

Non Communicable Disease Control

Cardiovascular disease, type 2 diabetes, hypertension, asthma, COPD and identify cancers and eye conditions in adults

Case management desk guide for doctors

NCDC Programme, DGHS, Dhaka.

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Non Communicable Disease

**Cardiovascular disease, type 2 diabetes, hypertension, asthma, COPD and identify cancers
and eye conditions in adults**

CASE MANAGEMENT DESK GUIDE FOR DOCTORS

BANGLADESH

DGHS NCD Programme, Dhaka

Use this guide for any adult patient in a health centre or hospital out-patient department, who has:

Symptoms and signs suggestive of:

- **cardiovascular disease (CVD)**
Current symptoms need URGENT treatment or referral to hospital
- **hypertension**
- **diabetes:** increased urination, thirst, weight loss or recurrent infections
- **>40years and looks overweight:** conduct opportunistic screening
- **a history of CVD:** either attending for a follow-up appointment or previously diagnosed but stopped treatment
- **cardiovascular risk factors**
- **possible cancer**
- **asthma or COPD**
- **eye conditions**

Introduction

This desk guide is a concise 'quick reference' for doctors and other qualified clinicians. The guidelines are adapted to the Bangladesh context, including for use by the Upazila Health Complex (UHC), NCD 'corner' doctors, Diabetes Association clinics and other primary care physicians. The essential drugs and recommended tests are according to what is appropriate and feasible.

There is also a training module for PHC physicians. The initial assessment page (page 10-11) are designed to use with any adult presenting at an outpatient department or clinic. The objective is to enable effective opportunistic screening, diagnosis, treatment and follow-up care for patients with CVD, hypertension, type 2 diabetes, asthma, COPD and underlying risk factors. The desk guide covers how to diagnose, treat and systematically monitor patients with these diseases and prevent and identify complications. It indicates when to refer patients to a district hospital/ specialist, including for investigation and treatment of possible cancer. Non-complex cases should then be referred back to the nearest facility (e.g. UHC) for follow-up care. It will help to educate patients about lifestyle measures and specific treatments so individuals can take responsibility for their own care. This Case Management Desk Guide only includes brief lifestyle education messages. It is accompanied by a Health Educator's Desk Guide, for use by the nurse/health educator. In addition there are training modules and a facilitator's guide.

This desk guide incorporates recommendations from WHO's Package of Essential Non-communicable Disease Interventions (PEN) for Primary Health Care (WHO, 2010), WHO's CVD-Risk Management Package for low and medium resource settings, and the Global Guidelines for Type 2 Diabetes (IDF, 2012). It has been produced by thoroughly reviewing current guidelines, systematic reviews and other relevant literature. It includes recommendations within the National Guidelines for the management of hypertension in Bangladesh, DGHS and WHO 2013. Also see the 'Prevention, Early Detection and Management of Non-Communicable Diseases in Bangladesh: a training module for PHC Physicians' of the NCD programme.

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ASK THE SYMPTOMS, LOOK FOR SIGNS, AND DIAGNOSE THE ILLNESS

1. **Greet** the patient in a warm and welcoming manner, so as to put the patient at ease
2. **Ask** about the problem. During the first 'golden' minute¹, let the patient speak freely and ask open-questions to find out more details.
3. **Look**, listen and feel for signs relevant to the presenting problem
4. **Assess** for which symptoms and signs are present
5. **Diagnose**: consider possible diagnoses then decide the most likely diagnosis(es).
6. **Treat**: prescribe and explain. Adult doses are included, see a drug formulary for doses in children, as well as for contraindications, side-effects etc.
7. **Follow up** in 2 days for acute illnesses requiring antibiotics, in a week for chronic patients, then as required for drug resupply, and when stable clinical review may be 1 – 3 monthly.
8. **Provide preventive** care and advice and consider screening for common diseases: e.g.
 - Women (18-45) ask if they want FP advice, or if pregnant refer for antenatal care
 - Overweight and >40 years, check BP and glucose
 - Ask if smoke, advise to stop (see page 22)

In every consultation, once you've dealt with the problem, and the patient is then receptive, give some preventive advice related to the problem.

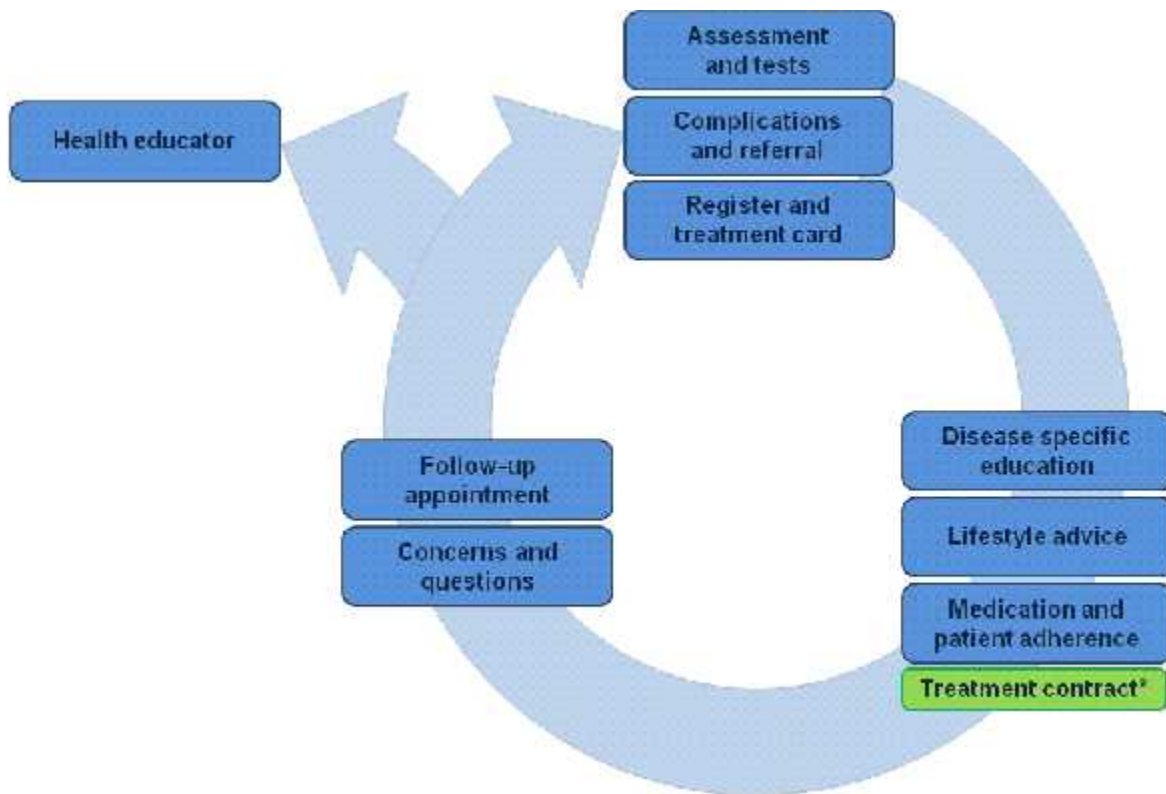
¹ **'Golden minute'**: The first minute of the consultation is a 'golden' opportunity to encourage the patient to explain in their own words their symptoms, and tell you their concerns. Use clear simple language, and use open questions e.g. 'How long has this cough been going on', 'What did the (e.g. pain) feel like'. If they don't volunteer the details you need, then ask in a non-leading way e.g. 'Was the pain coming and going or there all the time', or 'Was your cough present for more or less than 2 weeks? Also ask 'is there anything else you are worried about' – if they voice their concerns, and know you've considered them, then they are more likely to accept your explanation of the diagnosis and treatment.

THE NCD CARE MODEL

For each consultation with a patient with a chronic NCD condition, such as diabetes, follow the model as below. The model has 4 parts:

1. **consultation**: this involves assessing and investigating the patient, treating or referring them where necessary and completing a register and treatment card
2. **lifestyle advice**: this involves disease specific education, lifestyle advice, support for medication adherence and setting up a treatment contract (on the first consultation only)
3. **follow-up**: this involves assessing the patient at a follow-up appointment and addressing their concerns and questions
4. **counsel**: by the doctor, and then with a health educator/ counsellor if available, or counsel yourself. Counselling can occur less frequently after a few consultations.

We recommend that you complete each of the 4 parts as outlined. The first stage takes longer in the initial consultations.



Acronyms

ACEi	Angiotensin converting enzyme inhibitors
ARB	Angiotensin receptor blocker
BD	Twice a day
BG	Blood glucose
BP	Blood pressure
bpm	Beats per minute
CCB	Ca-Channel blocker
CHW	Community health worker
COPD	Chronic Obstructive Pulmonary Disease
CVD	Cardiovascular disease
eGFR	Estimated glomerular filtration rate (kidney function)
FBC	Full blood count
FBG	Fasting blood glucose
FEV ₁	Forced expiratory volume in 1 second
GTT	Glucose tolerance test
HbA _{1c}	Glycosylated haemoglobin (measures previous 3 months control)
ICS	Inhaled corticosteroids
IDF	International Diabetes Federation
IGT	Impaired glucose tolerance test
IM	Intramuscularly
IMAI	Integrated management of adult and adolescent illness
IV	Intravenously
K	Potassium
LABA	Long acting beta ₂ agonist
LAMA	Long acting muscarinic antagonist
Max	Maximum
MDI	Metered Dose Inhaler
MI	Myocardial infarction
PEFR	Peak expiratory flow rate
NICE	National Institute of Clinical Excellence
NGO	Non-governmental organisation
OD	Once a day
OGTT	Oral glucose tolerance test
QDS	Four times a day
RBG	Random blood glucose
SABA	Short acting beta ₂ agonist
SAMA	Short acting muscarinic antagonist
SOB	Shortness of breath
SpO ₂	Oxygen saturation
SR	Slow release
TB	Tuberculosis
TDS	Three times a day
TIA	Transient ischaemic attack
UHC	Upazila Health Complex
WHO	World Health Organisation
Yrs	Years

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ASSESSMENT OF PRESENTING COMPLAINTS

Ask the patient about:

- the presenting problem – allow them to describe it in their own words - as with the 'golden minute' above
- the duration of symptoms e.g. if cough, is it more than 3 weeks?
- previous episodes – are symptoms worse at night or early in the morning?
- any other symptoms or concerns relevant to the presenting problem e.g. fever or weight loss?
- past medical history: including CVD, diabetes, kidney disease, asthma etc.
- lifestyle risk factors: smoking, obesity
- family history of CVD, high cholesterol, diabetes (close relative < 50 years), asthma
- current medications

If suspected CVD, hypertension, diabetes, COPD also ask if they have had:

- any pain/pressure/heaviness in their chest, which:
 - lasted more than 30 minutes (heart attack)
 - is brought on by walking/exercising and goes away after resting (angina)
- one-sided: vision loss, weakness/ numbness of the face/arm/leg (TIA/Stroke)
- breathing difficulty (worse when lying flat) and/or ankle swelling (heart failure)
- pain in the legs when walking, relieved with rest (peripheral vascular disease)

Consider to refer urgently to the hospital if there are any symptoms now

If previous symptoms, or if a known diagnosis of CVD.

Test for diabetes if patient has any:

- thirst and frequency of urine (and dipstick urine for leucocytes and nitrites)
- unexplained weight loss
- feeling weak, tired all the time
- recurrent infections; vaginal/underarm thrush, skin boils
- "pins and needles" in the feet

If patient is presenting with other symptoms such as cough, fever, diarrhoea:

- <2 weeks: consult medical treatment guidelines
- >3 week history of cough: also send 2 sputum samples to the lab for TB microscopy, and see section below on COPD and asthma

EXAMINE THE ADULT PATIENT

If patient **looks very ill** check signs of severe illness and if any signs as below:

- respiratory rate >20/min (6-12 years 30)
- pulse >100 bpm (6-12 years 120)
- shock e.g. BP <90mmHg systolic
- very high BP >200mmHg systolic or >120mmHg diastolic
- fever >102°F (39°C),
- abdominal pain and guarding, chest pain, shortness of breath
- altered consciousness, low/ high glucose <4, >20mmol/l (<72, > 360mg/dl)

If present, give emergency medical care and consider urgent admission to hospital/urgent referral.

If **no signs** of severe illness examine as relevant to the presenting problem.

If a cough or wheeze, ask to remove their shirt, look and listen to chest and count the respiratory rate: > 20/min (6-12 years 30) is an early sign of pneumonia – which may occur as an acute on top of a chronic NCD e.g. COPD or lung cancer.

Check waist circumference if looks overweight, if waist >102cm (m) or >88cm (w), - explain obesity risks, send to health educator.

