

CHRONIC OBSTRUCTIVE AIRWAYS DISEASES (COPD)

For Class- B.Pharmacy 2nd Semester

Subject- Pathophysiology (BP204T)

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Definition

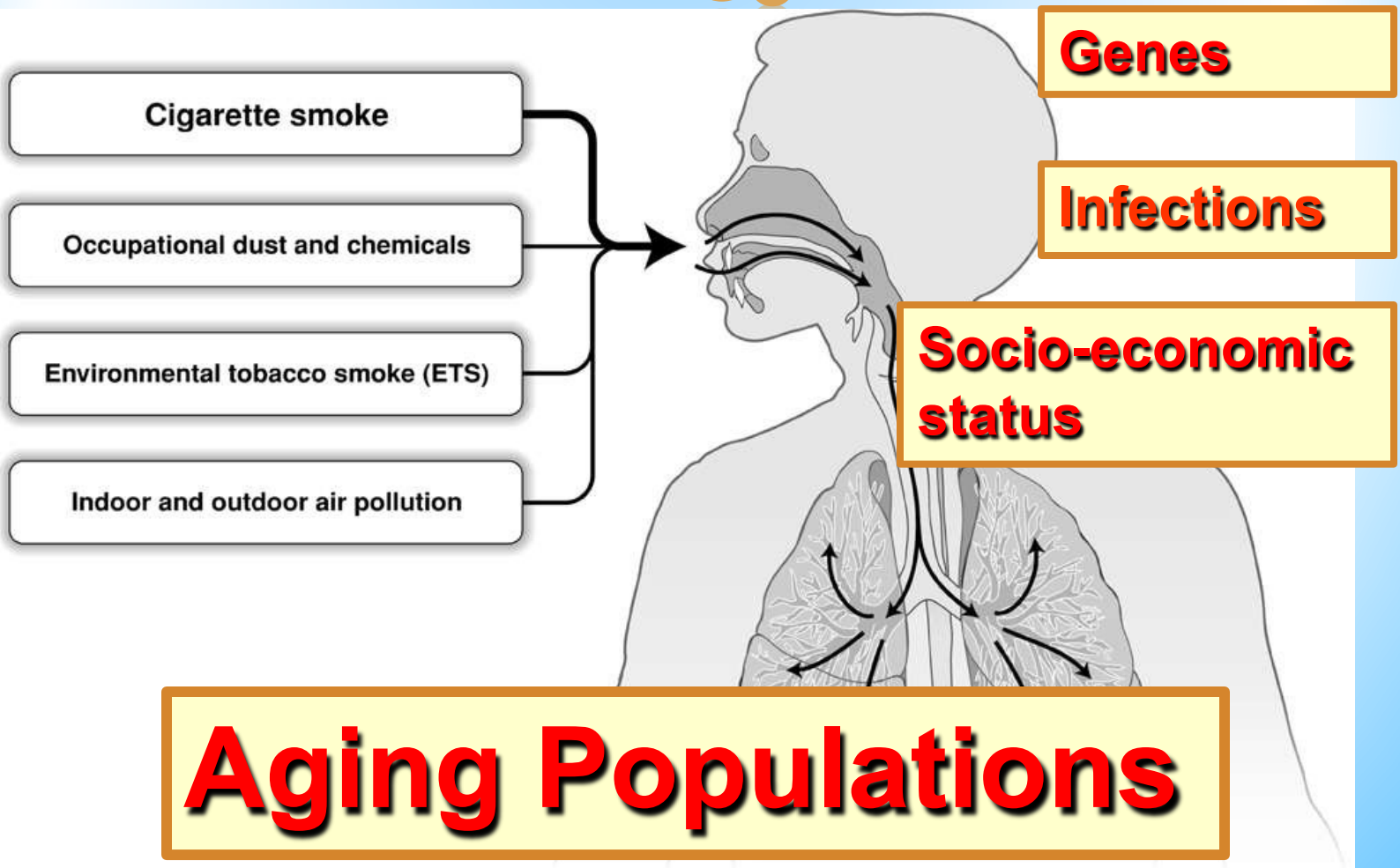
- ❧ A common **preventable** and treatable disease,
- ❧ Characterized by **persistent airflow limitation**
- ❧ Usually **progressive** and associated with an enhanced **chronic inflammatory response** in the airways and the lung to noxious particles or gases.

Epidemiology:

