Respiratory Care Seminar Update in COPD

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No conflict of interests to disclose

Overview

- Epidemiology
- Causes and Pathophysiology
- Diagnosis and Assessment
- Prevention and Management
- COPD Exacerbations

COPD DEFINITION

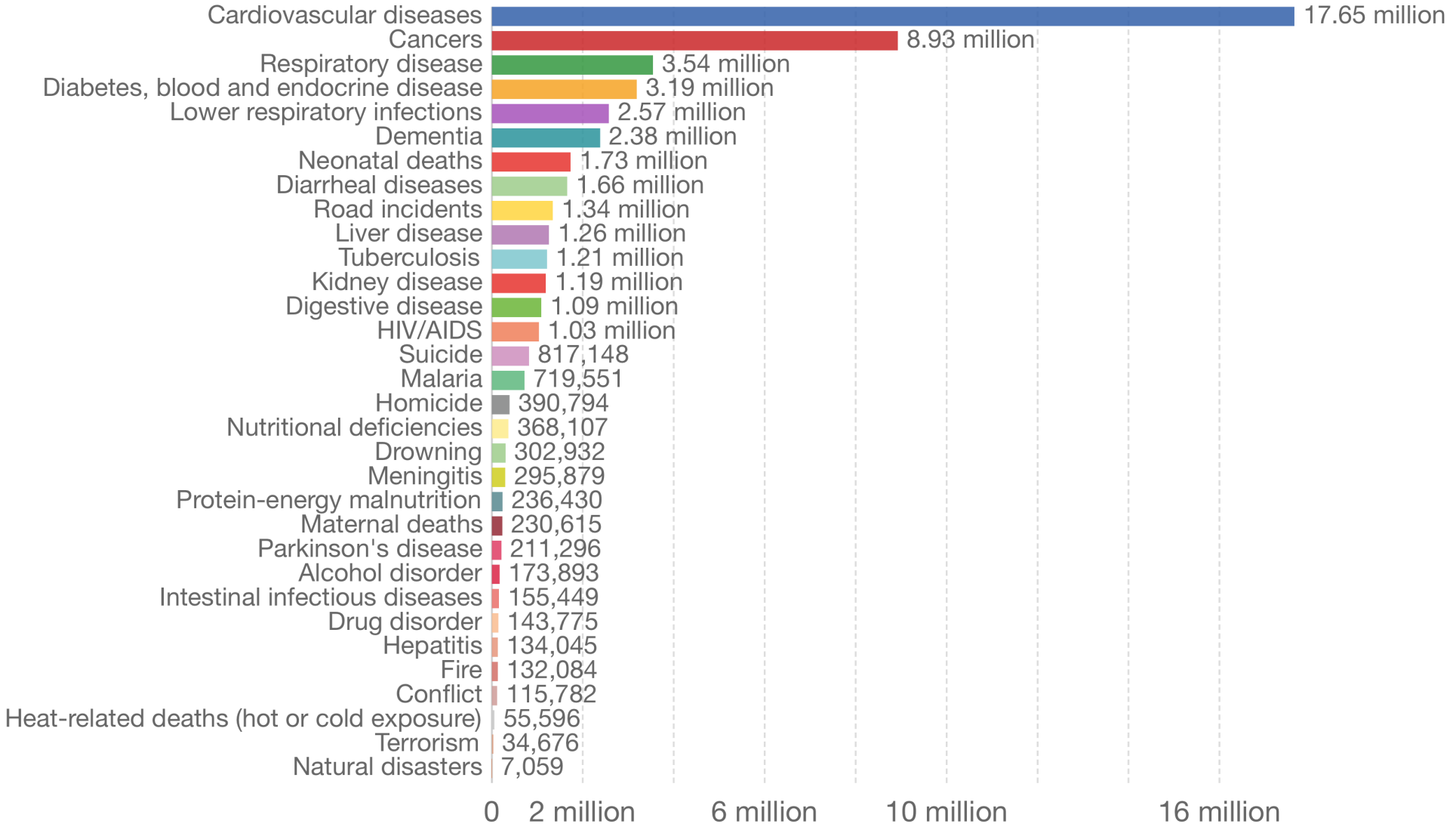
- A common, preventable and treatable disease that is characterized by persistent respiratory symptoms and airflow limitation that is due to airway and/or alveolar abnormalities usually caused by significant exposure to noxious particles or gases.

EPIDEMIOLOGY

- 4th leading cause of death in the world
- Projected to be the 3rd leading cause of death by 2020
- Estimated 384 million in 2010, with a global prevalence of 11.7%
- 3 million deaths annually.
- By 2030 expected to be over 4.5 million deaths annually from COPD and related conditions.