Check BP if: >40 years, or other risk factors or headache, and,

Check fasting plasma blood glucose if:

- symptoms of diabetes (page 10)
- >40 and family history of diabetes or CVD
- BP > 140/90
- personal history CVD, renal disease or TB
- lifestyle risk factors: age >40 **and** if overweight/ obese or smoker
- is pregnant (if FBG raised, refer)

If an eye problem – see page 15

If weight loss, change in bowel habit (> 50 yrs) etc– see ‘consider cancer’ (page 12 - 14)

Anaemia and/or under nutrition: investigate cause, treat, and discuss what healthy foods are available and affordable.

Women: *consider the whole needs of an NCD patient, including:*

If abnormal bleeding, refer to gynaecologist

If pregnant arrange antenatal care. If not pregnant, discuss contraception wishes: pill, injectable, IUD, implant and refer to UFPO or FWV

Consider Cancer

If any symptom or sign mentioned in the 'consider cancer' (page 14), and/or any of the following (otherwise unexplained symptoms):

General:

- Weight loss
- Prolonged or frequent fever, or drenching night sweats
- Lymph nodes if >2cm/ widespread/ increasing in size or persist for >6 weeks

Chest:

- Persistent (>3 weeks) cough/ hoarse voice/chest and or shoulder pain/difficulty breathing/finger clubbing
- Coughing up blood

Gastro-intestinal:

- Progressive difficulty in swallowing
- Persistent (>6 weeks) change in bowel habits, loss of appetite, feeling full Persistent (>3 weeks) abdominal distension, pain
- Passing bloody/blood stained/black stools
- Abdominal or pelvic mass
- Persistent (>3 weeks) vomiting
- Abnormal bleeding e.g. in stool, urine, sputum or vomit

Gynaecological:

- Abnormal vaginal discharge (may be blood stained or foul smelling)
- Abnormal vaginal bleeding: post-coital, between menstrual cycles, post-menopausal
- Urinary urgency, frequency or obstruction
- Vulval lump or discharge

Testicular mass or swelling

Skin, ENT:

- Unexplained anaemia or bruising
- Pigmented skin lesions which have an irregular shape or colour or are increasing in size, oozing or inflamed
- Non healing skin lesions, most commonly on head, face, hands, which are growing or ulcerate
- Unexplained red or white patches in the mouth , especially if painful, swollen or bleeding
- Unexplained persistent sore throat, especially if a smoker
- Thyroid mass
- >4 week history head or neck pain with earache and normal ear examination

Head and skeletal:

- Persistent headache esp. if associated with vomiting, neurological symptoms or headache altered by posture (worse in upright position)
- Bone pain, especially at night.

If unintended weight loss

Ask patients if they have lost weight, ask if their clothes still fit or compare current weight with previous records if available

If weight loss of >10% or clothes no-longer fit, this is significant and needs further investigation.

Ask if they have intentionally lost weight. If not, explore further

Exclude TB (2 sputum smears etc.), and diabetes (RBG). Also ask about diarrhoea and vomiting; if severe or > 2 weeks investigate and/or refer.

Consider:

- Anxiety and depression, ask about other relevant symptoms (consult medical guide), diagnose, treat or refer
- Sore mouth or difficulty swallowing; examine and consider referral.
- If pulse >100, tremor, hair loss, irritability, dislike of hot weather, +/- thyroid enlargement - consider thyroid disease - refer.
- If no specific cause found, consider cancer, see previous page (page12) and table below (page 14)

Consider cancer

<p>Abnormal vaginal bleeding (after sex, inter menstrual, abnormal vaginal discharge, painful coitus, vaginal mass).</p>	<p>Breast: lumps, swelling or nipple discharge, skin &/or nipple retraction. Axillary lymph nodes</p>	<p>Urinary symptoms in men > 45 yrs (urgency, hesitancy, difficulty passing urine)</p>	<p>Cough >3 weeks, blood-stained sputum, chest pain, history of smoking.</p>
↓	↓	↓	↓
<p>Refer or Do a speculum examination</p> <p>Consider/ treat STI if associated lower abdominal pain, but if not improved or there's a vaginal mass, suspect CaCervix. Refer</p>	<p>Examine breasts/ axillae for above signs.</p> <p>If present, refer for U/S scan (Mammogram) & biopsy to diagnose or exclude breast cancer.</p>	<p>Do digital rectal exam for prostate.</p> <p>If exam is normal, send for pelvic U/S to rule out BPH, and consider treating as STI.</p> <p>If hard, irregular or nodular prostate, suspect prostate Cancer and Refer.</p>	<p>Do a chest exam, exclude TB (2 sputum smears), and chest X-ray. Educate on smoking cessation. Consider lung cancer and refer.</p>

<p>Change in bowel habit > 50 year old (either constipation or diarrhoea). Bloody or black stools. Refer. [ask if a tender anus; look for piles or fissure - treat].</p>	<p>Night sweats (drenching), fever, unexplained weight loss, (B symptoms), lymphadenopathy, unexplained anaemia, unprovoked bleeding.</p>	<p>Abdominal pain/swelling, Jaundice and skin itching, tea coloured urine.</p>	<p>Mouth problem, any of: Ulcer (not injury), white or red patch? Fixed lump or, painful to open mouth, numbness in mouth. If any:</p>
↓	↓	↓	↓
<p>If a mass on abdominal or rectal exam.</p> <p>Consider bowel cancer.</p> <p>Refer for surgeon to biopsy/for diagnosis</p>	<p>Consider lymphoma or leukaemia</p> <p>Do FBC and differential count, peripheral film</p> <p>Refer for bone marrow and lymph node biopsy.</p>	<p>Consider liver cancer.</p> <p>Refer for U/S scan and biopsy, Hep B and Hep C screening and treatment in hospital.</p>	<p>Consider mouth cancer, refer.</p>

When you refer, discuss with the patient how they will get to the hospital they are referred to.

If vision or eye problem

Ask for how long?

< 2 weeks (acute):

- Sight reduced, or red or painful? Injury?
- Flashes of light or black spots, halos or rainbows seen?

If a red irritated conjunctiva (but not painful, no loss of sight), conjunctivitis is likely:

- apply Chloramphenicol eye drops, 2 drops, 6 times a day for 5 days

If history of injury, apply fluorescein, look with an ophthalmoscope/ light - if a ulcer or foreign body is seen, then:

- apply chloromycetin eye ointment, apply an eye patch and refer

If sudden loss of vision:

- or hazy or blurred; flashes of light or black spots; halos or rainbows; or in one eye:
 - urgent referral to ophthalmic specialist for serious eye problem e.g. glaucoma

> 2 weeks (chronic) reduced sight: difficult reading or unclear in the distance?

If not red, painful or other signs - just long standing poor reading or distance vision

- send for eye test and/or select glasses

If a hypertensive or diabetic or cataract or retinopathy seen:

- refer to the ophthalmic surgeon

HYPERTENSION

Diagnose hypertension

If BP > 140/90 mmHg recheck after sitting for 5 minutes

Advice lifestyle changes for all patients with hypertension (page 20)

Follow up all patients until BP target reached; see more frequently if severe hypertension or complications

Once BP stable, follow up can be every 3 months

BP < 140/90: No hypertension

- Give brief lifestyle advice
- Review in 5 years

BP 140-159/ 90-99: Stage 1 hypertension

- Start drug treatment now if a history of a CVD e.g. angina, or has diabetes or kidney disease or has two CVD risk factors:
 - Male
 - Obesity
 - Smoker currently
 - Age > 60
 - Family history of CVD < 50 years in a first degree relative

If **no** CVD and low CVD risk – advise lifestyle changes (page 20) and review BP in 3 months. If BP is still high, start drug treatment.

BP 160-179/ 100-109: Stage 2 hypertension

- Advise lifestyle change and start drug treatment immediately

BP > 180/ 110: Severe hypertension

- Start drug treatment immediately and/or
- Refer to hospital

Age < 40 and BP >140/90: Refer for investigation of secondary hypertension.

All do a random (if high then fasting) blood glucose, and manage as below

Type 2 diabetes and hypertension

BP >140/80:

- Advise lifestyle change (page 20) and start anti-hypertensive immediately (page18)

Target BP levels

Hypertension only < 140/90 mmHg

Hypertension + diabetes < 140/80 mmHg

Hypertension + diabetes

+ kidney/eye disease

OR history of TIA/stroke <130/80 mmHg

Investigations

Check for the following in people diagnosed with hypertension:

End organ damage

- Urine dipstick for blood and protein (kidney disease)
- Consider an ECG

Cardiovascular risk

- Check fasting cholesterol/lipids (if available)
- Check fasting glucose

Manage hypertension

Anti-hypertensive drugs

- If possible, offer drugs to take only once per day
- Drugs which are available in the UHC pharmacy/ affordable
- Start with lowest dose
- Increase doses step by step to maximum **tolerated** dose to achieve BP control
- See monthly until stable, then every 3-6 months; re-check BP and encourage lifestyle changes
- Monitor potential side effects. If present, lower the dose or change the drug
- If on maximum, or highest tolerated dose, and BP not controlled, then add another drug
- Drugs available include to use are: ABCD, ie: ACEi, Beta Blockers, Calcium Channel Blockers or Diuretics (thiazide). But ACEi are more costly and not available in the UHC.

Step 1: Add thiazide-like diuretic

Hydrochlorothiazide 12.5mg (starting dose) once daily

If BP not controlled, increase Hydrochlorothiazide to 25mg once daily (50mg maximum dose)

If BP still not controlled go to step 2

Step 2: Add a calcium channel blocker (CCB) e.g. Amlodipine initially 5mg, can increase to 10mg (or a B blocker e.g. Atenolol)

If BP still high increase dose step by step to maximum tolerated dose

If BP still not controlled go to step 3

Step 3: Add a third drug; whichever not used in step 2

Step down: After 1 year, and with BP having reached the target, consider *slowly* stepping down the dose (and perhaps a drug step) – especially so if the patient has lost weight. After 2 weeks reassess the BP. If BP rises above the target then return to the earlier step/dose.

Refer to hospital if:

- BP > 200/120
- Pregnant
- Symptomatic of CVD
- BP still >140/90mmHg despite 3 drugs and lifestyle advice
- Urine dipstick positive (possible kidney disease) *if available*:
 - microscopic haematuria
 - proteinuria on 2 or more occasions

Special circumstances in hypertension

Diabetes, impaired glucose tolerance, kidney disease, micro-albuminuria/ proteinuria

Step 1:

ACEi (if available)

If BP not controlled, increase dose step by step

If BP still not controlled, add step 2 drugs

Step 2: Add either thiazide diuretic or CCB

If BP remains uncontrolled, increase dose step by step

If BP still not controlled, add step 3 drugs

Step 3: Add whichever drug class not used in step 2

Other special circumstances

The following groups should be treated (or referred to hospital) as follows:

- Micro-albuminuria or kidney disease - refer (or manage as above)
- Previous heart attack (MI) – ACEi and beta blocker
- Angina – beta blocker or CCB
- Heart failure –beta blocker, ACEi +/- furosemide
- Woman who might become pregnant: CCB
- Asthma or COPD, avoid beta blockers (especially together with thiazides)
- Pregnancy – refer, for methyldopa or CCB (not ACEi)

Monitoring

- Monitor for side effects
- If not available, refer to hospital for:
 - Check of kidney function before starting thiazide diuretics and then 6 monthly monitoring of kidney function after that
 - Check of kidney function before starting, and 2 weeks after starting or increasing the dose of an ACE inhibitor, and yearly after that.

Lifestyle advice and managing the patient

Give: **Lifestyle** advice, medication **adherence** and disease specific advice

Encourage them to attend with and use the help of their treatment supporter

Discuss the following with each patient: Give a lifestyle education leaflet

Weight:

Advise all overweight patients to lose weight by increasing physical activity and healthy eating. Aim for waist circumference <102cm in men and <88cm in women.

Healthy eating:

Encourage individuals to eat less fat and salt and to increase their intake of fruit and vegetables. Also encourage patients to eat three portions of fish a week.

Physical Activity:

Encourage existing activity and advise 30 minutes/day of physical activity

Smoking (if applicable):

Encourage all patients who smoke to give up smoking. Advise patients that quitting smoking is the single most important thing they can do to protect their heart and health.

Encourage all non-smokers not to start smoking.

Documenting

- Document results and management on treatment card and patient notes
- Make follow up appointment and document
- Set annual review date at hospital and document
- Add to NCD register

Give education on **medications and adherence** and disease specific advice e.g. for hypertension, see next page (page 21)

Education for all patients

Reinforce messages at all appointments.

Add additional information as required e.g. change in medication.

Use local, simple and clear language. Give the patient an education leaflet.

Ask patient to repeat key points and ask if they have any questions.

