PRIMARYCARE
Team 435

Objectives:

- Diagnosis of Asthma in children and adults.
- History + Clinical exam.
- Investigations “PFT; Spirometry”.
- Trigger factors of Asthma.
- Highlights on COPD (Diagnosis by PFT and Treatment).
- Assessing the severity of Asthma.
- Exercise induced asthma (triggers and management).
- Management of Asthma.
- Rescue management.
- Prophylaxis.
- How to use different types of inhalers .
- Asthma education for patient about method to use inhalers properly.
- Practical: Examination of the Respiratory system (chest). Process (osce) of Examination.

Done by : Abdulrahman Alsayyari

Revised by: Abdullah Alghizzi & Khaled Al Jedia

References : Slides , doctor’s notes , GINA guidelines , step up to medicine , master the boards, WebMD,433 team

[Color index : Important | Notes | Extra]

All diagrams are important

This lecture is also important for osce, doctor eyad said he might give us a case like the one we have discussed.

Introduction

Asthma affects an estimated 300 million individuals worldwide. It is a serious global health problem affecting all age groups, with increasing prevalence in many developing countries, rising treatment costs, and a rising burden for patients and the community through loss of productivity, disruption to the family and it still contributes to many deaths worldwide.

Definition

Asthma, or reactive airway disease, is an abnormal bronchoconstriction of the airways. Asthma is a **reversible** obstructive lung disease, which is the main difference between this disorder and chronic obstructive pulmonary disease (COPD).

- Global Initiative for Asthma (**GINA**) was established to increase awareness and improve prevention and management of Asthma.

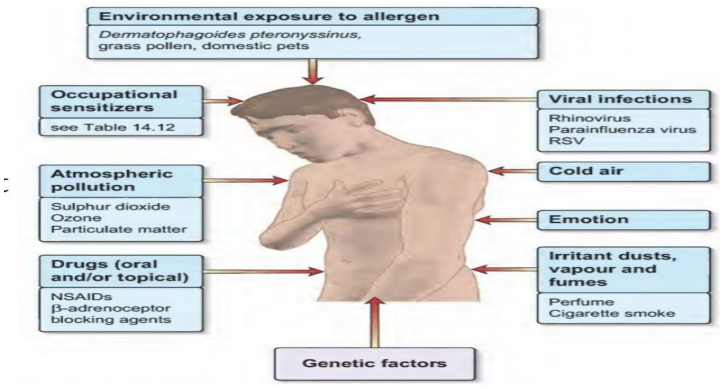
Effective treatment is reached when the patient is able to:

1. Avoid troublesome symptoms during day and night.
2. Need little or no reliever medication.
3. Have productive, physically active lives.
4. Have normal or near normal lung function.
5. Avoid serious asthma flare-ups (exacerbations, or attacks).

❖ Factors That May Trigger Or Worsen Asthma Symptoms:

- Viral infections, domestic or occupational allergens (e.g. house dust mite, pollens, cockroach), tobacco smoke, exercise and stress. Some drugs e.g beta blocker, aspirin and NSAIDs.
- **Flare-ups** may occur even in people taking asthma treatment, so all patients should have an asthma action plan.

- A stepwise approach to treatment, customized to the individual patient, takes into account the effectiveness of available medications, their safety, and their cost to the payer or patient.



