □ Age >50 □ Family Hx of MI/CVA<60 □ Diabetes
- **Total Chol> 7.5mmHg/290 mg/dL** □ □ **10 year CVD Risk Score:** ________%

### OLD MEDICATIONS

<table>
<thead>
<tr>
<th>Name</th>
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### MEDICATIONS

- □ Medication or dose adapted clinically

### REFERRAL

- □ Yes □ No
- If yes:
  - □ Podiatry □ Ophthalmogist □ Hospital/ER
  - □ Surgeon □ Cardiologist □ Respiratory
  - □ Endocrine □ Nephrology □ Specialist Other

### LABORATORY TEST REFERRAL

- □ Yes □ No

(Tick and date the tests ordered on Lab results form)

### PLAN

Next follow-up DATE (dd/mm/yyyy):
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**DATE NEXT appt:**
### Vital signs - each visit

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#### BLOOD PRESSURE

#### PULSE (visit 1 and when needed)

#### BLOOD SUGAR (Fast/Non-Fasting)
Diabetic (<100mg/dL)

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#### WEIGHT/BMI

#### OTHER (Sat, temp)

### Investigations

(normal range)

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#### Fasting Plasma Glucose

#### HbA1C Individual Target: ________

#### Urine Dipstick

#### Cholesterol tot

#### Triglycerides

#### Potassium

#### Sodium

#### Creatinine

#### Micro albumin

##### 3 Month

##### Annual

#### If needed

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<th>GGT</th>
<th>ALP</th>
<th>ALBUMIN</th>
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<th>ASR</th>
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<th>T4</th>
<th>Hb</th>
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<th>PEFR</th>
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#### Annual CVD Risk Score Assessment

- Male
- Smoker
- Obese (BMI>30)
- Age >50
- Diabetes
- Family Hx of MI/CVA<60
- Tot Cholesterol> 7.5mmHg/290 mg/dL

10 year CVD Risk Score: ________ %
## Allergies

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</table>
Annex 3: Asthma Self-management chart

Every day asthma care:

My personal best peak flow is: ____________

My preventer inhaler (insert name/colour): ____________

I need to take my preventer inhaler every day even when I feel well
I take ______ puff(s) in the morning
And ______ puff(s) at night.

My reliever inhaler (insert name/colour): ____________

I take my reliever inhaler only if I need to
I take ______ puff(s) of my reliever inhaler, if any of these things happen:
- I’m wheezing
- My chest feels tight
- I’m finding it hard to breathe
- I’m coughing.

Other medicines I take for my asthma every day:

With this daily routine I should expect/aim to have no symptoms.

When I feel worse:
- My symptoms are coming back (wheeze, tightness in my chest, feeling breathless, cough)
- I am waking up at night
- My symptoms are interfering with my usual day-to-day activities
- I am using my reliever inhaler ______ times a week or more
- My peak flow drops to below ______

This is what I can do straight away to get on top of my asthma:
1. If I haven’t been using my preventer inhaler, start using it regularly again or:
   Increase my preventer inhaler dose to ______ puffs times a day until my symptoms have gone and my peak flow is back to normal
   Take my reliever inhaler as needed (up to ______ puffs every four hours)
   If I don’t improve within 48 hours make an urgent appointment to see my GP or asthma nurse.
2. If I have been given prednisolone tablets (steroid tablets) to keep at home:
   Take mg of prednisolone tablets (which is x 5mg) immediately and again every morning for days or until I am fully better.

URGENT! Seek medical attention

In an asthma attack:

- My reliever inhaler is not helping or I need it more than every ______ hours
- I find it difficult to walk or talk
- I find it difficult to breathe
- I’m wheezing a lot or I have a very tight chest or I’m coughing a lot
- My peak flow is below ______

THIS IS AN EMERGENCY! TAKE ACTION NOW
1. Sit up straight – don’t lie down. Try to keep calm
2. Take one puff of my reliever inhaler every 30 to 60 seconds up to a maximum of 10 puffs
3. Seek medical attention
### Annex 4: Standard NCD database