Send to see the health educator

Remind patient:

- name and dosage of each tablet
- to take tablets as prescribed, at the same time each day
- not to take someone else's tablets
- if they forget to take a tablet, not to take an extra dose next time
- only change tablets when the doctor advises them
- of side effects (page 36) and to tell the doctor if they experience any

Patient adherence

Explain to the patient the importance of attending clinic appointments and taking prescribed medication.

Discuss and ask them to sign the treatment contract.

Explain the importance of a treatment supporter.

Tell the patient that if they miss an appointment a reminder will be sent or an attempt to contact them will be made.

Give the patient an education leaflet.

Send the patient to the health educator.

Hypertension patient education

Inform patients:

- Hypertension is a life-long condition, but treatable/ controllable with lifestyle changes and medication.
- Diabetes and hypertension are linked diseases - patients with diabetes can develop hypertension and the other way around.
- A healthy diet, increased physical activity, no smoking are essential.
- Without treatment, there is increased risk of stroke, heart attack, vision problems, disease of the blood vessels, kidney failure and death.
- Can't give hypertension to others (but relatives/children are at increased risk).

Encourage patients to share the message about healthy eating and increased activity with their relatives, to reduce their risk of hypertension and other diseases.

GUIDE TO HELP PATIENTS STOP SMOKING

Advise all smokers to stop smoking or using other forms of tobacco.

Key messages:

- Giving up smoking is the most important thing you can do to protect your lungs, heart and health.
- If you continue to smoke:
 - your disease will be worse
 - damage to your heart and lungs will affect the activity you can do
 - you are more likely to have heart attacks, strokes, cancer (especially lung cancer), disease of the blood vessels and impotence (men).

Help the patient make a plan to quit:

- Set quit date.
- Ask the patient to monitor smoking for a week before the quit date to become aware of cues/triggers (times, places, activities, people) that stimulate their desire to smoke.
- Discuss ways of avoiding or reducing these cues/triggers.
- Ask patient to inform family and friends and ask for their support.
- Advise patient to remove cigarettes/tobacco/objects that remind them of smoking.
- Explain that the patient may experience withdrawal signs i.e. tiredness, sleeplessness and becoming irritable - this is normal, is worst for the first week, but then will become easier the longer they do not smoke.
- Advise the patient to not smoke even one cigarette and to record their progress.
- Ask the patient to remind themselves of all the reasons they want to be a non- smoker.
- Reinforce success and praise positive steps towards quitting.

Encourage rewards for positive changes:

- Encourage patient to put aside money usually spent on cigarettes to spend on treating themselves or their families.

TYPE 2 DIABETES

Diagnosing type 2 diabetes

Check plasma glucose – either random blood glucose (RBG) or fasting blood glucose (FBG)

Diagnose diabetes if:

- **FBG 7 mmol/L(126mg/dl)** or
- **RBG 11.1 mmol/L (200mg/dl), ONLY** if also in the presence of diabetes symptoms (increased urination, thirst or unexplained weight loss)

If **asymptomatic**, the **diagnosis should not be based on one test** but requires a confirmatory FBG test in the above range.

If **RBG is between 5.6 – 11 mmol/L (100 – 199 mg/dl)** do FBG the next morning, then:

Diagnose 'impaired fasting glucose' if FBG is between 6.1 - 6.9mmol/L (110-124mg/dl)

- Inform patient they may develop diabetes in the future
- Advise lifestyle changes (p20)
- Check blood glucose every year (or every 6 months if they have CVD)

If pregnant:

Consider gestational diabetes if FBG > 5.1 mmol/L (92mg/dl) and refer to relevant doctor

Managing diabetes

At every appointment:

- Ask patients to come fasted, do a FBG on arrival and then allow patients to eat whilst awaiting consultation
If not fasted, do RBG (preferably about 2 hours after eating)
- Check BP (see page 16 & 17)

Each consultation

- Advise lifestyle changes (see page 20)
- Give patient education (see page 21)

At diagnosis of diabetes

Usually, start with lifestyle change advice alone (not a drug initially) for 3 months. However also start with a drug, **IF** the glucose is too high [FBG >10 mmol/L (180 mg/dl)] or the patient is not committed to try lifestyle change alone for the first few months.

Decide target level for blood glucose reduction (a higher target level if elderly, end organ damage or unacceptable hypoglycaemia as a side effect)

	Normal	Target
Fasting blood glucose	5.5 mmol/L (99 mg/dl)	<6.5 mmol/L (117 mg/dl)
Random, i.e. post meal blood glucose	7.8 mmol/L (141 mg/dl)	<9 mmol/L (162 mg/dl)

Oral anti diabetic agent (ADA)

- Start with lowest dose and increase gradually to achieve control of glucose (BG) level
- Check contraindications (page 35)
- Monitor possible side effects (page 36)
- If BG not controlled, increase up to the maximum tolerated dose
- If BG still not controlled, add the next step drug, until BG controlled

Step 1: Add Metformin* (500mg tablet) once daily after dinner, review after 2 weeks

If tolerated, add 500mg tablet with breakfast, increase by a tablet every 2 weeks, up to a maximum of 1g twice a day.

Recheck fasting glucose each visit

If BG not controlled add step 2 drug.

Step 2: Add a sulphonylurea, e.g. **Glibenclamide** (5mg tablet, not if > 65 years old) once daily after **breakfast** (also use as step 1 if metformin contraindicated or not tolerated)

Review after 2 weeks, and recheck fasting glucose. If tolerated and inadequate glucose control, increase by one tablet every 2 weeks up to a maximum of 15mg (avoid if alternative available, or use a reduced dose in the elderly).

Educate about possible of hypoglycaemia, especially if elderly or kidney disease.

Other sulphonylurea options for step 2:

Gliclazide (80mg tablet or 40mg in elderly)

Glipizide 2.5-5mg once daily (max 40mg)

Glimeperide 1mg once daily (max 8mg), but is costly

If there is significant risk of hypoglycaemia (esp. in the elderly) with a sulphonylurea, or if a sulphonylurea is contraindicated or not tolerated, refer to the hospital.

Step 3: If BG not controlled, refer to hospital to consider insulin.

*Refer patients with diabetes to the hospital to have their kidney function assessed annually. The dose of metformin should be reviewed if the eGFR falls to <45ml/minute/1.73m² or serum creatinine rises to 1.3 mg/dL(>114.92µmol/L). Metformin should be stopped if eGFR falls to <30ml/minute/1.73m² or serum creatinine rises to 1.5 mg/dL (>132.6µmol/L) for male and 1.4 mg/dL for female(>123.8 µmol/L)

Follow up

- Check FBG (or if not fasted, then RBG), BP and weight at each appointment
- If BG at target level, follow up 3 monthly
- If BG not at target level: review adherence, side effects, adjust dose and follow up monthly; consider referral if still not at target.

Also:

- Ask if any new or worsening symptoms e.g. vision change, pins and needles/numbness or foot problems. Examine if symptom present.
- Ask type of contraception and whether planning pregnancy. **(all female patient of reproductive age)**
- Reinforce the lifestyle, disease and adherence advice; refer to counsellor/ educator.

At diagnosis, and every year:

- Ask about change to vision/vision loss; use vision chart to check visual acuity (corrected with glasses), look for cataract and refer to hospital/ ophthalmologist for assessment of retinopathy
- Ask about any foot problems and assess the condition of the feet; check for any foot deformity, ulcers, infection, foot pulses and footwear.
- Ask about pins and needles, numbness in legs and poor erections; check for peripheral sensation loss with 10g monofilament and tuning fork.
- Assess kidney function (including albumin: creatinine ratio), or refer to hospital to be assessed
- Check fasting Lipid profile
- Ask type of contraception and whether planning pregnancy.
- Discuss knowledge and beliefs of diabetes, foot care, glucose monitoring.
- Discuss progress with lifestyle changes.

Send to the health educator.

Refer to relevant doctor/hospital/nearby BADAS center any patient (at any visit) with:

- pregnancy (for review and likely switch to insulin)
- leg ulcers and/or infection
- vision loss (retinopathy, cataract)
- pins and needles/numbness in hands and feet (neuropathy).
- urine dipstick +ve
 - proteinuria on 2 or more occasions
 - haematuria in absence of infection
- any child/young person diagnosed with diabetes (likely type 1 diabetes; needs urgent referral)

Insulin

(refer to relevant doctor/hospital or the BADAS centres to initiate)

Insulin is started when not controlled on oral drugs. When adding insulin, metformin can be continued but sulphonylurea is phased out.

When initiating insulin review after 3 days, weekly, then monthly, then when controlled, 3 monthly. Do a FBG at every visit.

When monitoring, if available ask/ ring the doctor for advice.

If problems, and feasible for the patient to go, refer to hospital.

Before starting insulin consider:

- Is patient/treatment supporter willing to start insulin? Do they have good vision, use of hands to use appropriate device?
- Can insulin be stored at home? (Cool dry place/fridge away from heat sources)
- Is glucose monitoring available at clinic or home?
 - If no, use long acting insulin once a day.
 - If yes, use in the following order until BG controlled:
 - long acting OD
 - mix of short/intermediate acting BD
 - short acting TDS
 - short acting TDS and long acting OD

Insulin dosage and frequency depends on:

- Their job, meal and sleep times, weekend activities, etc.
- Weight – heavier people need more insulin
- Duration/phase of diabetes – more insulin if advanced diabetes
- Sites for injection (as preferred by patient):
 - subcutaneous injection into Abdomen; or
 - upper and outer part of thighs,
 - upper and outer part of arm (deltoid area),
 - upper outer buttocks
 - rotate injection sites to reduce insulin injection site damage
- Increased physical activity –reduce the insulin
- Infections/ illnesses – increase insulin (but reduce insulin if reduced food intake e.g. as reduced appetite)
- Other treatments (beta blockers etc.)

Things to tell your patients taking insulin

- The sites they may choose to inject (page 27).
- Inject at 90 degree angle (or at 45 degrees if patient is thin).
- Patients are more likely to get low glucose (hypos) with insulin
- Patients are more likely to gain weight.
- Patients may get swollen ankles.
- It is important to take insulin even if unwell or not eating, but the dose may need to be altered.

Diabetes Foot care

At diagnosis and annual review, or more frequently if known problem:

- Inspect both feet for any ulcers or deformity
- Test foot sensation with monofilament and tuning fork
- Palpate for foot pulses (both arteria dorsalis pedis and posterior tibial).
- Inspect footwear

If any ulcer or new foot deformity, refer to relevant doctor/hospital.

If reduced sensation or absent foot pulses are high risk of acquiring foot disease.

Foot care education

- Do not walk with bare feet
- Make sure shoes fit properly and do not cause shoe bites. Advise to buy footwear in the evening when foot size is biggest
- Wash and dry your feet regularly
- Check your feet regularly for any broken skin. If any new broken skin, go to the UHC or other health facility to be seen, even if painless
- Do not cut calluses or corns – go to the clinic for treatment
- If you have numbness in feet, be careful near fires and hot water

Diabetes patient education

Inform patient:

Diabetes is when the body cannot properly use the foods we eat, especially sugar due to lack of insulin.

- Treatment is life-long.
- A person cannot give diabetes to another person. However, relatives, particularly their children, are at increased risk and they must take preventive measures, as advised to the patient.
- Blood sugar control, a healthy diet and enough physical activity are essential.
- If blood glucose is not controlled, it can cause blindness, kidney failure, heart disease, strokes, diseases of your blood vessels, impotence, and leg ulcers.

- Diabetes and hypertension are linked diseases.
- Patients with diabetes can develop hypertension and the other way round, especially if overweight.
- High blood sugars in pregnancy can damage unborn babies.
- Patients with diabetes have a high risk of infection, including TB, and any cough of more than 2 weeks **must be** investigated.

Lifestyle advice

Give lifestyle advice, as page 20.

Encourage patient to:

- reduce weight, if overweight
- eat a healthy balanced diet
- take regular physical activity (30 minutes per day)
- stop smoking

Hypoglycaemia

Risk of hypoglycaemia (too low blood sugar) if:

- on insulin and sulphonylureas
- drinking alcohol
- missed, small or delayed meals
- vigorous activity

Symptoms of hypoglycaemia

- headache
- dizziness
- anxiety
- weakness
- shakiness
- fast heartbeat
- hunger
- irritability
- cold sweat (moist skin)
- confusion
- loss of consciousness

If alert:

- Drink a sugary drink, eat a sweet or a tablespoon of sugar/honey (placed under the tongue), and then a snack e.g. bread

If not alert/unconscious:

- If available give hypertonic glucose IV
- **Urgently refer/admit to hospital.**

Hyperglycaemia

If BG ≥ 20 mmol/l (360 mg/dl) refer urgently to hospital. Before they leave:

If possible, give IV drip quickly, 1 litre of normal (0.9%) saline over 30 mins - 1 hour.