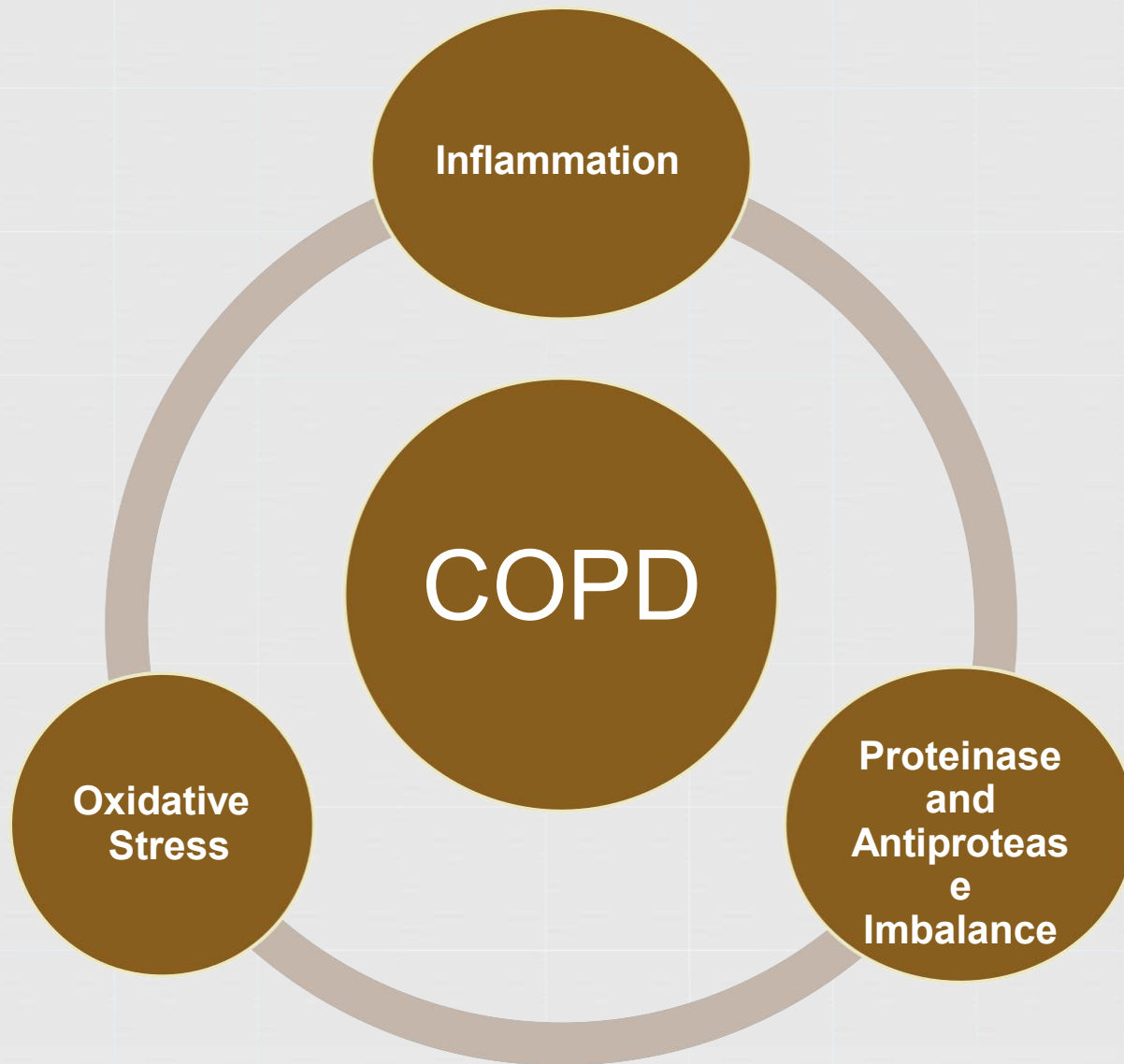


- ❧ Chronic respiratory disease including COPD is responsible for **7% of the total Disability-Adjusted Life Years (DALYs) in Malaysia** and is ranked **fifth** as the leading cause of disease burden.
- ❧ In a survey by the SEATCA in Malaysia in 2006, **7%** of the health economy burden among the three major tobacco-related diseases in Malaysia is **contributed by COPD**. (CPG,2009)
- ❧ The Global Burden of Disease Study has projected that COPD, which ranked 6th as the COD in 1990, will become 3rd leading COD worldwide by 2020 (Murray & Lopez, 1997)

Risk factors:

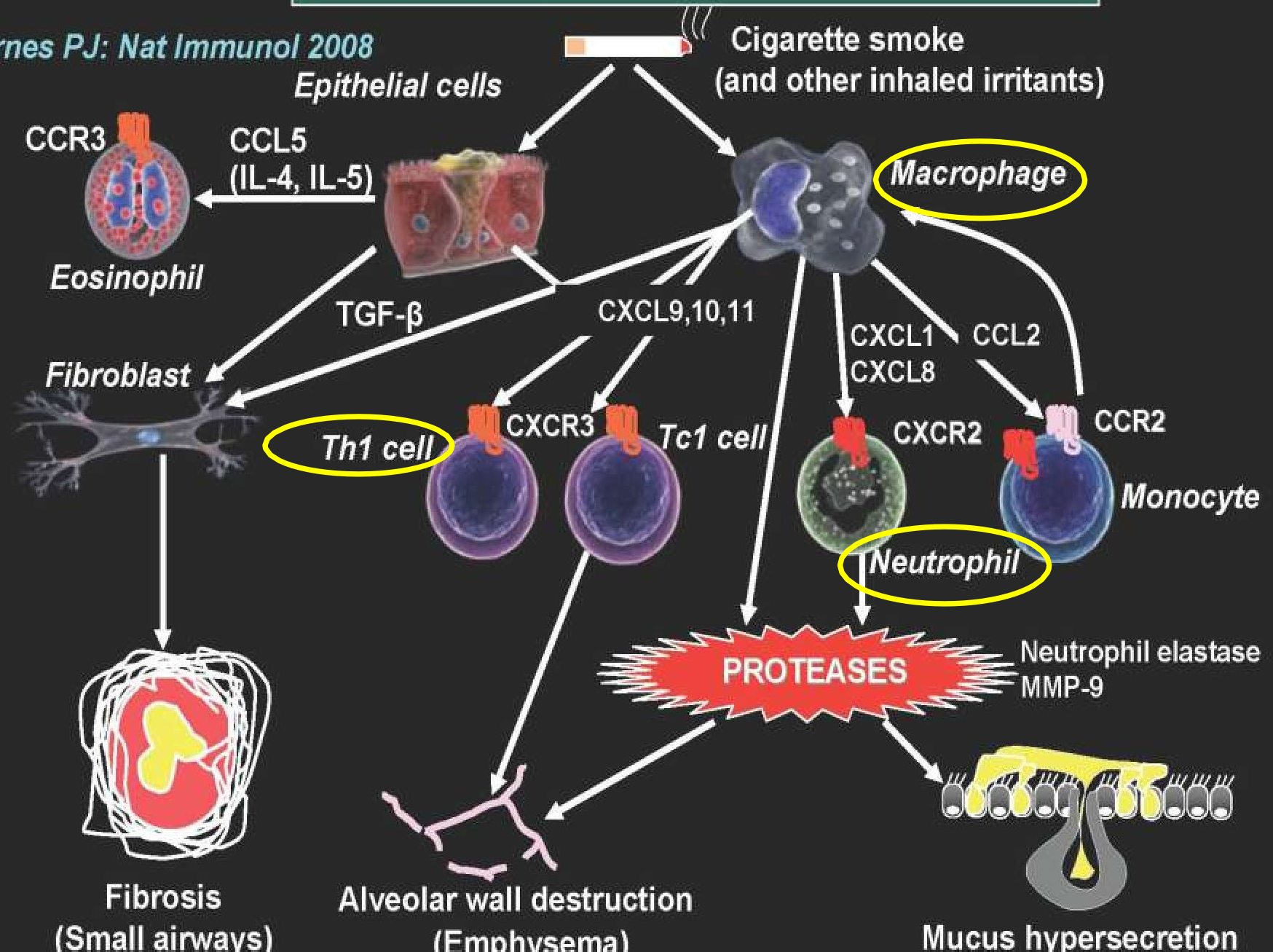


Pathogenesis:



CELLULAR MECHANISMS OF COPD

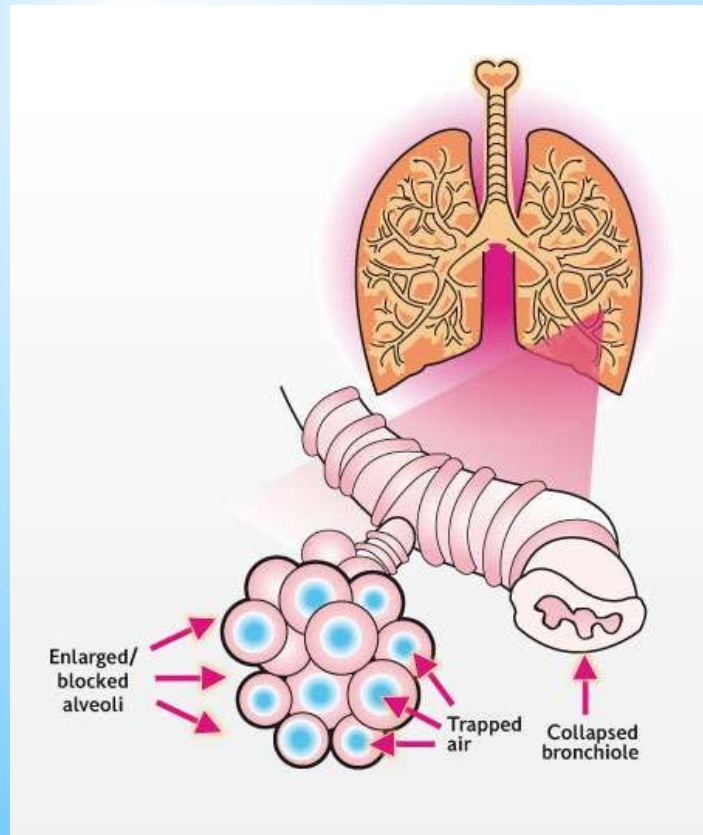
Barnes PJ: Nat Immunol 2008



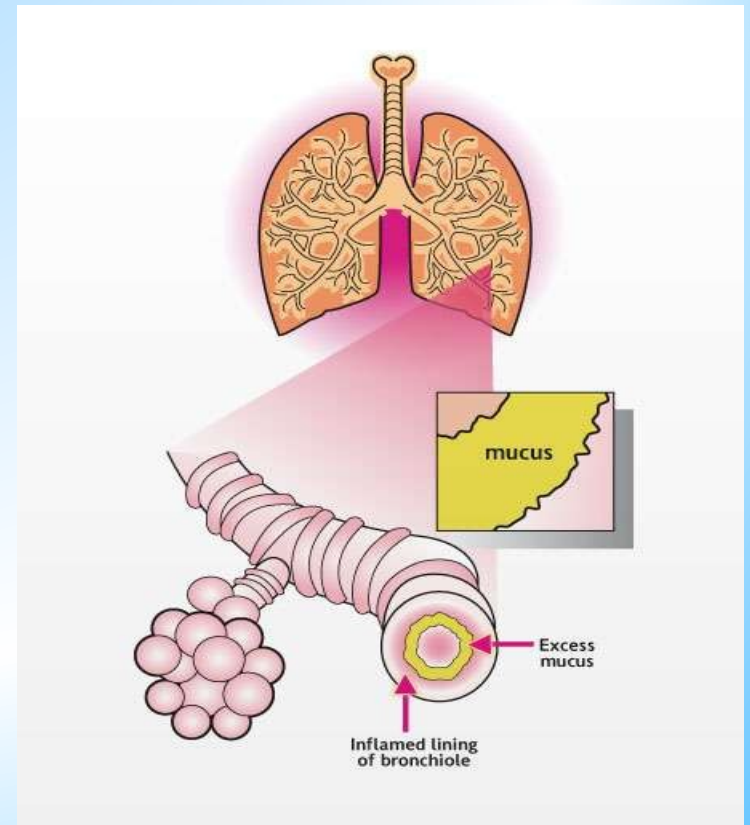
Pathophysiology:



Structural changes



Mucociliary Dysfunction



*Clinical Manifestation:



SYMPTOMS

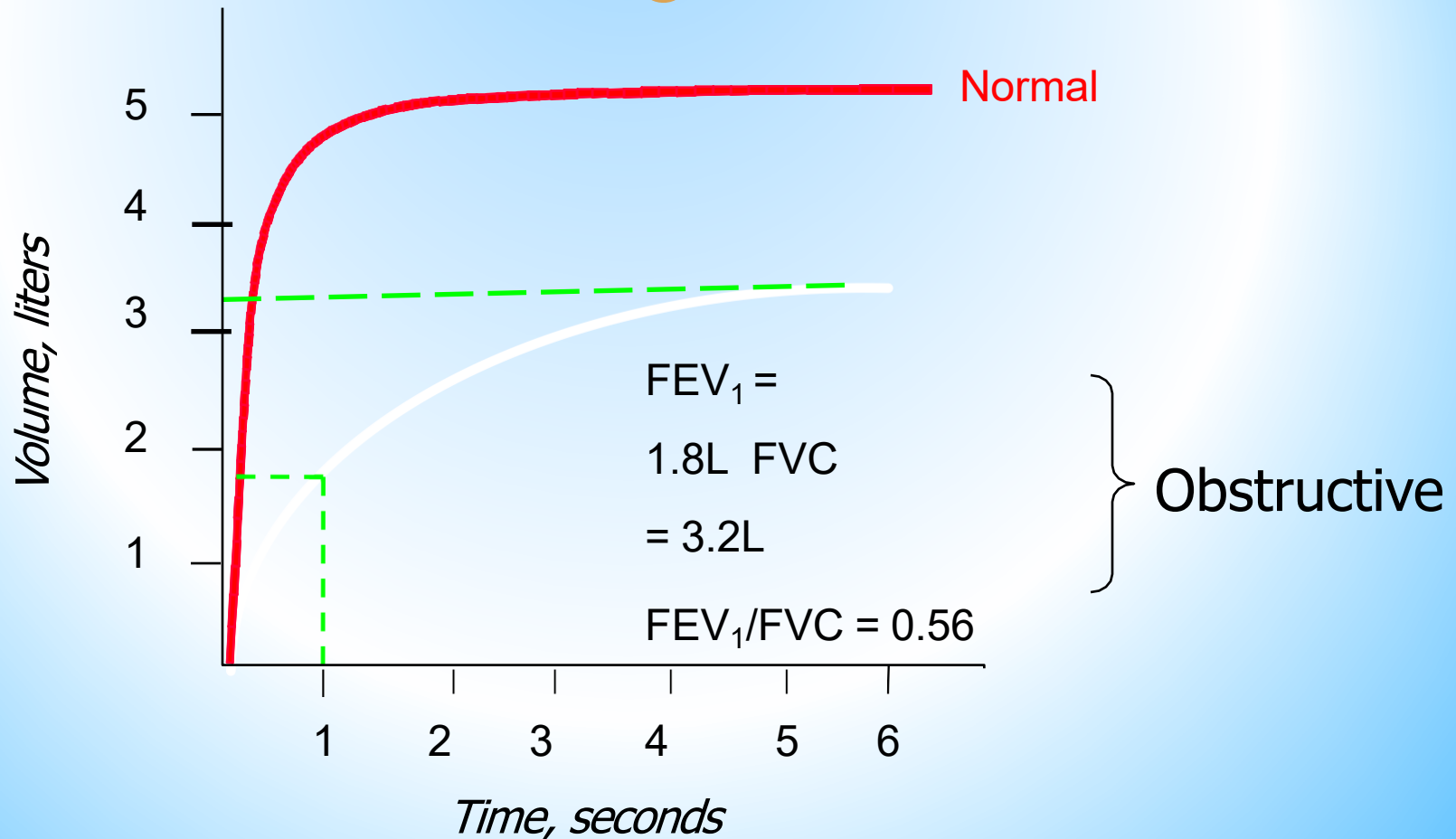
shortness of
breath
chronic cough
sputum