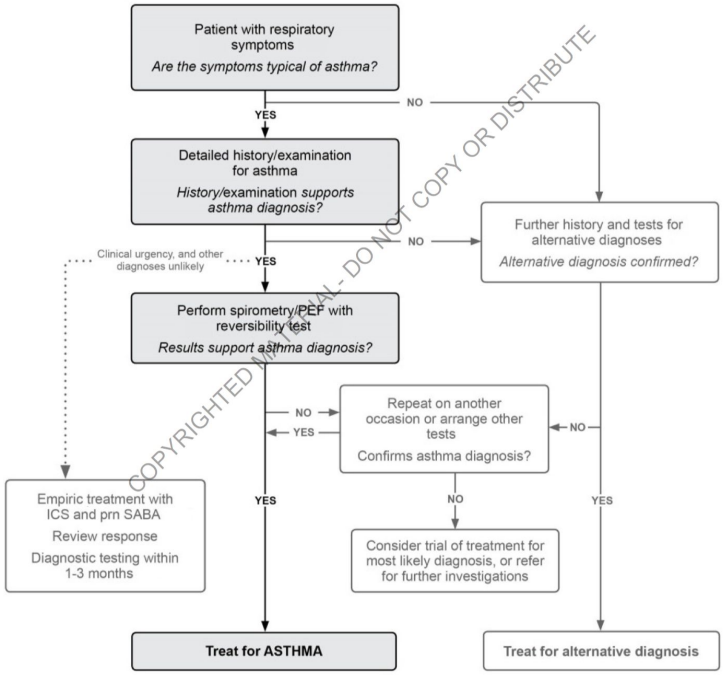
❖ MAKING THE DIAGNOSIS OF ASTHMA: 2 key finding features: IMP

1- History of respiratory symptoms such as **wheeze, shortness of breath, chest tightness and cough** that vary over time and in intensity:
• often triggered by exercise, laughter, allergens or cold air. • often occur or are worse at night or on waking.
2- Evidence of variable expiratory airflow limitation:

• At least once during the diagnostic process when **FEV1 is low**, document that the **FEV1/FVC ratio is reduced**[1].
• Document that variation in lung function is greater than in healthy people. For example:
  ○ FEV1 increases by more than **12%** and **200mL** after inhaling a bronchodilator. This is called '**Bronchodilator reversibility**'.(very characteristic of asthma)
  ○ Average daily diurnal PEF variability in children is **>10%**[2]
  ○ FEV1 increases by more than **12%** and **200mL** from baseline after 4 weeks of anti-inflammatory treatment (outside respiratory infections).
• Bronchodilator reversibility may be absent during **severe exacerbations** or **viral infections**.

DIAGNOSTIC FLOW-CHART OF ASTHMA IN CLINICS:

- Testing for Asthma better to be done during symptoms and off medication.
- The diagnosis of asthma should be confirmed and, for future reference, the evidence documented in the patient's notes.
- Confirming the diagnosis of asthma is more difficult after treatment has been started.



[1] **The FEV1/FVC ratio is normally more than 0.75–0.80 in a**

[2] Calculated from twice daily readings (best of 3 each time), a mean of the day's highest and lowest PEF, and averaged over 1-2 weeks. If using PEF at home or in the office, use the same PEF meter each time.

❖ Physical examination:

Physical examination in people with asthma is often normal, but **the most frequent finding is wheezing on auscultation**, especially on forced expiration.

DIAGNOSING ASTHMA IN SPECIAL POPULATIONS:	
The elderly:	Asthma may be under-diagnosed due to: 1. poor perception and assumption that dyspnea is normal in old age, 2. lack of fitness, or reduced activity. Asthma may also be over-diagnosed due to: ● confusion with shortness of breath due to left ventricular failure or ischemic heart disease.
Smokers and ex-smokers:	**Asthma** and **COPD** may co-exist or overlap (asthma-COPD overlap),particularly in smokers and the elderly
Confirming an asthma diagnosis in patients taking controller treatment:	For many patients (**25–35%**) with a diagnosis of asthma in primary care, the Diagnosis **cannot** be confirmed. If the basis of the diagnosis has not already been documented, confirmation with objective testing should be sought. For example, if lung function is normal, repeat reversibility testing after withholding medications for more than 12 hours. If the patient has frequent symptoms, consider a trial of step-up in controller treatment and repeat lung function testing after 3 months.

❖ Investigation: recommended video for PFT for more understanding of PFT

- **The best initial test is PEF and the most accurate is PFT**

➢ **Spirometry:** The results of spirometry can be used to determine the following:

- Determine whether baseline airflow limitation (**obstruction**) is present (reduced FEV1/FVC ratio).
- Assess the **reversibility** of the obstructive abnormality by repeating spirometry after administration of a **bronchodilator**.
- Characterize the severity of airflow limitation (based on the FEV1 as a percentage of the normal predicted value).
- For patients with normal airflow (normal FEV1/FVC ratio), identify a restrictive pattern as an alternate explanation for dyspnea (eg, FVC <80 percent predicted).
- Highest value of three readings taken.