#### New patient data variables

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<th>Date of Birth</th>
<th>Gender</th>
<th>Mobile No</th>
<th>Locality</th>
<th>Address</th>
<th># cig/day</th>
<th>N (occasions / month of 1+ drinks)</th>
<th>Height (cm)</th>
<th>Weight (Kg)</th>
<th>BMI (kg/m²)</th>
<th>HR</th>
<th>Sys BP (mmHg)</th>
<th>Dia BP (mmHg)</th>
<th>BG Fasting (mmol/L)</th>
<th>Total cholesterol (mmol/L)</th>
<th>Creatinine (μmol/L)</th>
<th>HbA1c (%)</th>
<th>Total Cholesterol</th>
<th>Creatinine</th>
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<th>Proteinuria (−/+/+ +/+++)</th>
<th>Procalcitonin (ng/ml)</th>
<th>Prolactin (ng/ml)</th>
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<th>Histopathology</th>
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<th>Symptoms of hypoglycaemia</th>
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#### Follow-up data variables

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<th>Total cholesterol (mmol/L)</th>
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<th>HbA1c (%)</th>
<th>Total Cholesterol</th>
<th>Creatinine</th>
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<th>Ketonuria</th>
<th>Proteinuria (−/+/+ +/+++)</th>
<th>Procalcitonin (ng/ml)</th>
<th>Prolactin (ng/ml)</th>
<th>Total Protein (g/L)</th>
<th>HbA1c (%)</th>
<th>Histopathology</th>
<th>Symptoms of hyperglycaemia</th>
<th>Symptoms of hypoglycaemia</th>
<th>Symptoms of hyperglycaemia</th>
<th>Symptoms of hypoglycaemia</th>
</tr>
</thead>
</table>
Annex 5 INHALER TECHNIQUE

Using a Metered Dose Inhaler:
1. Shake the inhaler and ensure that liquid is heard in the canister.
2. Remove the cap
3. Inhale and then exhale as completely as possible.
4. Place the lips firmly around the mouthpiece.
   - 5. Start to inhale with a long, slow breath and continue to breathe as deeply as possible while activating the inhaler.
6. Close the lips and hold the breath for 10 seconds, or as long as is comfortable.
7. Exhale, wait a few seconds, shake again and then repeat for the next puff, if required.

Repeat the steps if a second dose is required.
Mouth should be rinsed with water after using a steroid inhaler to avoid oral candidiasis.

Depressing the canister’s button and coordination with the breath may be more difficult for some patients for example the elderly. A spacer device is essential in these groups, and is recommended for all patients if possible.

To Use a Spacer:
1. Shake the inhaler well before use (3-4 shakes)
2. Remove the cap from the inhaler, and from the spacer, if it has one
3. Put the inhaler into the spacer
4. Breathe out, away from the spacer
5. Bring the spacer to the mouth, put the mouthpiece between the teeth and close lips around it
6. Press the top of the inhaler once
7. Breathe in very slowly until a full breath has been taken.
8. Hold breath for about ten seconds, then breathe out.

---

Using an inhaler with a spacer in young children

1. Remove the cap from the inhaler, and from the spacer, if it has one
2. Put the inhaler into the spacer
3. Hold the MDI and spacer together. Shake it 3-4 times.
4. Make sure the child is sitting comfortable. For younger children sit on parents lap
5. Put the mask firmly onto the child’s face. Be sure to cover the mouth and nose
6. Hold the mask over the child’s face with one hand. Hold the spacer with the other hand and press the MDI down firmly with your thumb. This will release 1 puff into the space
7. Hold the mask over the child’s nose and mouth for 10 to 15 seconds. This should allow the child to take 6 breaths. You can also watch a valve move inside the spacer to count the breaths.
8. Take the mask off the child’s face.
9. Wipe the child’s face. Let the child drink or rinse her mouth with water afterwards. This will remove the medicine left in the mouth to prevent thrush.
Initiating Warfarin

This can be initiated following discussion with and advice from the MTL or MedCo. Where rapid anticoagulation is required (e.g. acute venous thromboembolism) Warfarin is usually started in the hospital setting. Five to ten milligrams is the usual starting dose. In cases where rapid anticoagulation is not required (e.g. prevention of stroke in patients with Atrial fibrillation), Warfarin can be commenced in the primary care or non-acute setting.