Annual number of deaths by cause, World, 2016

Data refers to the specific cause of death, which is distinguished from risk factors for death, such as air pollution, diet and other lifestyle factors. See sources for further details on definitions of specific cause categories.

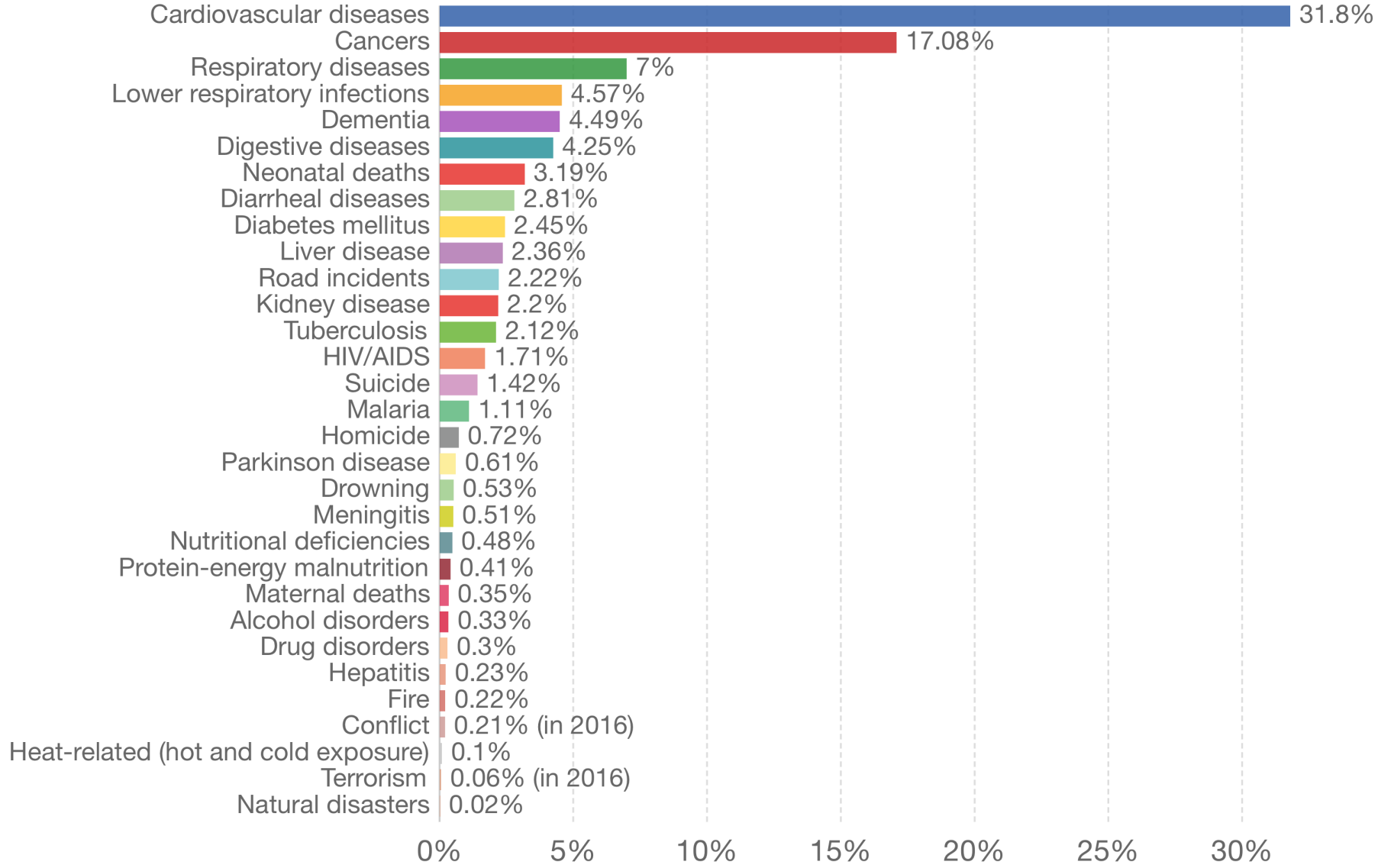


Source: Institute for Health Metrics and Evaluation (IHME); Global Terrorism Database (GTD); Amnesty International

Share of deaths by cause, World, 2017

Data refers to the specific cause of death, which is distinguished from risk factors for death, such as air pollution, diet and other lifestyle factors. This is shown by cause of death as the percentage of total deaths.