EXPOSURE TO RISK FACTORS

tobacco
occupatio
indoor/outdoor
pollution

SPIROMETRY: Required to establish
diagnosis

* Spirometry (post-bronchodilator usage)



Additional Investigations



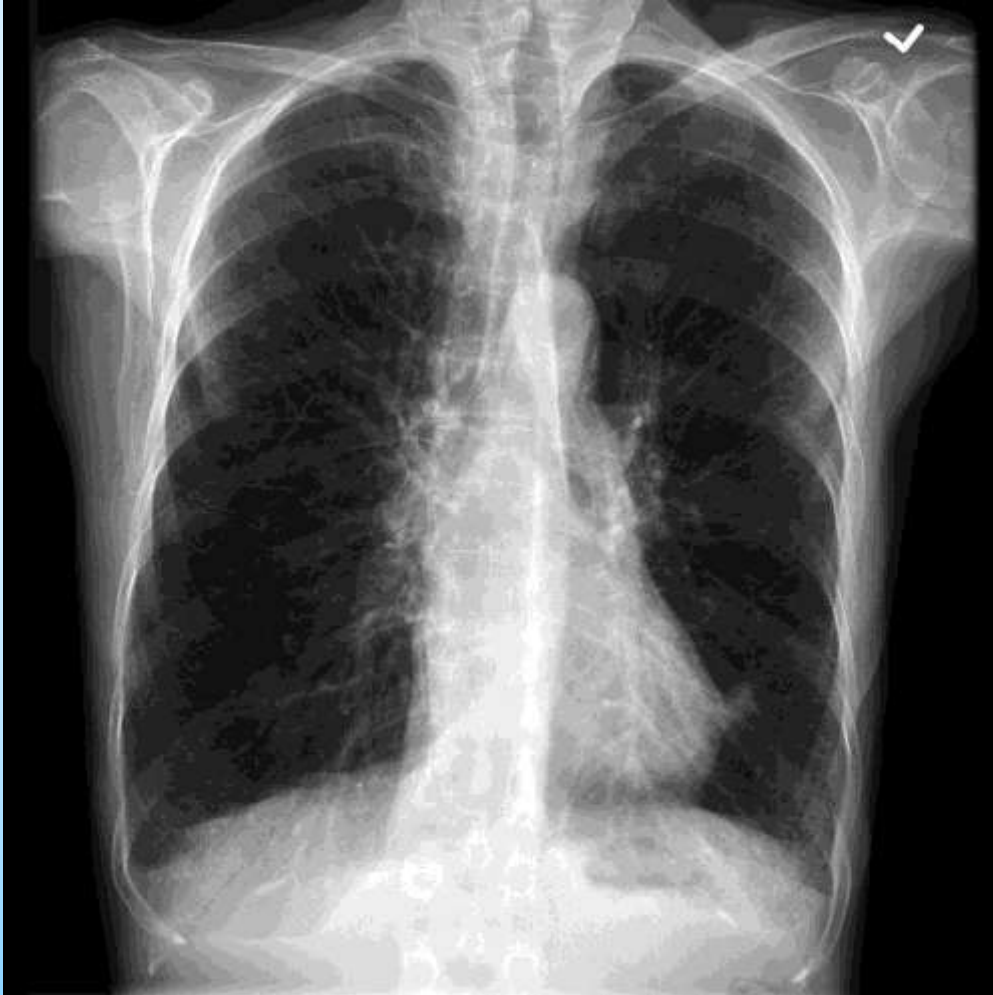
Chest X-ray: Seldom diagnostic but valuable to exclude alternative diagnoses and establish presence of significant comorbidities.

Lung Volumes and Diffusing Capacity: Help to characterize severity, but not essential to patient management.

Oximetry and Arterial Blood Gases: Pulse oximetry can be used to evaluate a patient's oxygen saturation and need for supplemental oxygen therapy.

Alpha-1 Antitrypsin Deficiency Screening: Perform when COPD develops in patients of Caucasian descent under 45 years or with a strong family history of COPD.

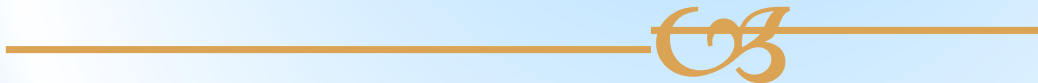
CXR



“This case demonstrates unequivocal and marked hyperinflation secondary to emphysema.

Assessment of COPD severity

Consider the following aspects of the disease separately:



- current level of patient's symptoms
- severity of the spirometric abnormality
 - frequency of exacerbations
 - presence of comorbidities.

1. Assess

Use the COPD Assessment Test(CAT)
or
mMRC Breathlessness scale

Modified MRC (mMRC) Questionnaire

PLEASE TICK IN THE BOX THAT APPLIES TO YOU
(ONE BOX ONLY)

mMRC Grade 0. I only get breathless with strenuous exercise.

☐

mMRC Grade 1. I get short of breath when hurrying on the level
or walking up a slight hill.

☐

mMRC Grade 2. I walk slower than people of the same age on the
level because of breathlessness, or I have to stop for breath when
walking on my own pace on the level.

☐

mMRC Grade 3. I stop for breath after walking about 100 meters or
after a few minutes on the level.