Before Starting Warfarin, Contraindications to Warfarin should be checked. These include:

- haemorrhagic stroke,
- pregnancy
- severe renal or hepatic impairment.

Caution should be exercised in patients with the following history:

- peptic ulcer,
- recent surgery,
- recent ischaemic stroke,
- concomitant use of drugs that increase
- risk of bleeding,
- severe hypertension
- bacterial endocarditis.

Check list for patient advice at initial consultation

- Social supports and ability to adhere to prescribing advice should be considered at initiation.
- Ensure the patient understands the indication for warfarin, the target INR and the duration of treatment
- Counsel on the importance of compliance with medication taken at the same time each day usually in the evening. Advise on the importance of monitoring and achieving target INR
- Clear instructions should be given to patients on what dose to take and when the return visit for INR is scheduled.
- Advise on interactions with food and medications including herbs and supplements (see below). Patients should be advised to moderate their alcohol intake and that a large intake irregularly is most harmful to INR control
- Female patients of child bearing age should be advised regarding contraceptive methods and the issue of teratogenicity should be addressed
- Signs and symptoms of over anticoagulation and under anticoagulation need to be stressed. Advise on action if bleeding/adverse reaction occurs

Starting Treatment

- A slow loading regimen (2mg -5mg) is safe in patients who do not need rapid anticoagulation and achieves therapeutic anticoagulation in the majority of patients within 3-4 weeks 60. This helps to reduce the risk of overcoagulation and bleeding. Extra care (and therefore a lower starting dose)

---


should be taken with patients that are at increased risk of side effects with Warfarin (aged over 65, weight <45 kgs, congestive cardiac failure, mild to moderate renal failure or medications known to potentiate oral anticoagulation (see below))

- The INR rises without clinical anticoagulant effect for the first two days of treatment. The dose should be gradually increased with INR every day or alternate days until the target is reached for two consecutive values.
- Weekly INRs should follow until good control is established. During the maintenance phase it may take 4-5 days for dose changes to be reflected in the INR. INR should be repeated at 1-4 weekly intervals depending on stability of result. If results remain stable for three months then repeat INR testing can be gradually extended up to every 12 weeks.
- The INR should be performed more frequently – 2-3 times a week if new medications, intercurrent illness or significant diet change are a factor. If a drug with known interaction with warfarin is prescribed then the INR should be checked after 3-5 days.

**Common Indications for Oral Anticoagulation and Target INR**

<table>
<thead>
<tr>
<th>Common Indications for Oral Anticoagulation</th>
<th>Target INR (Range +/- 0.5)</th>
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<tbody>
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<tr>
<td>Atrial fibrillation with a high risk of cardio-embolic stroke</td>
<td>2.5</td>
</tr>
<tr>
<td>Mechanical prosthetic heart valve*</td>
<td>3.5</td>
</tr>
<tr>
<td>Recurrence of venous thromboembolism whilst on warfarin</td>
<td>3.5</td>
</tr>
</tbody>
</table>

*Varies between 2.5 and 3.5 depending on type of valve. Follow advice of the specialist.

**Follow up visits**

- Check compliance (ensure correct dosage is being taken and patient understands the dosage).
- Enquire about concerns with medication and adverse events.
- Dosage, INR and interval for repetition of INR should be clearly documented in notes and patient held booklet.
- Increase frequency of INR (every 2-4 days) if any of the following happens: non-therapeutic INR, intercurrent illness, medication change (including herbal), significant diet change.
- Do NOT change the dose when the INR is not therapeutic if patient non-compliant (forgot doses or took too many doses); Inadequate number of days before previous dose change; Binge alcohol use (will transiently elevate INR)

Flowchart: Frequency of INR Testing interval
**INR intervention** (Refer to flowchart on previous page for timing of next INR)

- **If INR ≤ 1.5** - Give one time top-up equal to 20% of weekly dose and increase weekly dose by 10-20%.
- **INR > 1.5 but < therapeutic range** - No change in dose. If two consecutive INRs are low, increase the weekly dose by 10-20%.
- **INR in therapeutic range** - No change in dose
- **INR > therapeutic range but < 5.0** - Lower weekly dose (10-20%) or consider omitting one single dose. Increase the frequency of INR monitoring and resume therapy at 10-20% lower weekly dose when INR therapeutic.
- **Note:** If the INR is only minimally elevated (0.1 - 0.4 above upper limit of the therapeutic range), dose reduction may not be necessary