Table for ASTHMA History taken from 435 Medicine team helpful especially for OSCE

❖ ASSESSING A PATIENT WITH ASTHMA:

patients should be reviewed whenever they visit the primary clinic. E.g. for refill.
In addition to a schedule routine review at least

1. Asthma control:

Asthma control has two domains: **symptom control** and **risk factors** for future poor outcomes.

- Assess symptom control over the last 4 weeks.
- Identify any other risk factors for poor outcomes.
- Measure lung function before starting treatment, 3–6 months later, and then periodically, e.g. at least yearly in most patients.

2. Treatment issues:

- Record the patient's treatment, and ask about side-effects.
- Watch the patient using their inhaler, to check their technique.
- Have an open empathic discussion about adherence.
- Check that the patient has a written asthma action plan.
- Ask the patient about their attitudes and goals for their asthma.

3. Are there any comorbidities?

- These include rhinitis, rhinosinusitis,gastroesophageal reflux (GERD), obesity, obstructive sleep apnea, depression and anxiety.
- Comorbidities should be identified as they may contribute to respiratory symptoms and poor quality of life.

How to assess asthma control?

Box 4. Assessment of symptom control and future risk

A. Level of asthma symptom control

In the past 4 weeks, has the patient had:		Well controlled	Partly controlled	Uncontrolled
Daytime symptoms more than twice/week?	Yes☐ No☐	None of these	1–2 of these	3–4 of these
Any night waking due to asthma?	Yes☐ No☐			
Reliever needed* more than twice/week?	Yes☐ No☐			
Any activity limitation due to asthma?	Yes☐ No☐			

B. Risk factors for poor asthma outcomes

Assess risk factors at diagnosis and periodically, at least every 1-2 years, particularly for patients experiencing exacerbations.

Measure FEV_1 at start of treatment, after 3–6 months of controller treatment to record personal best lung function, then periodically for ongoing risk assessment.

Having uncontrolled asthma symptoms is an important risk factor for exacerbations

Additional potentially modifiable risk factors for exacerbations, even in patients with few asthma symptoms, include:

- ICS not prescribed; poor ICS adherence; incorrect inhaler technique
- High SABA use (with increased mortality if >1x200-dose canister/month)
- Low FEV_1, especially if <60% predicted
- Higher bronchodilator reversibility
- Major psychological or socioeconomic problems
- Exposures: smoking; allergen exposure if sensitized
- Comorbidities: obesity; chronic rhinosinusitis; confirmed food allergy
- Sputum or blood eosinophilia; elevated FENO in allergic adults taking ICS
- Pregnancy

Other major independent risk factors for flare-ups (exacerbations) include:

- Ever being intubated or in intensive care for asthma
- Having 1 or more severe exacerbations in the last 12 months.

Having any of these risk factors increases the patient's risk of exacerbations *even if they have few asthma symptoms.*

Risk factors for developing fixed airflow limitation include preterm birth, low birth weight and greater infant weight gain; lack of ICS treatment; exposure to tobacco smoke, noxious chemicals or occupational exposures; low FEV_1; chronic mucus hypersecretion; and sputum or blood eosinophilia

Risk factors for medication side-effects include:

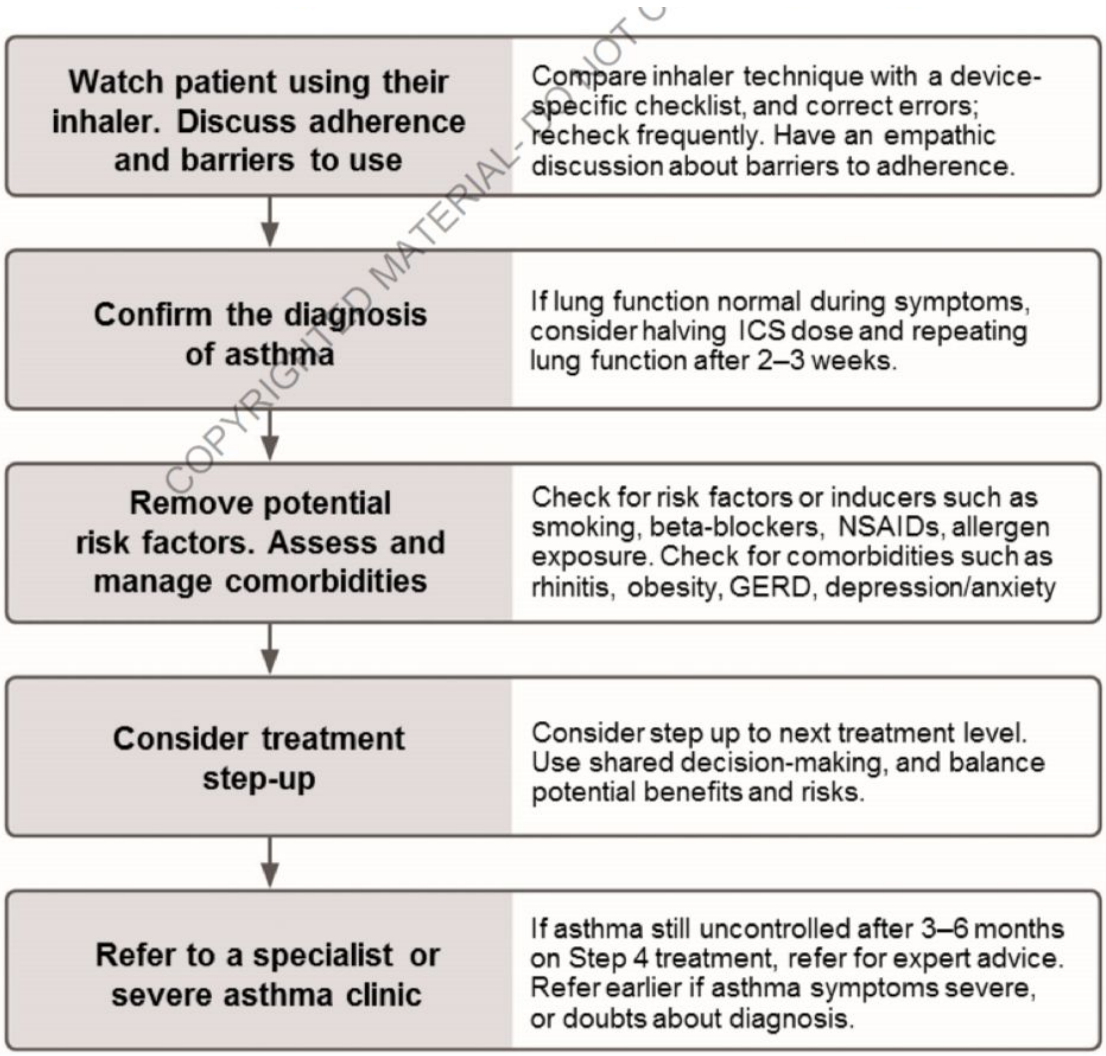
- *Systemic*: frequent OCS; long-term, high dose and/or potent ICS; also taking P450 inhibitors
- *Local*: high-dose or potent ICS; poor inhaler technique

❖ WHAT IS THE ROLE OF LUNG FUNCTION IN MONITORING ASTHMA?

lung function is most useful as an indicator of future risk. It should be recorded **at diagnosis**, **3–6 months after** starting treatment, and **periodically** thereafter. Most patients should have lung function measured at least **every 1-2 years**,

•Risk factors for developing fixed airflow limitation include lack of ICS treatment; exposure to tobacco smoke, noxious chemicals or occupational exposures; low FEV1; chronic mucus hypersecretion; and sputum or blood eosinophilia.

❖ HOW TO INVESTIGATE UNCONTROLLED ASTHMA IN PRIMARY CARE?



➔ Exercise-induced asthma:

- ◆ is a narrowing of the airways in the lungs that is triggered by strenuous exercise.
- ◆ Factors that may increase the risk of the condition or act as triggers include:

  - Cold air. - Dry air. - Air pollution. -High pollen counts.