☐

mMRC Grade 4. I am too breathless to leave the house or I am
breathless when dressing or undressing.

☐

2. Severity of Airflow Limitation in COPD



In patients with $FEV_1/FVC < 0.70$:

GOLD 1: Mild

$FEV_1 \geq 80\%$ predicted

GOLD 2: Moderate

$50\% \leq FEV_1 < 80\%$ predicted

GOLD 3: Severe

$30\% \leq FEV_1 < 50\%$ predicted

GOLD 4: Very Severe

$FEV_1 < 30\%$ predicted

**Based on Post-Bronchodilator FEV_1*

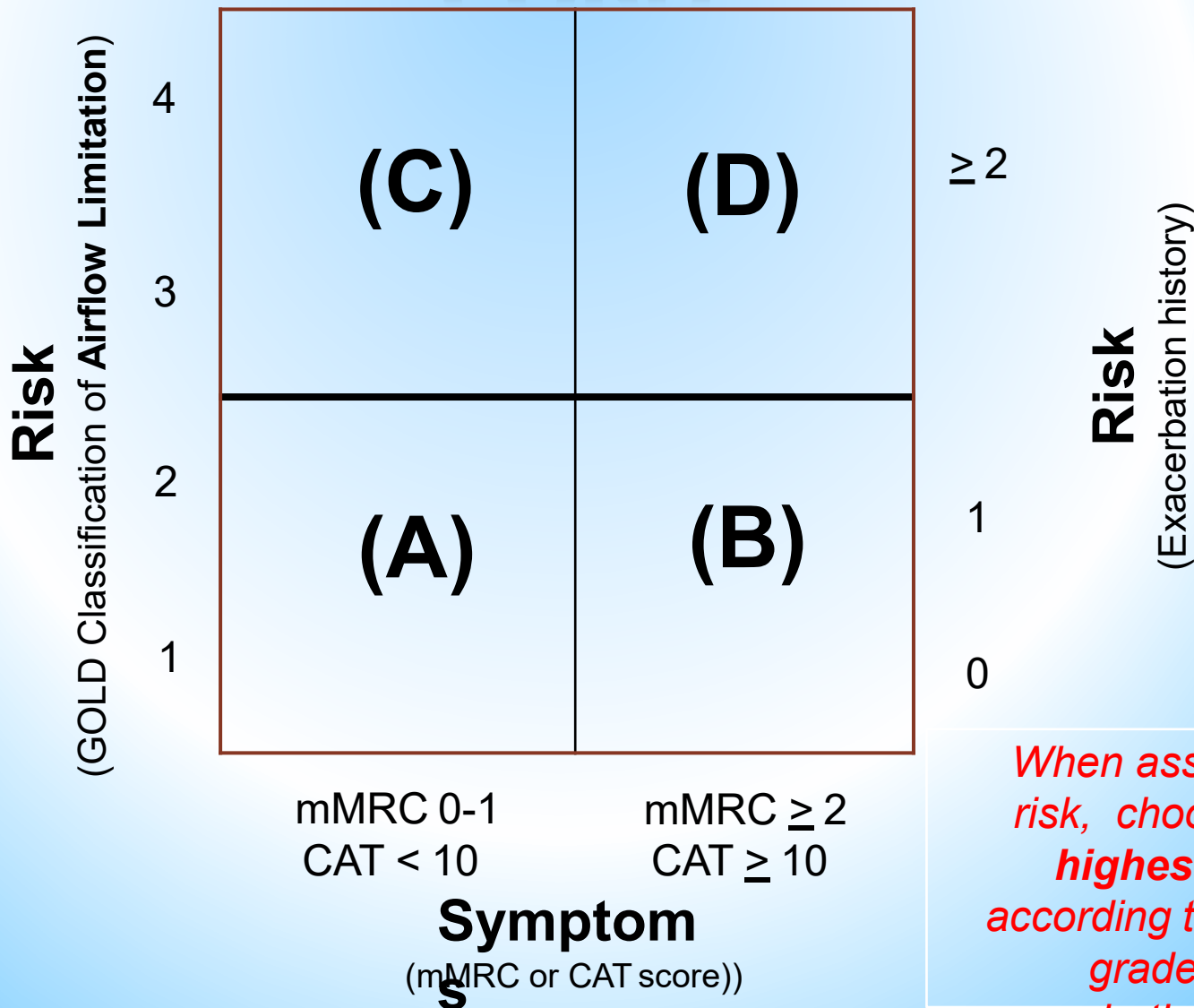
3. Assess Risk of Exacerbations



To assess risk of exacerbations use history of exacerbations and spirometry:

- Two or more exacerbations within the last year *or* an $FEV_1 < 50\%$ of predicted value are indicators of high risk.

Combined Assessment of COPD



4. Assess COPD Comorbidities



COPD patients are at increased risk for:

- Cardiovascular diseases
- Osteoporosis
- Respiratory infections
- Anxiety and Depression
- Diabetes
- Lung cancer

These comorbid conditions may influence mortality and hospitalizations and should be looked for routinely, and treated appropriately.