The risk of bleeding increases significantly with an INR > 5.0. In the case of an elevated INR:

- Check if there is an obvious cause for the fluctuation e.g. compliance, new medication, alcohol consumption, change in diet, intercurrent illness and correct this underlying cause first.
- **If INR is >5 but it is <8** and no bleeding then stop warfarin for one to two doses and restart at a lower maintenance dose. Recheck INR in 2-4 days.
- **If the INR is >8.0 with no or minor bleeding** stop warfarin, monitor INR daily and restart when INR <5. Oral Vitamin K at a dose of 1-5mgs should be administered. The effect of a single dose of Vitamin K can be expected within 8-24 hours.
- **In the case of life threatening bleeding** refer to hospital for IV Vitamin K and further management

**Important Drug and dietary Interactions with Warfarin**

<table>
<thead>
<tr>
<th>MEDICATIONS</th>
<th>Increased bleeding risk due to increased effect of warfarin: ↑ INR</th>
<th>Decreased effect warfarin ↓INR</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Analgesics</strong></td>
<td>- acetaminophen*</td>
<td>- sodium valproate</td>
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<tr>
<td>- aspirin (high dose)</td>
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<tr>
<td>- salicylates, topical</td>
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<tr>
<td>- tramadol</td>
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<tr>
<td><strong>Antihypertensives</strong></td>
<td>- amlodipine</td>
<td>- ezetimibe</td>
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<tr>
<td>- amlopidine</td>
<td>- fenofibrate</td>
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<tr>
<td>- propafenone</td>
<td>- fluvastatin</td>
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<tr>
<td><strong>Antibiotics e.g.</strong></td>
<td>- amoxicillin</td>
<td>- gemfibrozil</td>
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<tr>
<td>- cephalosporins (some)</td>
<td>- paroxetine</td>
<td>- mexitilin</td>
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<tr>
<td>- isoniazid</td>
<td>- SSRIs</td>
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<tr>
<td>- fluquinocillines*</td>
<td>- fluoxetine</td>
<td></td>
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<tr>
<td>- macrolides*</td>
<td>- fluvoxamine</td>
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<tr>
<td>- metronidazole</td>
<td>- paroxetine</td>
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<td>- sulfonamides</td>
<td>- sertraline</td>
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<tr>
<td>- tetracyclines*</td>
<td>- citalopram</td>
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<tr>
<td><strong>Anticoagulants e.g.</strong></td>
<td>- Fluconazole</td>
<td>- aldactizone</td>
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<tr>
<td>- Coumadin</td>
<td>- Itraconazole</td>
<td>- corticosteroids (oral)</td>
</tr>
<tr>
<td>- Warfarin</td>
<td>- Ketoconazole</td>
<td>- proton pump inhibitors (PPI)</td>
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<tr>
<td>- mocapazole (oral, vaginal)</td>
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<tr>
<td>- Voriconazole</td>
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<tr>
<td><strong>Antifungals e.g.</strong></td>
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<tr>
<td><strong>Antihyperlipidemics</strong></td>
<td>- atorvastatin</td>
<td>- isolated case reports with</td>
</tr>
<tr>
<td>- ezetimibe</td>
<td>- fluvastatin</td>
<td>all PPIs</td>
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<tr>
<td>- fenofibrate</td>
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</tr>
<tr>
<td>- gemfibrozil</td>
<td>- simvastatin</td>
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<tr>
<td><strong>Other</strong></td>
<td>- allopurinol</td>
<td>- thyroid supplements</td>
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<tr>
<td>- atorvastatin</td>
<td>- sitostanol</td>
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<td><strong>Important Drug and dietary Interactions with Warfarin</strong></td>
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</tr>
</tbody>
</table>

**Increased bleeding risk due to non-warfarin mechanisms**

| Analgesics | - aspirin | - Cox II inhibitors |
| - nonsteroidal anti-inflammatory drugs | | |
| Anticoagulants/Antiplaquette agents | - Antidepressants | - selective serotonin reuptake inhibitors |