Encourage them to drink water, as much as possible, on the way if the patient is conscious

Treatment supporter

Explain to patient why a treatment supporter is important:

- Treatment is life-long, support is essential.
- It can be difficult to remember to take tablets regularly, but it is vital to continue treatment.
- A treatment supporter is someone they can talk to easily and who will encourage them to continue with treatment.
- It is their choice who will be their treatment supporter. The treatment supporter will be called if they cannot be contacted or if there is a problem.

Discuss who would be the best treatment supporter. It must be someone concerned, trusted and committed to providing support.

Help the patient choose someone e.g. family member, friend or community volunteer. If patient cannot decide, suggest someone.

Record name, address and mobile phone number of patient and treatment supporter on the patient's treatment card.

Ask the patient to bring treatment supporter with them for all clinic visits, to learn about the illness, treatment and their role.

Advise treatment supporter to:

- meet with the patient often; try to make this an enjoyable time. If possible, meet at the time the patient takes their tablets to see them taking the tablets as prescribed.
- look at tablet pack to check the patient is taking tablets correctly.
- inform health worker if the patient stops taking the tablets.
- encourage the patient to be active, eat healthily, stop smoking and attend appointments.

Patient adherence

- **Explain** to the patient the importance of attending clinic appointments and taking prescribed medication.
- **Discuss and sign** the treatment contract.
- **Explain** the importance of a treatment supporter.
- **Tell** the patient that if they miss an appointment a reminder will be sent or an attempt to contact them will be made.
- **Give** the patient an education leaflet.
- **Refer** the patient to the health educator.

Appointment reminders

If an individual fails to attend a review appointment, **take action**.

- **Phone** patient and encourage them to return.
- **Phone** treatment supporter and ask them to remind patient.
- **Ask** someone e.g. CHW to do a home visit if the patient does not return.

If patient is not adhering to treatment or attending appointments:

- do not criticise
- discuss any concerns or difficulties
- encourage the patient and treatment supporter to continue with support and attending appointments
- remind patient of treatment contract and the importance of continued medication

If patient has stopped medication:

Check BP (see page 16-17) and do lab tests as appropriate.

If results are high, review and start again as if new patient.

CVD preventive treatment

The following groups should be assessed as high risk of cardiovascular disease and treated with a statin (e.g. simvastatin 20mg daily). Patients with:

- Known CVD e.g. previous heart attack, angina (**secondary prevention: simvastatin 80mg daily**)
- Age ≥ 75 years
- Total cholesterol ≥ 8mmol/L (320mg/dL) if available
- Persistently raised BP > 160/100 (despite treatment)
- Kidney disease
- Aged ≥ 40 with diabetes
- Aged < 40 with diabetes and one *other risk factor
- Aged >50 and one *other risk factor
- Aged 40-50 with two *other risk factors

*other risk factors include current smoker (or significant smoking history), total cholesterol ≥ 6mmol/L or persistent blood pressure >140/90, family history of CVD in a first degree relative <50.

If CVD risk - and can afford - discuss taking a daily statin. Also consider aspirin.

Aspirin

Consider prescribe ASPIRIN for the primary prevention of CVD - not routinely, as:

Aspirin 75mg once daily should only be prescribed for patients with high blood pressure, **when** BP is controlled to <145/90, **AND also** who:

- have a history of CVD, or
- have chronic kidney disease, or
- are > 50 years and have a 10 year cardiovascular risk of at least 20% (as above)

And only if

- no contraindications e.g. previous gastrointestinal bleeds (black stools) or recent surgery

Drugs for hypertension

ACE inhibitors (ACEi)

Enalapril 5mg OD (max 40mg OD) (WHO 2009)

Alternatives: Captopril 12.5mg BD (max 50mg BD)

Ramipril 1.25mg OD (max 10mg OD)

Lisinopril 5-10mg OD (max 80mg OD)

(Joint Formulary Committee 2011)

Angiotensin receptor antagonist(ARB)

Losartan 50mg OD (max 100mg OD)

Alternatives: Candesartan 8mg (max 32mg OD)

Irbesartan 150mg (max 300mg OD)

Valsartan 80mg OD (max 320mg OD)

(Joint Formulary Committee 2011)

Calcium channel blocker (CCB)

Amlodipine 5mg OD (max 10mg OD) (WHO 2009)

Alternative: Nifedipine retard 20mg daily (max 80mg)

(Joint Formulary Committee 2011)

Diuretics

Hydrochlorothiazide 12.5mg daily (max 50mg daily)(WHO 2009) or Bendroflumethiazide 2.5mg daily (max 5mg daily).

Chlorthalidone 12.5- 25mg OD or Indapamide 1.5-2.5mg OD

(Joint Formulary Committee 2011)

If heart failure, use Furosemide. 20mg daily (max 80mg).(WHO 2009). If K^+ <4.5mmol/l and optimum eGFR consider Spironolactone 25mg daily(WHO 2009).

Beta Blockers (BB)

If history of angina/MI add Atenolol^{2nd} line 50mg daily (max 100mg) (WHO 2009)

If pregnant, Methyldopa 250mg BD/TDS (max 3g/daily) (WHO 2009)

Drug contraindications

Drugs	Contraindications
Thiazide diuretic	gout lipid disorder
Beta blockers (BB)	asthma chronic obstructive airways disease second/third degree heart block bradycardia<50/min Raynaud's Peripheral vascular disease
ACE-inhibitor (ACEi)	pregnancy hyperkalaemia bilateral renal artery stenosis angioedema
Ca-Channel blocker (CCB)	congestive heart failure severe left ventricular dysfunction aortic stenosis second/third degree heart block
Aspirin	peptic ulcer (and caution if dyspepsia)
Metformin	severe renal damage (eGFR<30) hepatic disease cardiac failure chronic hypoxic lung disease (severe COPD)
Sulphonylureas	[Glibenclamide OK] others pregnancy or breast feeding cautious use in elderly due to risk of hypoglycaemia

Major side effects

Drugs

Thiazide diuretic

Major side effects

muscle weakness (low potassium)
increased serum cholesterol
impaired glucose tolerance/diabetes
impotence
fatigue

Beta blockers (BB)

worsening of congestive heart failure
swelling of face, mouth, hands or feet
difficulty breathing (COPD and asthma)
worsening calf pain (peripheral vascular disease)
hypoglycaemia (can be masked in diabetes)
weight gain
depression
impotence

ACE-inhibitor (ACEi)
(especially with first
dose)

worsening dyslipidaemia in diabetes
cough
difficulty in swallowing or breathing
allergic reaction (sneezing, nasal congestion, itching or skin
rashes)
abdominal pain or swelling
fainting, drowsiness, weakness or fatigue
fast heartbeat
headache
nausea or vomiting
diarrhoea
abdominal cramps, pain or distension
joint and chest pain
foetal abnormalities
high blood potassium
hypoglycaemia

Ca-Channel blocker
(CCB)

ankle swelling
constipation
fluid retention
heartburn
stomach pain

Aspirin

heartburn
nausea and vomiting
gastrointestinal tract complications, bleeding and ulcers
haemorrhagic stroke
aspirin-induced asthma

Metformin

Diarrhea
Nausea
Loss of appetite

Sulphonylureas

Hypoglycaemia
weight gain

Cough, difficulty breathing or wheeze in adult patients or adolescents
aged over 12 years

Assess for asthma/COPD and exclude other diseases

For symptoms and signs suggestive of a cause other than asthma or COPD, see page 65.

Consider asthma if:

- Young patient (though can also be an older adult)
- More than one of the following symptoms – wheeze, cough, difficulty breathing, chest tightness, particularly if:
 - frequent and recurrent
 - worse at night and early in the morning
 - symptoms variable from day to day
 - worse after exercise or other triggers such as after exposure to animals, cold or damp air, smoke; or after taking aspirin or beta blockers
- Personal or family history of hay fever, eczema or asthma (atopic disease)
- Widespread wheeze heard when listening to the chest, often worse on expiration
- Patient's symptoms improve in response to inhaled salbutamol

Clinical features which make asthma less likely:

- Symptoms only when patient has a cold/upper respiratory tract infection
- Chronic cough, productive of sputum
- Dizziness, light-headedness or peripheral tingling sensation (paraesthesia)
- Normal examination when symptomatic e.g. no wheeze heard
- Normal peak expiratory flow rate PEFr (see page 40) when symptomatic
- No response to inhaled salbutamol
- Heart disease

Consider COPD if:

- Over 35 years old and current, or ex-smoker with one or more of:
 - Shortness of breath on exertion
 - progressive persistent shortness of breath (rather than on/off i.e. episodic)
 - Chronic cough
 - Regular sputum production
 - Recurrent chest infections or 'bronchitis'

Clinical features which make COPD less likely:

- Chest pain
- Haemoptysis
- Significant improvement in breathlessness after salbutamol
- Wake at night with cough/wheeze

Consider alternative diagnoses (see page 67)

More common with asthma

Table 1: Comparison of COPD and asthma

	COPD	Asthma
Symptoms <35 years	Rare	Common
Smoking history	Nearly all	Maybe
Breathlessness	Persistent and progressive Poor response to salbutamol	Variable throughout the day and from day to day (episodic) Good response to salbutamol
Chronic cough with sputum production	Common	Uncommon
Waking at night with wheeze/cough	Uncommon	Common

Consider TB

If cough > 3 weeks screen for TB, send to the TB corner for 2 sputum smears. Suspect pulmonary TB if prolonged cough, weight loss, night sweats, etc. See the national TB guidelines.

Consider lung cancer

Refer adults over 40 years with a persistent (>3 week cough), and current or ex-smoker, and/or:

- coughing up blood
- breathlessness (dyspnoea)
- loss of weight/appetite
- long-standing respiratory problems with exacerbation of existing symptoms
- chest pain (non-cardiac) / shoulder pain (with no obvious cause)
- hoarseness
- chest signs
- features suggestive of metastasis from lung cancer
- finger clubbing or neck lymph glands.

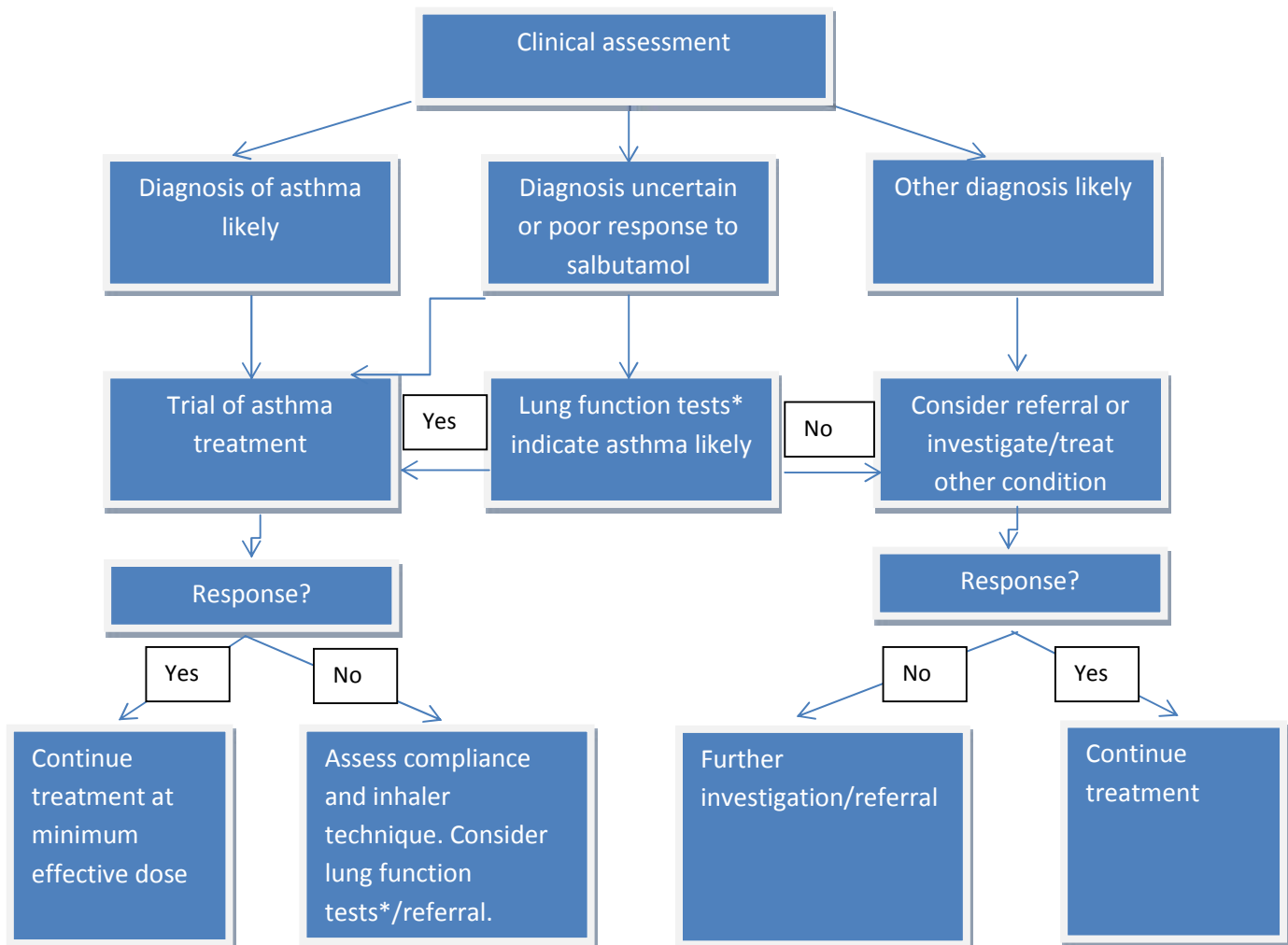
Refer for urgent chest X-ray

A normal X-ray is unlikely to be cancer - but it is possible, so if there is a high suspicion of lung cancer refer for further investigation in hospital. Chest X-rays suggestive of lung cancer include a pleural effusion and slowly resolving consolidation.