  - Chlorine in swimming pools.

  - Chemicals used with ice rink resurfacing equipment.

  - Respiratory infections or other lung disease.

  - Activities with extended periods of deep breathing, such as long-distance running, swimming or soccer.

- ◆ **Treatment**:
  - Pre-exercise medication:
    - SABA.
    - Ipratropium.
  - Long term control medicaiton:
    - Inhaled corticosteroid .
    - Combination inhalers: e.g. ICS & LABA.

MANAGEMENT OF ASTHMA

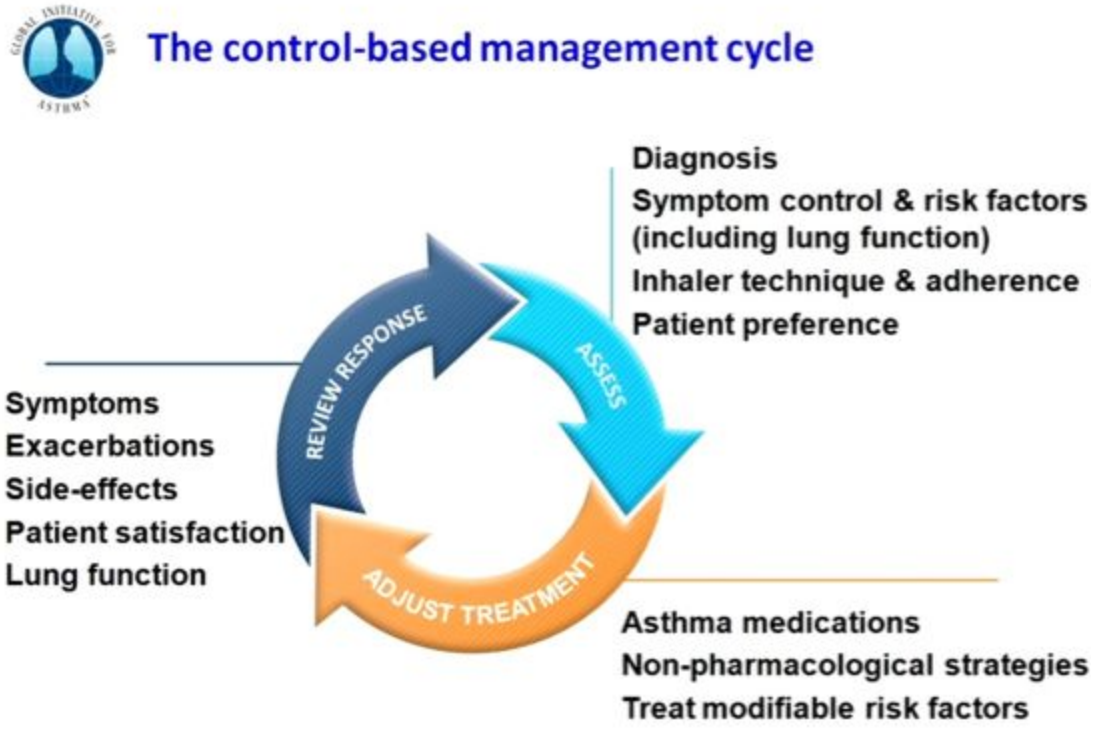
❖ Treating to control symptoms and minimize risk:

Treatment of asthma for symptom control and risk reduction includes:

- **Medications**. Every patient with asthma should have a reliever medication, and most adults and adolescents with asthma should have a controller medication.
- Treating modifiable **risk factor.**
- **Non-pharmacological** therapies and strategies.

Importantly, every patient should also be trained in essential skills and guided asthma self-management, including:

- Asthma information.
- Inhaler skills.
- Adherence.
- Written asthma action plan.
- Self-monitoring. (PEF can be used)
- Regular medical review.