Difference between Asthma & COPD

Clinical features	Asthma	COPD
Age of onset	Usually early childhood, but may have onset at any age	Usually > 40 years old
Smoking history	May be non-, ex- or current smoker	Usually > 10 pack-years
Atopy	Often	Infrequent
Family history	Asthma or other atopic disorders commonly present	Not a usual feature
Clinical symptoms	Intermittent and variable	Persistent and gradually progressive worsening
Cough	Nocturnal cough or on exertion	Morning cough with sputum
Sputum production	Infrequent	Often
Reversibility of airflow obstruction	Characteristic of asthma	Airflow limitation may improve but never normalises
Exacerbations	Common at all levels of severity except in mild disease	Increase in frequency with increasing severity of disease

Extracted from: CPG Management of COPD 2nd edition, 2009)

Manage Stable COPD: Goals of Therapy



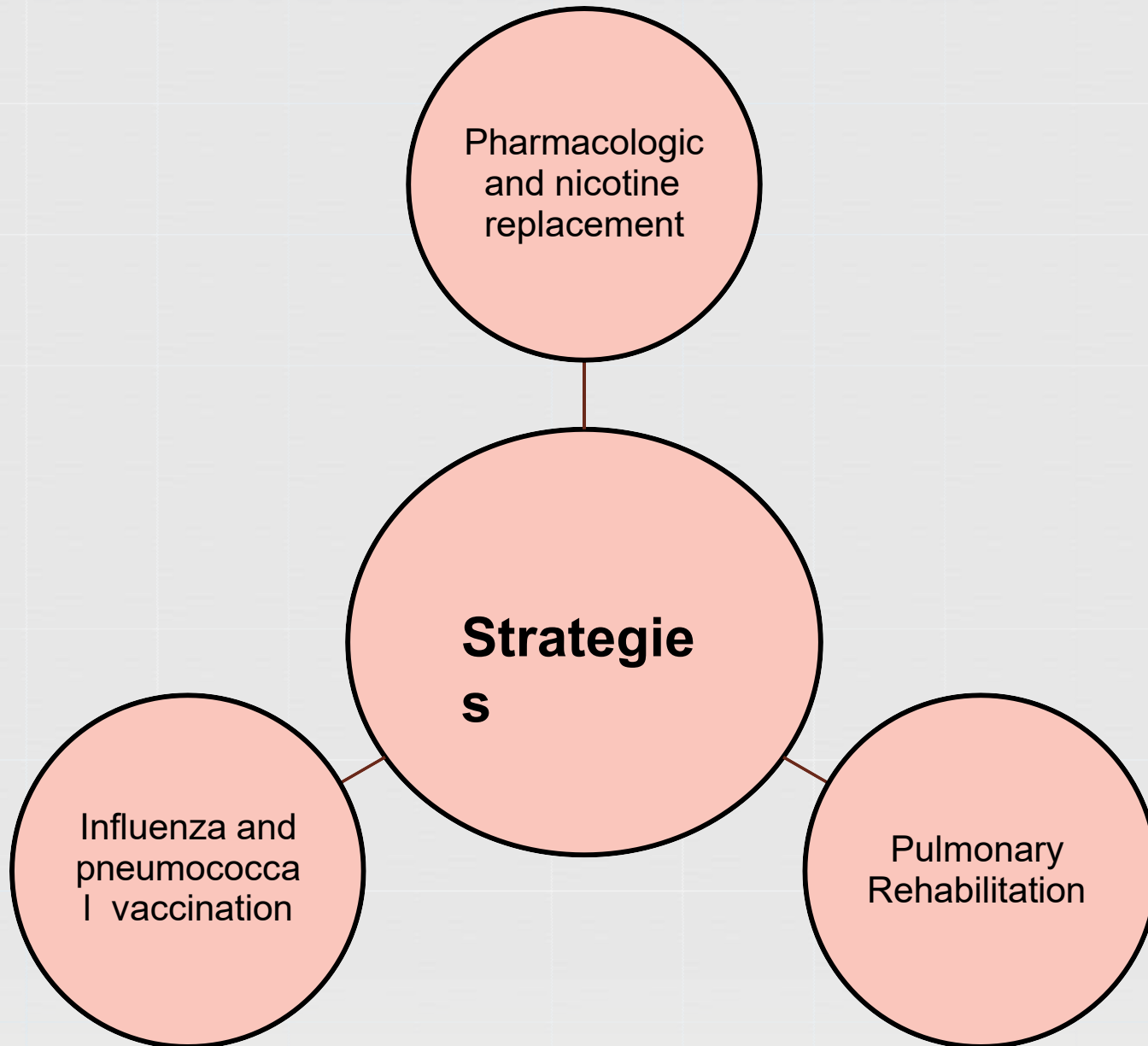
- Relieve symptoms
- Improve exercise tolerance
- Improve health status

Reduce symptoms

- Prevent disease progression
- Prevent and treat exacerbations
- Reduce mortality

Reduce risk

Management Strategies



Pulmonary Rehabilitation



❧ **Exercise training**

-10 to 45 minutes per session, at least 6 weeks.

❧ **Smoking cessation**

-ASK,ADVICE,ASSESS,ASSIST,ARRANGE

❧ **Nutrition counseling**

-Patient show reduction in body mass index and fat free mass. Independent risk factor for mortality in COPD cases.

-Advice to increase calorie intake with exercise regimen that have nonspecific anabolic action.