Diagnosing asthma

With a thorough history and examination, asthma can usually be classified into three groups:

- Diagnosis of asthma likely
- Diagnosis uncertain
- Other diagnosis likely



*The recommended lung function test is spirometry before and after bronchodilators (e.g. salbutamol). Where spirometry is unavailable peak flow measurements can be useful to determine if an asthma diagnosis is likely when:

- Day to day variation in PEFr is greater than 20% for at least 3 days in a week for 2 weeks OR
- Improvement in PEFr 10 minutes after 4 puffs of salbutamol through a spacer

Peak Expiratory Flow Rate (PEFR)

PEFR is the measurement of how much the patient can blow out of their lungs in one breath. However, it is not as accurate as spirometry.



There are guidelines for the “normal” values, which you can use to compare against the values your patient is able to achieve. You will find the EU scale here:

http://www.peakflow.com/pefr_normal_values.pdf

or

the Wright scale here: http://www.peakflow.com/top_nav/normal_values/PEFNorms.html

It is better to record their best PEFR, taken when **not** unwell/ wheezy, and then compare their existing PEFR with their best.

How to measure PEFR

1. Connect a clean mouthpiece.
2. Ensure the marker is set to zero.
3. Stand up or sit upright.
4. Take as deep a breath in as you can and hold it.
5. Place the mouthpiece in your mouth and form as tight a seal as possible around it with your lips (you can still breath through).
6. Breathe out (blow quickly and) as hard as you can.
7. Observe and record the reading.
8. Repeat the process 3 times and record the highest reading.
9. Note in a diary the reading to allow comparison with readings on other days.

Once you have discussed the process with the patient, you should show the patient how to perform the measurement. Do this by measuring your own PEFR.

Once the technique has been demonstrated, ask the patient to show you how they would perform the measurement themselves. Make sure they are doing it correctly, and correct any mistakes which they might be making.

Finish by asking the patient if they have any questions or concerns about either their asthma or taking their PEFR measurement.

Record on chronic disease card the likely diagnosis **e.g.** asthma

Assess asthma severity

- Mild intermittent:
 - symptoms occur two times or less a week
 - symptoms may occur only with exercise
 - no symptoms (asymptomatic) between attacks (exacerbations)
 - exacerbations brief

- Mild persistent:
 - symptoms occur more than twice a week but not everyday
 - exacerbations may affect activity

- Moderate:
 - daily symptoms
 - daily use of salbutamol
 - exacerbations affect activity
 - exacerbations two or more times a week

- Severe:
 - continuous symptoms
 - limited physical activity
 - frequent exacerbations

The aim of asthma treatment is control of the disease:

- No daytime symptoms
- No night time wakening due to asthma symptoms
- No exacerbations
- No limitations of activity including exercise
- Normal lung function (PEFR >80% predicted or best)
- Minimal side-effects from medication

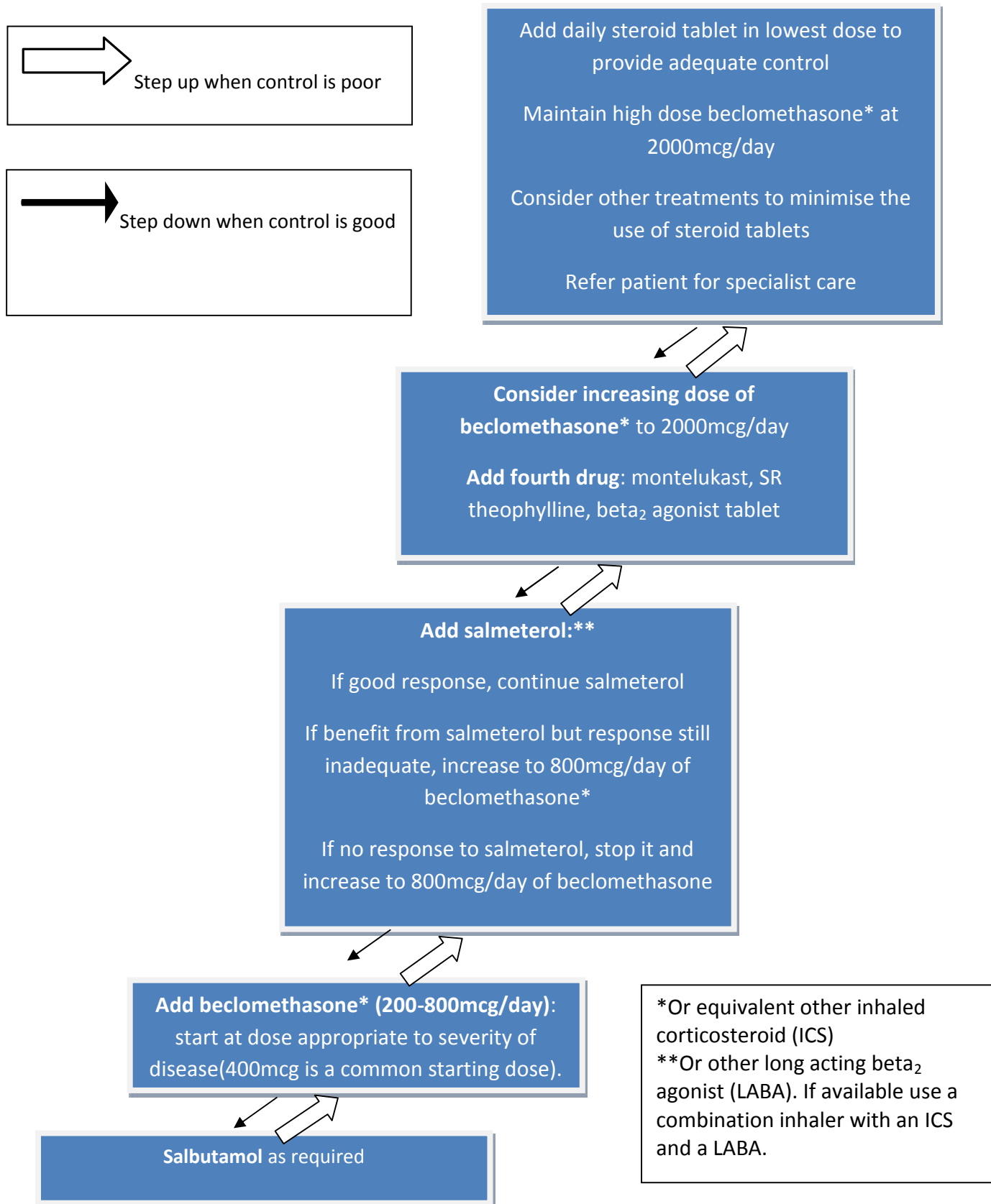
'Preventers and Relievers'

- Salbutamol (a short acting beta₂ agonist) is used when a patient develops symptoms of asthma, to relieve those symptoms.
- Medications known as 'preventers' are used daily to prevent the symptoms of asthma.
- Steroid inhalers are the most effective 'preventers' and should be started if patients are using salbutamol 3 times a week, are symptomatic 3 times a week, or are waking 1 times a week with asthma symptoms.
- For every step of the asthma treatment pathway, inhaled salbutamol can be used to relieve symptoms if they occur.

Use a stepwise approach for the treatment of asthma

1. Start treatment at the step most appropriate to initial severity
2. Achieve early control
3. Maintain control by:
 - Stepping up treatment if symptoms are not controlled
 - Poor control = symptoms 3 times a week or 1 night a week
 - Stepping down when control is good
 - If control is maintained for 3+ months, consider stepping down the regimen (first reduce the dose of beclomethasone and then salmeterol)
4. Before stepping up treatment, check adherence to current treatments, inhaler technique and identify and eliminate any trigger factors e.g. animal fur

Figure 1: Management algorithm for the management of asthma in adults and adolescents aged over 12 years



Exercise-induced asthma

- If a person has otherwise well-controlled asthma, but finds exercise-induced asthma to be a problem:
 - Tell patients to use salbutamol 10–15 minutes before the start of exercise and after 2 hours of prolonged exercise, or after exercise has finished.
 - Consider adding either a leukotriene receptor antagonist (montelukast) or a long-acting beta₂ agonist (e.g. salmeterol)

Delivery systems

- Only prescribe inhalers after teaching inhaler technique to all patients and once the patient has demonstrated a satisfactory technique. See page 61.
- If possible use a MDI (metered dose inhaler).
- Reassess inhaler technique at regular intervals.
- Consider the use of a spacer (especially for individuals with poor inhaler technique), but always ensure a spacer is compatible with the inhaler (see appendix B page 61).

Symptoms of an acute asthma attack

Moderate asthma exacerbation if:

- Increasing symptoms
- PEFr 50-75% best or predicted*
- No features of severe or life-threatening asthma (see below)

Severe asthma exacerbation if:

- Unable to complete sentences in one breath
- Breathing rate > 25 breaths/minute
- Heart rate >110 beats/minute
- Intercostal recession
- PEFr <50% of best or predicted*

Life threatening asthma exacerbation if:

- Heart rate <60 beats per min
- Silent chest (unable to hear breath sounds)
- Cyanosis
- Poor respiratory effort
- Confusion
- Exhaustion, altered conscious level
- PEF <33% best or predicted*
- SpO₂ <92%**

*PEFR calculated as a % of the patient's best previous value is most useful but if this is unknown, PEFr as a % of predicted gives a rough guide.

** If oxygen is available, maintain oxygen saturations at 94-98%

Treatment of an acute asthma attack

- ⇒ For a mild/moderate exacerbation, give inhaled salbutamol: 6-10 puffs via MDI, with spacer if available (see 'how to make plastic bottle spacer' in appendix B page 61)
- ⇒ For acute severe or life threatening exacerbations give a salbutamol nebuliser (5mg) – this should be oxygen driven if available
- ⇒ If nebuliser unavailable, give inhaled salbutamol: 10 puffs via MDI, with spacer
- ⇒ Repeat salbutamol nebuliser/inhaler every 15-30 minutes according to response
- ⇒ Salbutamol nebulisers can be given continuously if there is a poor response to the first nebuliser
- ⇒ If available, give nebulised ipratropium bromide to patients with an acute severe or life threatening exacerbation, or to patients with a poor response to initial treatment
- ⇒ Give 40mg-50mg prednisolone orally as a single dose. If acute severe or life threatening exacerbation, consider a single dose of 200mg IV hydrocortisone.

If patient does not respond, consider status asthmaticus and refer urgently.

Moderate exacerbation

If the patient has a moderate exacerbation of asthma and responds well to treatment, they do not need to be referred to a hospital.

Continue prednisolone 40-50mg daily for at least 5 days.

Advise patients to continue 6 puffs of salbutamol every 4 hours for 2 days and then reduce to 4 puffs of salbutamol every 6 hours for 2 days. After that, advise them to return to using the salbutamol inhaler as required.

Acute severe exacerbation

Criteria for discharge:

- Good response to treatment
- No features of acute severe asthma after treatment
- PEFr >75% of best or predicted 1 hour after treatment
- Never any features of life threatening asthma

Continue prednisolone 40-50mg daily for at least 5 days.

Advise patients to continue 6 puffs of salbutamol every 4 hours for 2 days and then reduce to 4 puffs of salbutamol every 6 hours for 2 days. After that, advise them to return to using the salbutamol inhaler as required.