❖ INITIAL CONTROLLER TREATMENT:

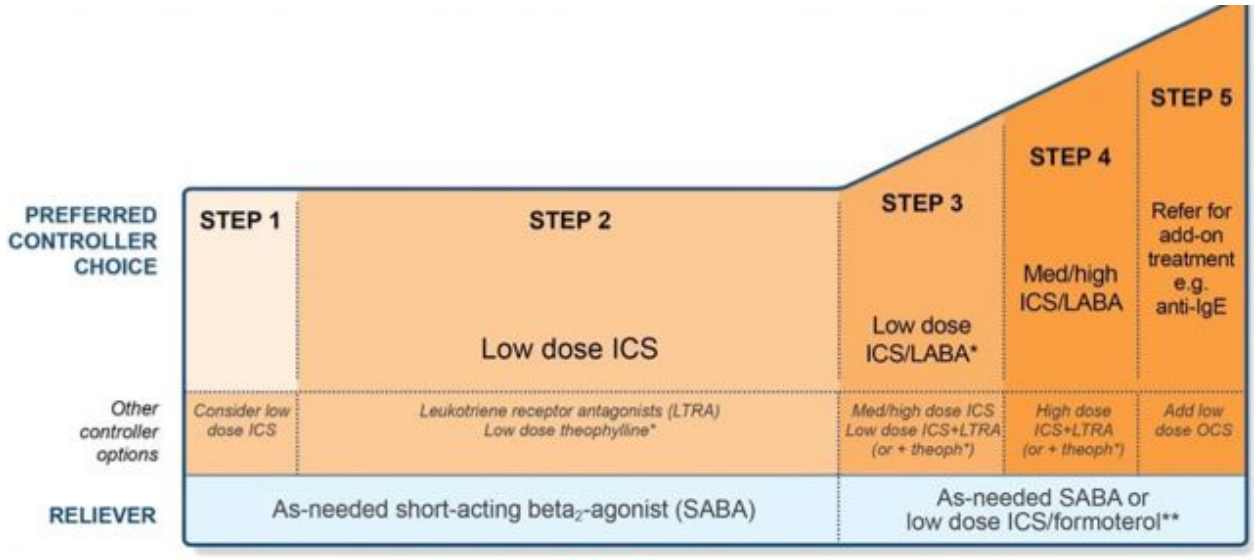
For the best outcomes, regular daily controller treatment should be initiated as soon as possible after the diagnosis of asthma is made.

•Regular low dose ICS is recommended for **all patients** with a diagnosis of asthma and any of the following:

- Asthma symptoms more than twice a month.
- Waking due to asthma more than once a month.
- Any asthma symptoms plus any risk factor(s) for exacerbations.

INITIAL CONTROLLER TREATMENT	
Before	**After**
• Record evidence for the diagnosis of asthma, if possible. • Document symptom control and risk factors. • Assess lung function, when possible. • Train the patient to use the inhaler correctly, and check their technique. • Schedule a follow-up visit.	• Review response after 2–3 months, or according to clinical urgency. • Consider step down when asthma has been well-controlled for 3 months.

Stepwise approach to asthma management



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❖ LOW, MEDIUM AND HIGH DAILY DOSES OF INHALED CORTICOSTEROIDS (MCG):

Inhaled corticosteroid	Adults and adolescents			Children 6–11 years		
	Low	Medium	High	Low	Medium	High
Beclometasone dipropionate (CFC)*	200–500	>500–1000	>1000	100–200	>200–400	>400
Beclometasone dipropionate (HFA)	100–200	>200–400	>400	50-100	>100-200	>200
Budesonide (DPI)	200–400	>400–800	>800	100–200	>200–400	>400
Budesonide (nebules)				250–500	>500–1000	>1000
Ciclesonide (HFA)	80–160	>160–320	>320	80	>80-160	>160
Fluticasone furoate (DPI)	100	n.a.	200	n.a.	n.a.	n.a.
Fluticasone propionate(DPI)	100–250	>250–500	>500	100–200	>200–400	>400
Fluticasone propionate (HFA)	100–250	>250–500	>500	100–200	>200–500	>500
Mometasone furoate	110–220	>220–440	>440	110	≥220–<440	≥440
Triamcinolone acetonide	400–1000	>1000–2000	>2000	400–800	>800–1200	>1200

CFC: chlorofluorocarbon propellant; DPI: dry powder inhaler; HFA: hydrofluoroalkane propellant. *Included for comparison with older literature.