❧ **Education**

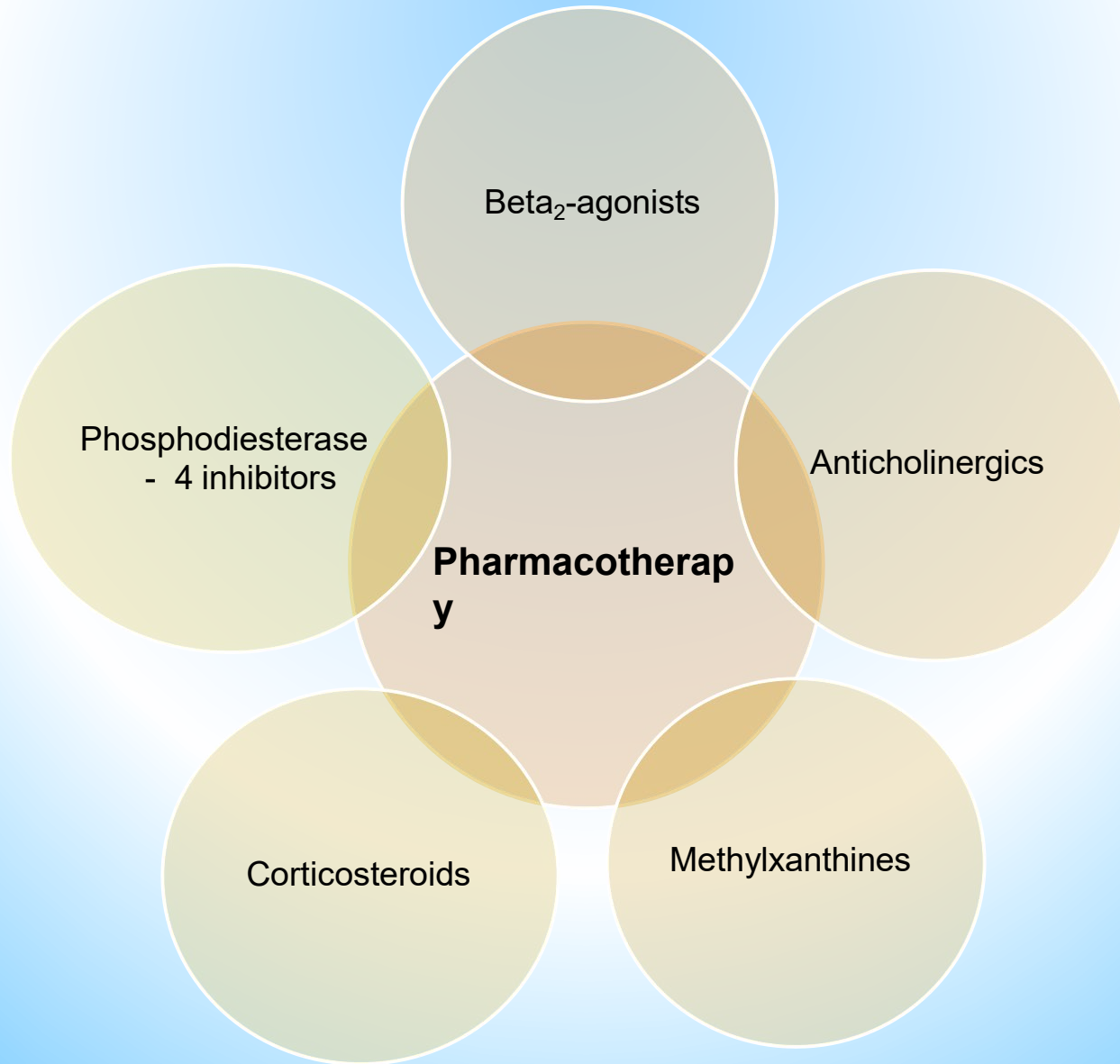
-Basic information on COPD, general approach to management, & when to seek help

Manage Stable COPD: Non-pharmacologic



Patient	Essential	Recommended	Depending on local guidelines
A	Smoking cessation (can include pharmacologic treatment)	Physical activity	Flu vaccination Pneumococcal vaccination
B, C, D	Smoking cessation (can include pharmacologic treatment) Pulmonary rehabilitation	Physical activity	Flu vaccination Pneumococcal vaccination

COPD Medication



Manage Stable COPD: Pharmacologic Therapy

Patient	First choice	Second choice	Alternative Choices
A	SAMA prn or SABA prn	LAMA or LABA or SABA and SAMA	Theophylline
B	LAMA or LABA	LAMA and LABA	SABA <i>and/or</i> SAMA Theophylline
C	ICS + LABA or LAMA	LAMA and LABA	PDE4-inh. SABA <i>and/or</i> SAMA Theophylline
D	ICS + LABA or LAMA	ICS and LAMA <i>or</i> ICS + LABA and LAMA <i>or</i> ICS+LABA and PDE4-inh. <i>or</i> LAMA and LABA <i>or</i> LAMA and PDE4-inh.	Carbocysteine SABA <i>and/or</i> SAMA Theophylline

Complications:



- ❧ Cor pulmonale
- ❧ Acute exacerbation of COPD
- ❧ Pulmonary Hypertension
- ❧ Pneumothorax
- ❧ Secondary polycythemia
- ❧ Respiratory failure