Life threatening exacerbation

After initial treatment and improvement, refer all patients to a hospital even if there is a good response to treatment.

Criteria for referral

- Any feature of acute severe asthma persisting after treatment
- Any features of life-threatening asthma at any time
- Ongoing significant symptoms
- Concerns that patient won't comply with medication
- Previous severe attacks or easily become worse asthma
- Patient is pregnant

Consider referral if:

- Presentation is in the evening or at night
- Recent night time symptoms
- Other physical disability or learning disability

Referring to a hospital

- Ensure that somebody accompanies the patient
- Give the patient a salbutamol inhaler with spacer to take with them and advise them to continue taking 6-10 puffs, at least every 15-20 minutes (if ongoing severe symptoms)
- Arrange a follow up appointment with you and remind the patient to bring their hospital notes with them

Follow-up of patients with asthma

After a diagnosis of asthma, review the patient after 1 month to see if their symptoms are well controlled on their current medication.

If a patient's symptoms are poorly controlled +/- a change is made to medication, continue to review every month.

Once symptoms are well-controlled, and the patient is on a stable medication regimen, review patients with asthma at least once a year.

At diagnosis:

- Explain the importance of taking medications as directed to improve quality of life and reduce the chance of exacerbations
- Check smoking status and strongly advise the patient to stop smoking
- Explain the symptoms of an acute exacerbation, how to use the salbutamol inhaler during an exacerbation and when to return to the clinic

At follow up:

Review patient

- Check symptoms since last seen using the following three questions:
 - Have you had any difficulty sleeping because of your asthma symptoms (including cough)? If so how often?
 - Have you had your usual asthma symptoms during the day (cough/wheeze/chest tightness or breathlessness)? If so how often?
 - Has your asthma interfered with your usual activities e.g. work/school?
- Check smoking status and strongly advise patients to stop smoking
- Ask about, and record, any acute exacerbations
- Check medication – check adherence, inhaler technique and side-effects (palpitations, tremor, oral thrush)
- Check PEFr and compare with previous records
- Listen to the chest and assess for wheeze
- Ask the patient if they have any new symptoms

Manage symptoms:

- If symptoms well controlled, continue the same regimen
- If symptoms inadequately controlled, step up the regimen as shown on page 43

Document:

- Record the main symptoms and PEFr on the chronic disease card and/or in the notebook held by the patient
- On a monthly basis, identify any patients who have missed their follow-up appointment and take retrieval action

Asthma treatment preparations

Drugs			Daily Dose (adults unless stated)	
Class	Name	Preparation	Dose	Max.
Oral*	Salbutamol	4 mg tablet	2-4mg TDS / QID as required	8mg daily
Oral	Salbutamol	Syrup 2mg/5ml	Child 6–12 years, 2 mg 3–4 / day	8mg/ day
Inhaled short-acting beta ₂ agonist	Salbutamol	100mcg/puff	2 puffs PRN QDS	8 puffs (800 mcg)
Inhaled corticosteroids	Beclomethasone dipropionate	250 mcg/puff	1-4 puffs BD	1000mcg BD (2000 mcg in total)
		200 mcg/puff	1-4 puffs BD	
		100 mcg/puff	1-2 puffs BD	
		50 mcg/puff	2 puffs BD	
	Budesonide	100 mcg/puff	1-2 puffs BD	800 mcg BD (1600 mcg in total)
		200 mcg/puff	1-2 puffs BD	
		400 mcg/puff	1-2 puffs BD	
	Fluticasone	50 mcg/puff	2 puffs BD	500 mcg BD (1000 mcg in total)
		100 mcg/puff	1-4 puffs BD	
		250 mcg/puff	1-2 puffs BD	
		500 mcg/puff	1 puff BD	
	Inhaled long-acting beta ₂ agonist	Formoterol	12mcg/puff	1-2 puff BD
Salmeterol		25 mcg/puff	2-4 puffs BD	100mcg BD (200mcg in total)
Continued PTO				

Drugs			Daily Dose (adults unless stated)	
Class	Name	Preparation	Dose	Max.
Inhaled long-acting beta ₂ agonist + corticosteroids	Beclomethasone +formoterol	100/6 mcg per puff	1-2 puffs BD	4 puffs (400/24 mcg)
	Budesonide + formoterol	100/6 mcg per puff	1-4 puffs BD	800/24 mcg BD
		200/6 mcg per puff	1-4 puffs BD	(1600/48 mcg in total)
		400/12 mcg per puff	1-2 puffs BD	
	Fluticasone and salmeterol	100/50 mcg per puff	1 puff BD	500/50 mcg BD
		250/50 mcg per puff	1 puff BD	(1000/100 mcg in total)
500/50 mcg per puff		1 puff BD		
Methyl Xanthine	Theophylline m/r (uniphyllin)	200 mg tablet	One tablet BD	2 tablets BD (800mg total)
Leukotriene receptor antagonist	Montelukast	10mg tablet	One tablet at night	10mg
Oral corticosteroid	Prednisolone	5mg tablet	1-8 tablets daily	40mg daily Acute attacks only and give for 1 week

* Oral salbutamol is available in the UHC, but if the patient can afford, the inhaled is preferable.

Diagnosing COPD

If a diagnosis of COPD seems likely (see page 37), perform or refer for the following investigations:

- Post bronchodilator spirometry if available (record the actual values and percentage of predictive values)
- Chest x-ray to exclude other diagnoses
- FBC – to identify anaemia or polycythaemia

If on the basis of clinical assessment +/- investigation findings you are confident that the patient has COPD, diagnose COPD and start treatment:

- Record a smoking history, including pack years smoked
- Encourage all patients who smoke to stop (see page 22)
- Offer nicotine replacement therapy and advice to help patients stop smoking (see appendix C)
- Determine disease severity (see table in page 52)

Record on NCD treatment card

If the diagnosis of COPD is likely, record the diagnosis on the NCD treatment card

Screening for alternative diagnoses

Any patient with a cough for more than 2-3 weeks should have 2 sputum smears (as a screening test, even if not typical 'TB' symptoms, as many TB patients don't have the 'typical' symptoms:

- If sputum smear negative, but symptoms suggestive of TB, check the chest X-ray
- If sputum smear positive, or another reason to revise your diagnosis, change diagnosis on the chronic disease card.

Assess COPD severity

Spirometry is the most accurate way of diagnosing COPD and is also useful to find out the severity of COPD.

The spirometer takes two measurements: the volume of air a patient can breathe out in one second (called the forced expiratory volume in one second or FEV₁) and the total amount of air the patient can breathe out (called the forced vital capacity or FVC), after taking a maximum breath in.

The FEV₁, as a percentage of the predicted value, is used to predict COPD severity as shown in table 2. However, if spirometry is not available, classify severity according to clinical symptoms, as shown in table 2.

Table 2: COPD disease severity

Severity	Clinical state	FEV₁ % predicted	Treatment step
Mild	<ul style="list-style-type: none"> • Cough • Little or no breathlessness • Wheeze - absent • No increased use of services 	80%	1-2
Moderate	<ul style="list-style-type: none"> • Cough +/- sputum • Breathlessness – on exertion (hurrying on the flat or walking up any incline) • Wheeze – on exertion • Intermittent use of services 	50-79%	2-3
Severe	<ul style="list-style-type: none"> • Marked cough +/- sputum • Increased breathlessness on exertion and reduced exercise tolerance • Wheeze – marked • Frequent use of services & hospital admissions. 	30-49%	3-4
Very severe	<ul style="list-style-type: none"> • Breathless on minimal exertion or at rest • Chronic respiratory failure • Signs of right-sided heart failure (cor pulmonale: there is increased pressure in the arteries in the lungs leading to signs of fluid overload e.g. ankle swelling) 	<30%	4 and refer to specialist

Treatment approach to COPD

- Treat COPD in a stepwise manner; review after 2 weeks and add another medication if symptoms are not controlled (persistent breathlessness or exacerbations).
- Start treatment at the step appropriate to disease severity.
 - Mild case: step 1 or 2
 - Moderate case: step 2 or 3
 - Severe case: step 3 or 4 and refer to a specialist if feasible
 - Very severe: step 4 and refer to a specialist
- If still a smoker, start and continue smoking cessation advice; helping patients to stop is the most important part of care.
- For the management of COPD exacerbations see page 55.

Step 1:

- Salbutamol - preferably by inhaler, as 2 puffs as required up to 4 times/day or
- Ipratropium 1-2 puffs as required up to 4 times/day

Step 2:

- Salmeterol* 2 puffs twice a day **OR**
- Tiotropium 1 puff once daily (stop ipratropium when you start tiotropium)

Step 3:

- Continue salmeterol and add beclomethasone** (100mcg/puff) 2 puffs twice daily
 - discontinue beclomethasone if no benefit in 4 weeks
- **OR** change to tiotropium 1 puff once daily (and discontinue salmeterol)

Step 4:

- Combine salmeterol, beclomethasone and tiotropium

Step 5:

- Refer for consideration of theophylline

* Or equivalent other long acting beta₂ agonist (LABA).

**Or equivalent other inhaled corticosteroid (ICS). If available use a combination inhaler with an ICS and a LABA.

Assess the effectiveness of therapy using measures such as:

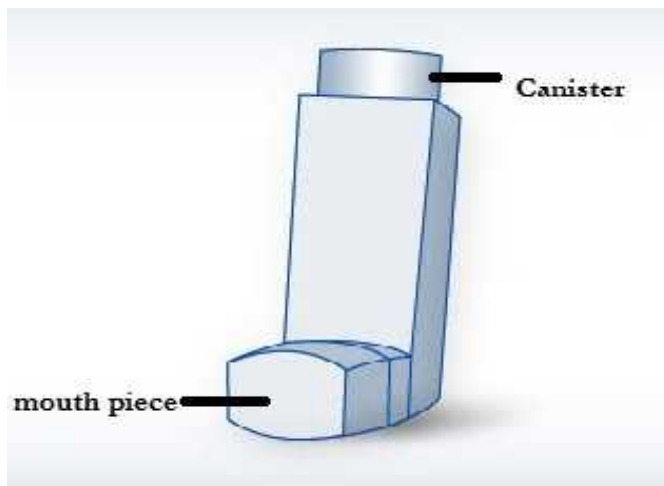
- improvements in symptoms
- ability to carry out activities of daily living
- exercise capacity
- speed of symptoms relief (short-acting bronchodilators only)

Refer for specialist care if:

- Severe (where feasible) and very severe COPD
- Poorly controlled symptoms despite step 4 treatment
- Signs of cor pulmonale (ankle swelling, fatigue)
- Age less than 40 (to exclude case cystic fibrosis, predisposing to emphysema)
- Frequent exacerbations of COPD
- Rapid deterioration in symptoms
- Uncertain diagnosis
- Haemoptysis

Delivery systems

- Only prescribe inhalers after teaching inhaler technique to all patients and once the patient has demonstrated a satisfactory technique. See page 60.
- If possible use a MDI (metered dose inhaler).
- Reassess inhaler technique at regular intervals.
- If used, ensure a spacer is compatible with the inhaler
- Explain / counsel on its use (see appendix B).



Exacerbations of COPD

Symptoms suggestive of a COPD exacerbation include:

- sustained increase in breathlessness or wheeze or chest tightness
- increased cough or
- change in colour (from clear to yellow/green) or volume of sputum
- reduced walking distance (before getting breathless)

Signs of a severe exacerbation:

- New ankle swelling
- Purse lip breathing (patients breathe out through pursed lips)
- Cyanosis
- Confusion

Management of COPD Exacerbations

- Increase frequency of salbutamol (up to 2-8 puffs 4 times a day)
- Prednisolone 30mg daily for 7-14 days
- Give oral antibiotics if sputum is purulent (yellow/green) or clinical signs of a lower respiratory tract infection are present
 - Use amoxicillin, clarithromycin or doxycycline (if not allergic)
 - Amoxicillin 500mg TDS 7 days; clarithromycin 250-500mg BD 7 days; doxycycline 200mg OD first day and then 100mg OD for 6 days
- Give patient advice about circumstances which should prompt return for review
- Give clear instructions about correct use of medications and when to stop steroid medication
- Assess inhaler technique
- Advise on stopping smoking (see page 22)

Criteria for referral

- Severe breathlessness
- Oxygen saturations <90%
- Use of accessory muscles at rest
- Pursed lip breathing
- Poor general condition
- Cyanosis
- New or worsening peripheral oedema
- Impaired level of consciousness
- Acute confusion
- Living alone/ unable to cope at home
- Significant co-morbidity

Referring to a hospital

- Ensure that somebody accompanies the patient
- If available, give the patient a salbutamol +/- ipratropium nebuliser prior to referral to hospital (driven by air if concerned about hypercapnia)
- Give the patient a salbutamol inhaler with spacer to take with them and advise them to continue using it up to every 15-20 minutes.