STEPWISE APPROACH FOR ADJUSTING TREATMENT :	
STEP 1:	As-needed SABA with no controller .
STEP 2:	Regular low dose ICS plus as-needed SABA.
STEP 3:	Low dose ICS/LABA either as maintenance treatment plus as needed SABA, or as ICS/formoterol maintenance and reliever therapy .
STEP 4:	Low dose ICS/formoterol maintenance and reliever therapy, or medium dose ICS/LABA as maintenance plus as-needed SABA.
STEP 5:	Refer for expert investigation and add-on treatment.

SABA: Albuterol (Salbutamol)

Example of ICS are: · Beclomethasone,budesonide, flunisolide, fluticasone,mometasone, triamcinolone

LABA:salmeterol , formoterol.

❖ HOW OFTEN SHOULD PATIENTS WITH ASTHMA BE REVIEWED?

Patients should preferably be seen **1–3 months** after starting treatment and every **3–12 months** after that, except in pregnancy when they should be reviewed every **4–6 weeks.** After an exacerbation, a review visit within **1 week** should be scheduled.

❖ STEPPING UP ASTHMA TREATMENT:

- Sustained step-up (for at least 2–3 months): if symptoms and/or exacerbations persist despite 2–3 months of controller treatment.
- Short-term step-up (for 1–2 weeks) by a clinician or by a patient with a written asthma action plan,e.g. during viral infection or allergen exposure.

❖ STEPPING DOWN TREATMENT WHEN ASTHMA IS WELL-CONTROLLED:

- Consider stepping down treatment once good asthma control has been achieved and maintained for 3 months.
- Choose an appropriate time for step-down (no respiratory infection, patient not travelling, not pregnant).
- Step down through available formulations to reduce the ICS dose by 25–50% at 2–3 month intervals.

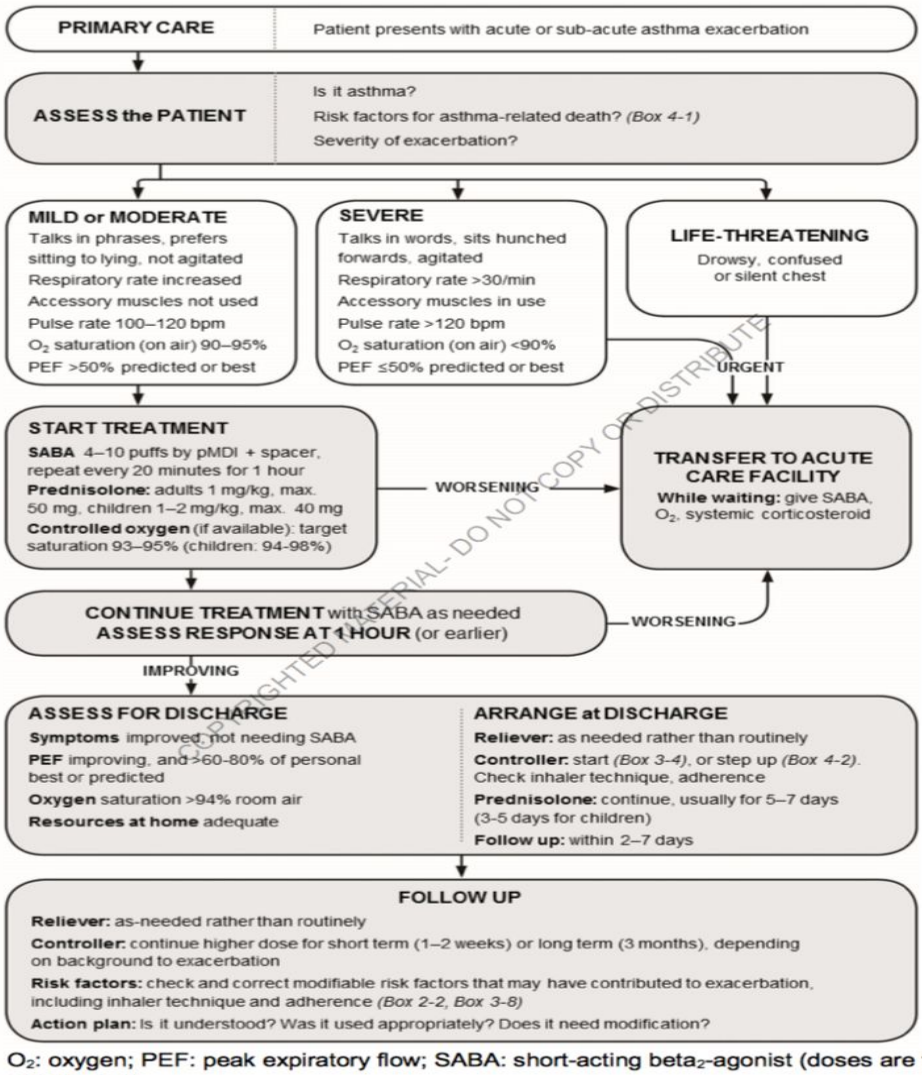
❖ NON-PHARMACOLOGICAL STRATEGIES AND INTERVENTIONS:

- Smoking cessation advice.
- Physical activity: encourage people with asthma to engage in regular physical activity because of its general health benefits.
- Occupational asthma:ask all patients with adult-onset asthma about their work history.
- NSAIDs including aspirin: always ask about asthma before prescribing.

❖ The written asthma action plan should include:

- The patient's usual asthma medications:
  - When and how to increase medications, and start OCS.
  - How to access medical care if symptoms fail to respond.

❖ MANAGEMENT OF ASTHMA EXACERBATIONS IN PRIMARY CARE:



O_2: oxygen; PEF: peak expiratory flow; SABA: short-acting beta$_2$-agonist (doses are for salbutamol)

❖ COPD :

Definition

COPD is the presence of shortness of breath from **lung destruction** decreasing the elastic recoil of the lungs. Most of the ability to exhale is from elastin fibers in the lungs passively allowing exhalation. This is lost in COPD, resulting in a decrease in FEV1 and FVC with an increase in the total lung capacity (TLC). COPD is not always associated with reactive airway disease such as asthma, although both are obstructive diseases.

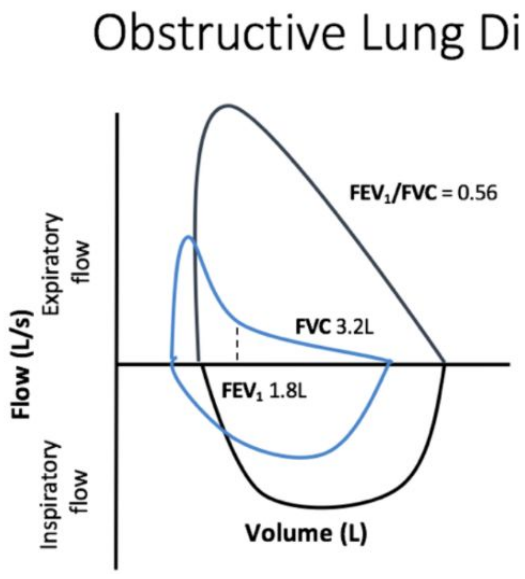
➢ Finding in history and examination:

Presence of risk factors	Cough	shortness of breath	Cyanosis
Hyperresonance on percussion	Coarse crackle	Wheezing on auscultation	Barrel chest

➢ Investigation:

- Pulmonary function testing (spirometry):
  a. This is the definitive diagnostic test.
  b. Obstruction is evident based on the following:

1. Decreased FEV 1 and decreased FEV 1 /FVC ratio—GOLD staging is based on FEV 1 . FEV 1 ≥80% of predicted value is mild disease, 50% to 80% is moderate disease, 30% to 50% is severe disease, and <30% is very severe disease.
2. Increased total lung capacity residual volume and functional reserve capacity (air trapping)
3. Decreased vital capicity.



➢ Treatment:

1. Smoking cessation
2. Inhaled anticholinergic drugs (e.g. ipratropium bromide)
3. Inhaled B2 agonist
4. Combination of 2&3.
5. Inhaled corticosteroid.
6. Theophylline
7. Oxygen (Proven to improve survival and quality of life).