Follow-up of patients with COPD

Following the first diagnosis of COPD, review the patient after 1 month to see if their symptoms are well controlled on their current medication.

If a patient's symptoms are poorly controlled +/- a change is made to medication, review after 1 month.

Once symptoms are well-controlled, review patients with asthma at least once a year, but more often if severe disease.

At diagnosis explain to the patient:

- The importance of taking medications as prescribed to improve quality of life and reduce the chance of exacerbations
- Check whether they smoke and explain that stopping smoking is the most important thing they can do
- Explain that COPD will require lifelong management
- Explain the symptoms of a COPD exacerbation to the patient, how to increase their salbutamol, and advise them to return to the clinic if they have an exacerbation

At follow up check:

- smoking status and encourage patients to stop smoking (see page 22)
- adequacy of symptom control:
 - breathlessness
 - exercise tolerance
 - estimated exacerbation frequency
- if patient has had any acute exacerbations
- drug side-effects
- adherence to medications
- inhaler technique
- nutritional status and offer nutritional supplements if their weight (or BMI) is low
- presence of complications, including cor pulmonale
- if wheeze on examination

Manage symptoms:

- If symptoms well controlled, continue the same regimen.
- If symptoms inadequately controlled, step up the regimen as shown on page 53

Measure: MRC dyspnoea score (see table 3 below on page 58)

Document: Maintain the chronic disease record

On a monthly basis, identify any patients who have missed their follow-up appointment and take retrieval action

Table 3: MRC Dyspnoea Scale

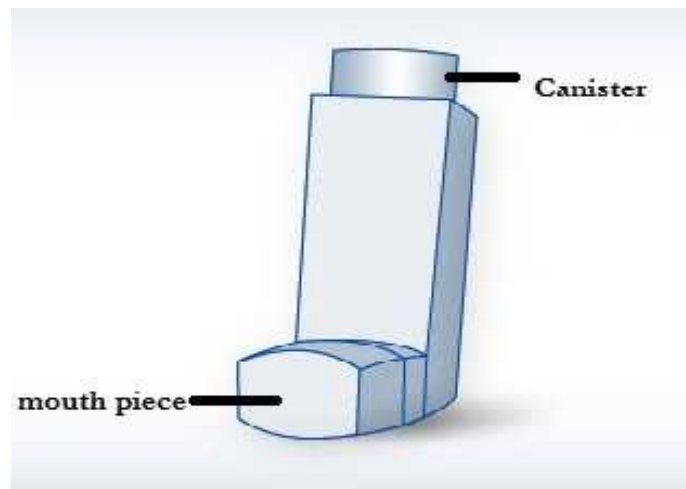
Grade	Degree of breathlessness related to physical activity
1	Not troubled by breathlessness unless does strenuous activity
2	Short of breath when hurrying on the flat or walking up hill
3	Walks slowly on flat ground due to breathlessness or has to stop for breath after walking at own pace
4	Stops for breath after walking about 100m, or after a few minutes, on flat ground
5	Too breathless to leave house or breathless dressing/undressing

COPD Medications

Drugs			Daily Dose	
Class	Name	Preparation	Dose	Max.
Inhaled short-acting beta ₂ agonist	Salbutamol	100mcg/puff	2 puffs PRN QDS	8 puffs (800 mcg)
Inhaled short-acting muscarinic antagonist	Ipratropium bromide	20mcg/puff	1-2 puffs TDS-QDS	8 puffs (160 mcg)
Inhaled long-acting beta ₂ agonist	Salmeterol	25mcg/puff	2 puffs BD	50mcg BD (100mcg in total)
	Formoterol	12mcg/puff	1 puff BD	12mcg BD (24mcg in total)
Inhaled corticosteroids	Beclomethasone dipropionate	250mcg/puff	1-4 puffs BD	1000mcg BD (2000 mcg in total)
		200mcg/puff	1-4 puffs BD	
		100mcg/puff	1-2 puffs BD	
		50mcg/puff	2 puffs BD	
Inhaled long-acting muscarinic antagonist	Tiotropium bromide	18 micrograms	1 puff OD	18 micrograms
Inhaled long-acting beta ₂ agonist + ICS	Beclomethasone +formoterol	100/6 mcg per puff	2 puffs BD	2 puffs BD (400/24 mcg in total)
	Fluticasone and salmeterol	500/50 mcg per puff	1 puff BD	1 puff BD (1000/100 mcg in total)
Oral corticosteroids	Prednisalone	5mg tablets	6 tablets OD	
Antibiotics	Amoxicillin	500mg tablet	1 tablet TDS	
	Clarithro-mycin	500mg tablet	One tablet BD	
	Doxycycline	100mg tablet	2 tablets day 1 and then 1 tablet days 2-7	
	Co-amoxiclav	375 mg tablet	One tablet TDS	
		625mg tablet	One tablet TDS	

Appendix A: How to use an inhaler

Inhaler



How To Use Inhaler?

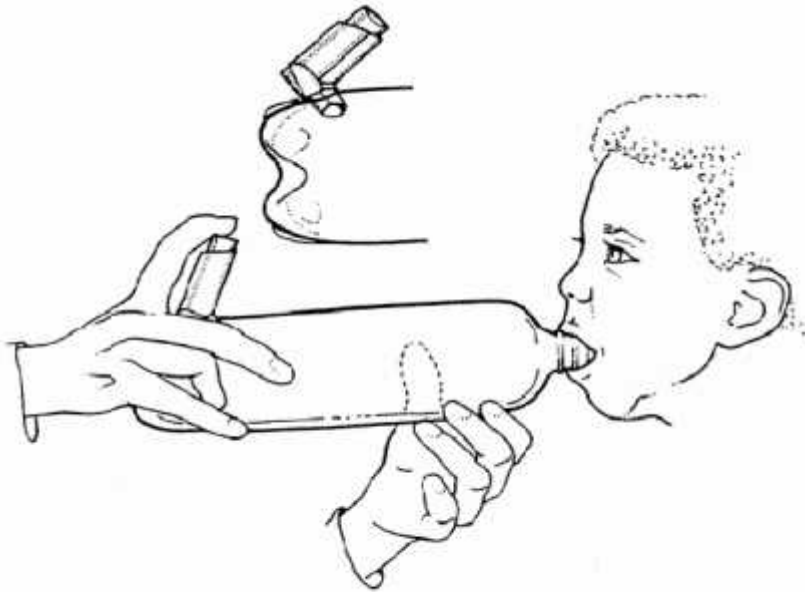
Using an inhaler is the most common way of taking asthma and COPD medicines. Explain the following 8 steps to the patient for proper use of inhaler.

1. Remove cap and hold inhaler upright then shake well
2. Breathe out gently and put mouthpiece between teeth without biting
3. Breathe in slowly through mouth and press down firmly on canister
4. Continue breathe in slowly and then hold breath for about 10 seconds
5. While holding breath, remove inhaler from mouth
6. Breathe out gently away from mouthpiece
7. If an extra dose is needed, wait 1 minute and repeat steps 2 to 8
8. Replace cap

Appendix B: How to make a spacer out of a plastic bottle

Patients can find it difficult to use metered dose inhalers. Spacers can be used so that people do not need to coordinate taking a breath in whilst pressing the inhaler.

To make a spacer out of a bottle, use a soldering iron, a piece of hot metal or a candle to make a hole at the bottom of the bottle as shown below. The hole should be made approximately the size of the inhaler and when the plastic is hot, the inhaler can be pressed in to make a hole of the correct size.

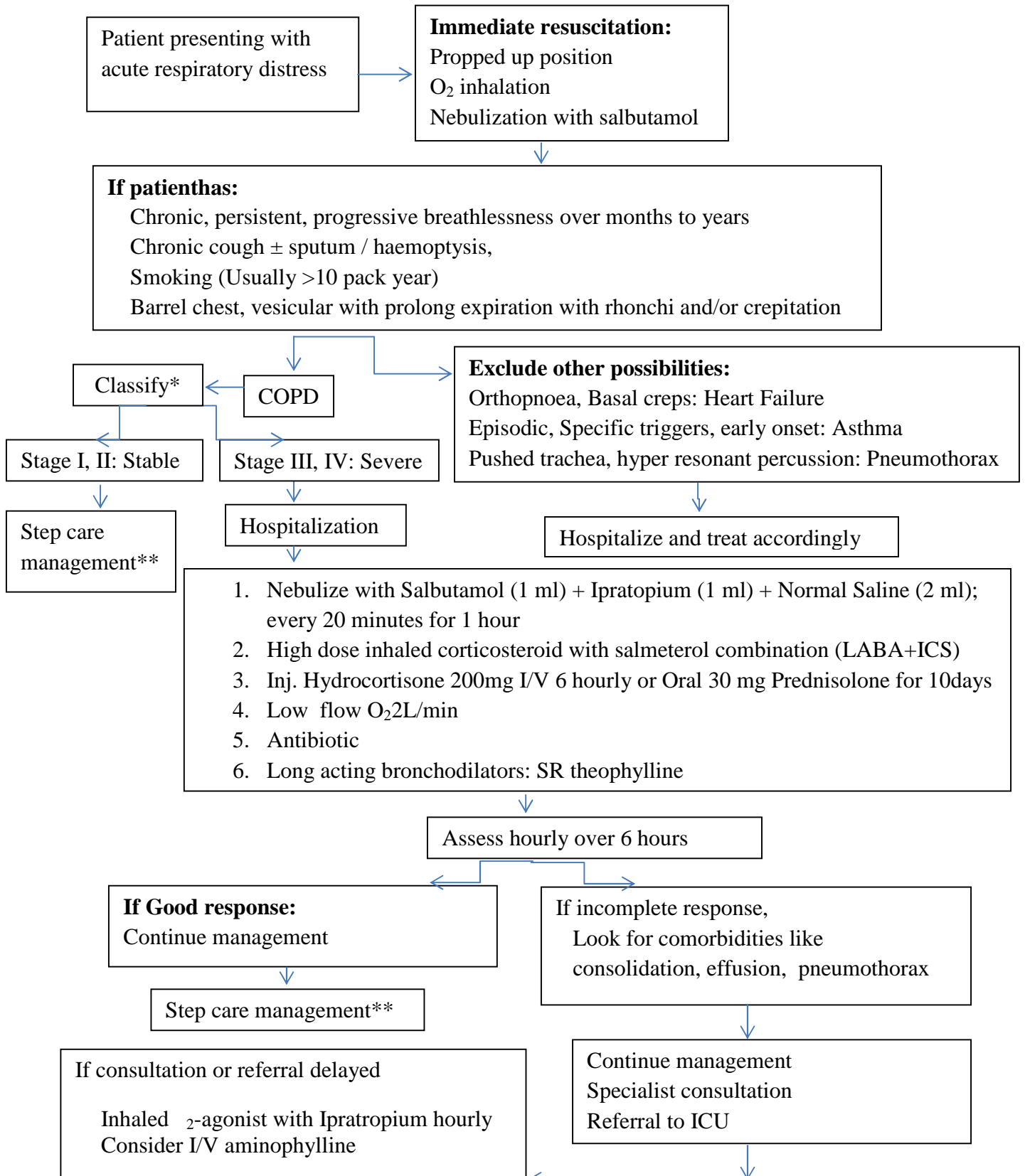


How to use a spacer

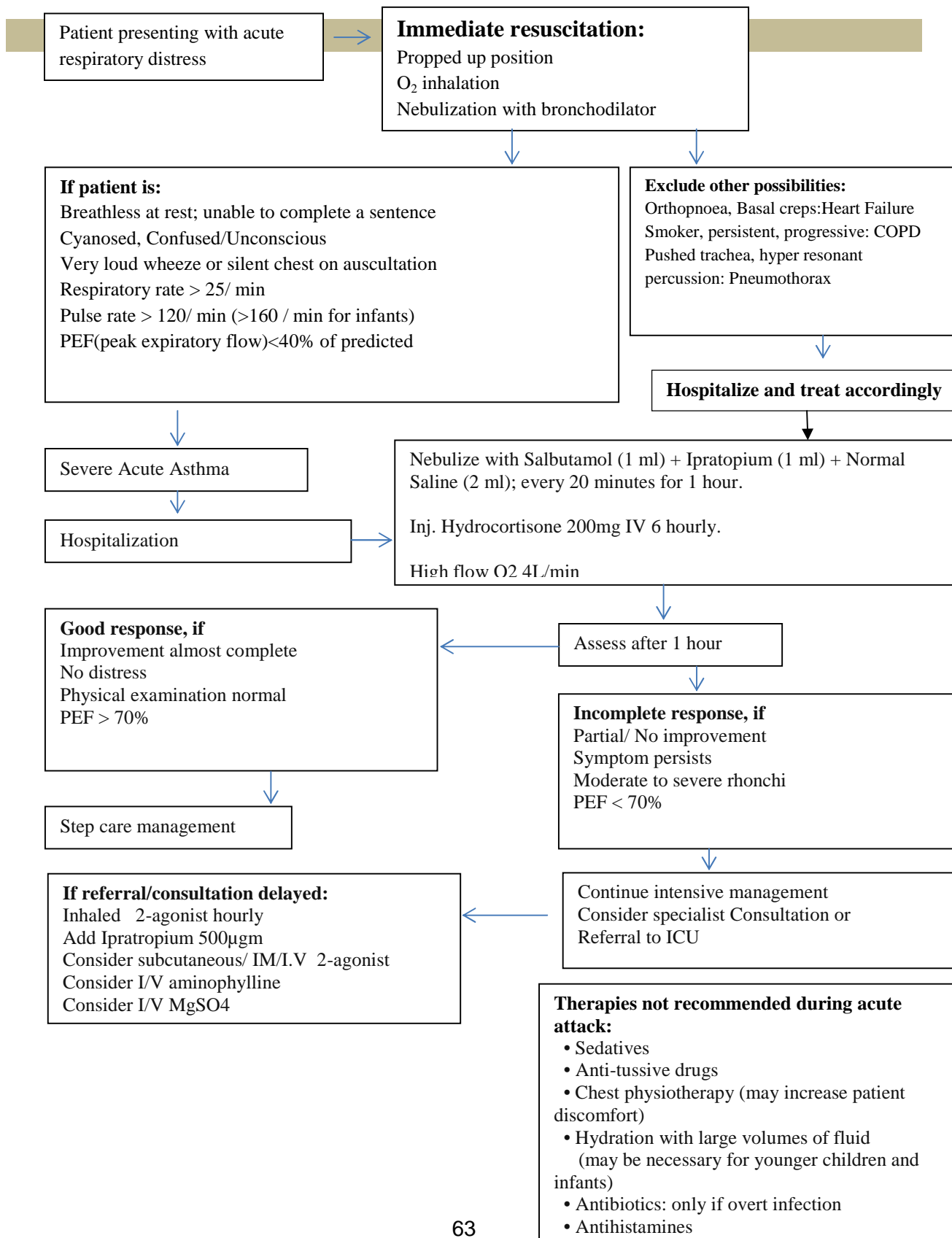
- Put one puff of your inhaler into the spacer and breathe in deeply through the mouthpiece.
- Hold your breath for ten seconds (or for as long as is comfortable) then breathe out slowly.
- It is best to take at least two deeply held breaths for each puff of your inhaler.
- If you find it difficult to take deep breaths, breathe in and out of the mouthpiece several times after each puff of the inhaler
- Repeat the step above for each dose/puff needed
- Wash your spacer once a month - leave it to drip-dry as this helps to prevent the medicines sticking to the sides
- Spacers should be replaced at least every year

See pages below for UHC inpatient care of severe COPD, asthma and lung abscess cases, from the 'Clinical Management Protocol' May 2014 by the 'Hospital Services Management DGHS, Dhaka.

Severe Chronic Obstructive Pulmonary Disease (COPD): Exacerbation assessment and management



Severe Acute Asthma Management



Initial management of other severe respiratory conditions

Ensure initial stabilisation of ABCs (i.e. airway; breathing; and circulation) prior to (or in-parallel) to other testing or examination. The initial urgent care is below (prior to further management or referral to district hospital):

- If signs of life threatening **respiratory failure** (i.e. inability to breathe, cyanosis, confusion, rapid pulse), then:
 - ⇒ Stabilise[#] the patient, before referring to the specialist, by:
 - ventilation support (i.e. oxygen through nasal or facial mask)
 - maintain intravenous access (and fluid balance)
- If signs of **adult pneumonia** (i.e. fever; chills; rapid breathing; pain with breathing; cough with yellow or green sputum), and X-ray (if available) signs are consistent with pneumonia, then:
 - ⇒ Prescribe oral antibiotics such as Amoxicillin and Paracetamol and/or Ibuprofen
- If signs of **pulmonary embolism** (i.e. sharp chest pain worsen with deep breath, sudden shortness of breath, hypoxemia) then: administer:
 - ⇒ Stabilise and refer; after injecting (I/V) Heparin (units: 5,000) (to prevent the existing clot to grow and avoid a new clot to form)
- If signs of **pulmonary oedema** (difficult breathing, suffocating feeling, wheezing, cough with frothy sputum) and fine crepitation's heard in the lung bases, then:
 - ⇒ administer the following:
 - Nitroglycerine (sub-lingual) 0.5 mg tablet (only if systolic BP > 100)
 - Furosemide, initially as 10 - 20 mg (I/V stat) and continue orally as required
 - Blood pressure drugs – for too high or too low BP
- **If signs of pneumothorax** (i.e. lung collapse; chest pain with shortness of breath; cyanosis), with X-ray signs consistent with pneumothorax, then manage after:
 - ⇒ Stabilise the patient by:
 - ventilation support (i.e. oxygen through nasal or facial mask)
 - maintain intravenous (I/V) line
 - ⇒ Perform needle thoracostomy (pleural decompression)
- **If signs of lung cancer** (chest pain; chronic cough; haemoptysis; shortness of breath; loss of appetite and weight; weakness and fatigue), then:
 - ⇒ Treat for symptoms (e.g. cough; pain) and refer.

- **If signs of lung abscess** (high grade remittent fever, Cough with copious purulent sputum, Pleuritic chest pain, Clubbing, Features of consolidation, Pleural rub), then:
 - ⇒ Exclude other possibilities: PTB: low grade evening fever, weight loss, haemoptysis, Ca-Lung: Weight loss, haemoptysis, features of collapse
 - ⇒ Investigate: CBC, CXR P/A, Sputum for Gm / AFB stain & C/S, Blood for C/S
 - ⇒ Oxygen, fluid balance
 - ⇒ Clindamycin (600 mg IV 8h followed by 150-300 mg PO QID), or Co-amoxiclav 1.2 g 8-hourly + oral metronidazole 400 mg 8-hourly

If signs of Acute Myocardial Ischaemia

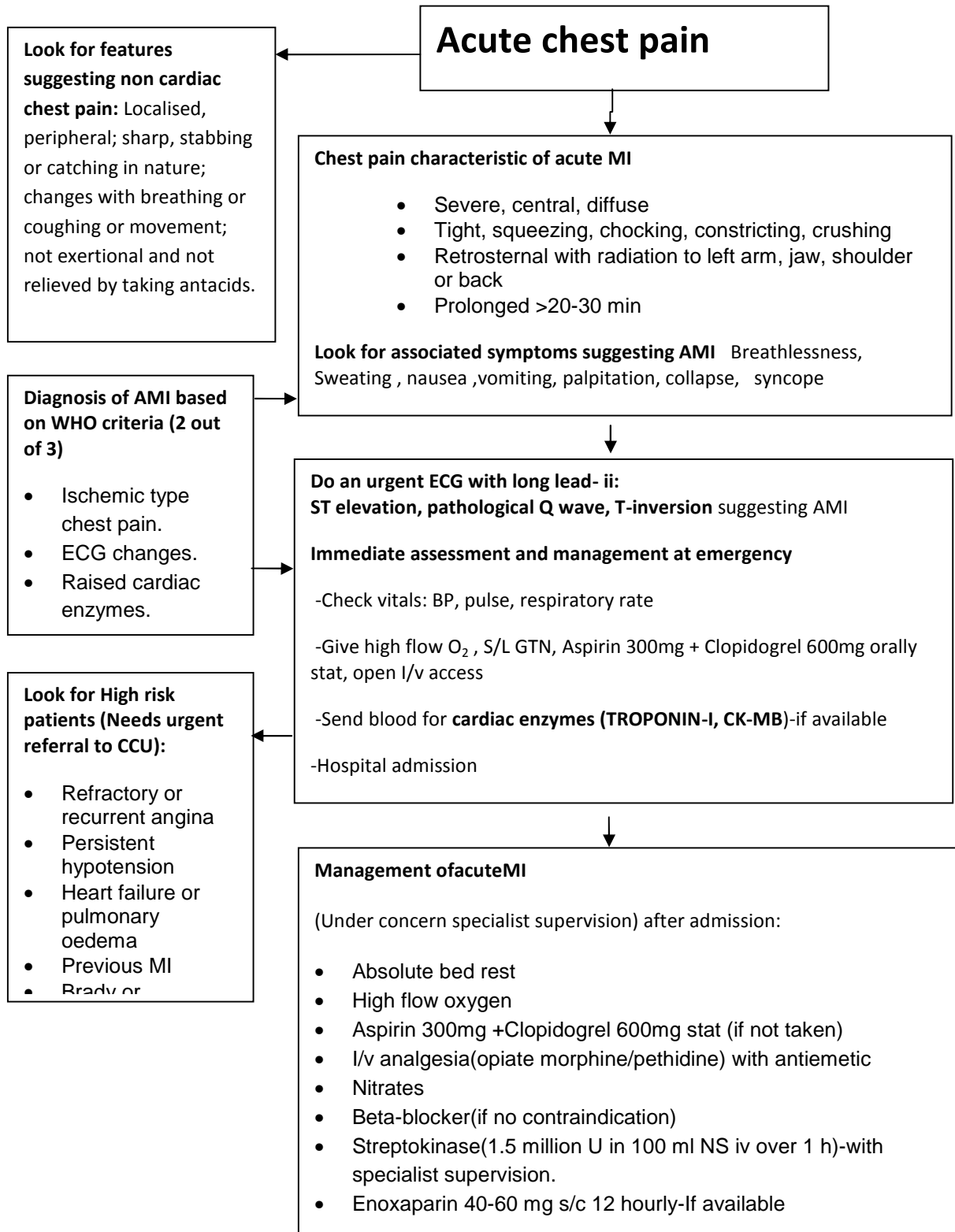
See next page (page 67)

Important drugs and doses used in Acute Myocardial Ischaemia are:

- Inj. Morphine: 1 amp(1ml=15mg)+14ml NS or 5%DA, 2-5 mg iv slowly stat and may be repeated in 5-30 minutes if necessary
- Inj. Pethidine: 1 amp(1ml=100mg), 75-100mg iv slowly stat and may be repeated at 2-4 hours interval
- Inj. Streptokinase: 1 vial=1.5million unit+ 50 ml NS iv over 60 minutes.
- Inj. Low molecular weight heparin (Enoxaparin, Inj. Clexane): 1mg/kg, sc twice daily for 5-8 days.

Source: 'Clinical Management Protocol' May 2014, by the 'Hospital Services Management DGHS, Dhaka.

Management of Acute Chest Pain



Useful resources

WHO Model Formulary 2008

www.who.int/selection_medicines/list/WMF2008.pdf

British National Formulary

<http://www.bnf.org/bnf/>

IMAI District clinician manual: Guidelines for the Management of Common Illnesses with Limited Resources - Volumes 1 and 2

<http://www.who.int/hiv/pub/imai/imai2011/en/>

WHO Integrated Management of Adolescent and Adult Illness (IMAI)

- Acute care: www.who.int/hiv/pub/imai/en/IMAIAcuteCareRev2.pdf

- General principles of good chronic care:

<http://www.who.int/hiv/pub/>

<http://www.who.int/hiv/pub/imai/generalprinciples082004.pdf>

<http://www.who.int/hiv/pub/imai/generalprinciples082004.pdf>

<http://www.who.int/hiv/pub/imai/generalprinciples082004.pdf>

<http://www.who.int/hiv/pub/imai/generalprinciples082004.pdf>

Other IMAI publications

www.who.int/hiv/pub/imai/en/index.html

LMIC specific guidance:

- WHO. 2002. WHO CVD-Risk Management Package for low and medium resource settings. Geneva: World Health Organisation.
- WHO Prevention of recurrent heart attacks and strokes in LMIC populations. Evidence-based recommendations for policy makers and health professionals.
http://www.who.int/cardiovascular_diseases/resources/pub0402/en/
- Rheumatic fever and rheumatic heart disease: Report of a WHO expert consultation.
www.who.int/trs/WHO_TRS_923.pdf

General guidance:

- European Society of Cardiology <http://www.escardio.org/guidelines-surveys/esc-guidelines/Pages/GuidelinesList.aspx>
- Centre for Disease Control and Prevention
http://www.cdc.gov/heartdisease/guidelines_recommendations.htm
- NICE National Institute for Health and Clinical Excellence
<http://www.nice.org.uk/guidance/index.jsp?action=byTopic&o=7195>