Our World in Data



Source: IHME, Global Burden of Disease

COST OF COPD

- Europe: 6% of the total healthcare budget, with COPD accounting for 56% (38.6 billion Euros)

- United States: estimated direct costs of COPD are $32 billion and the indirect costs $20.4 billion.

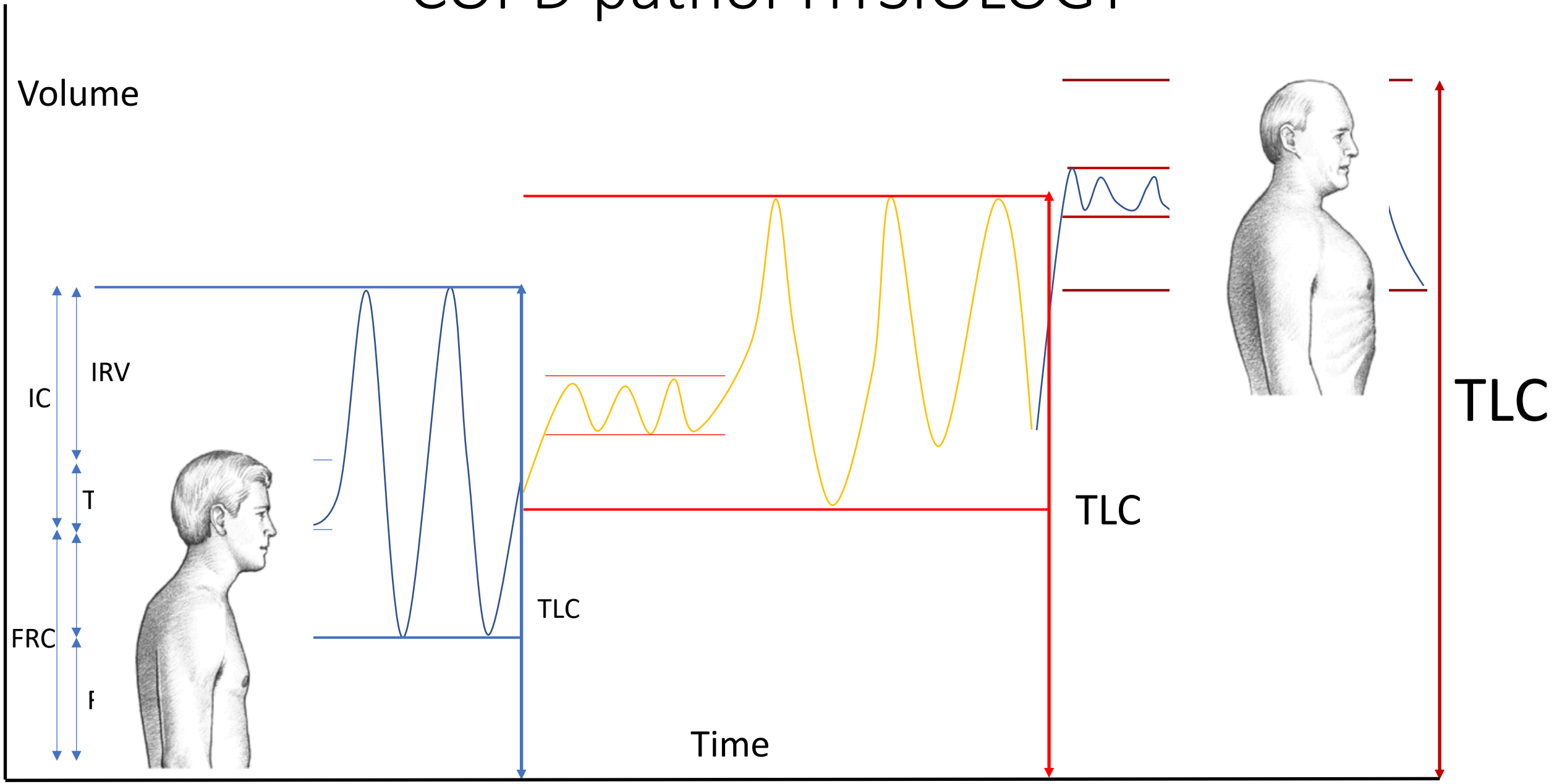
Causes

- Genetic Factors: Genetic association, Alpha 1 antitrypsin deficiency, Cutis Laxa
- Chronic inflammation: Chronic inhalation of irritants, including cigarette smoke, biomass fuel smoke and air pollutants
- Defective endogenous anti-ageing mechanisms
- Increased oxidative stress

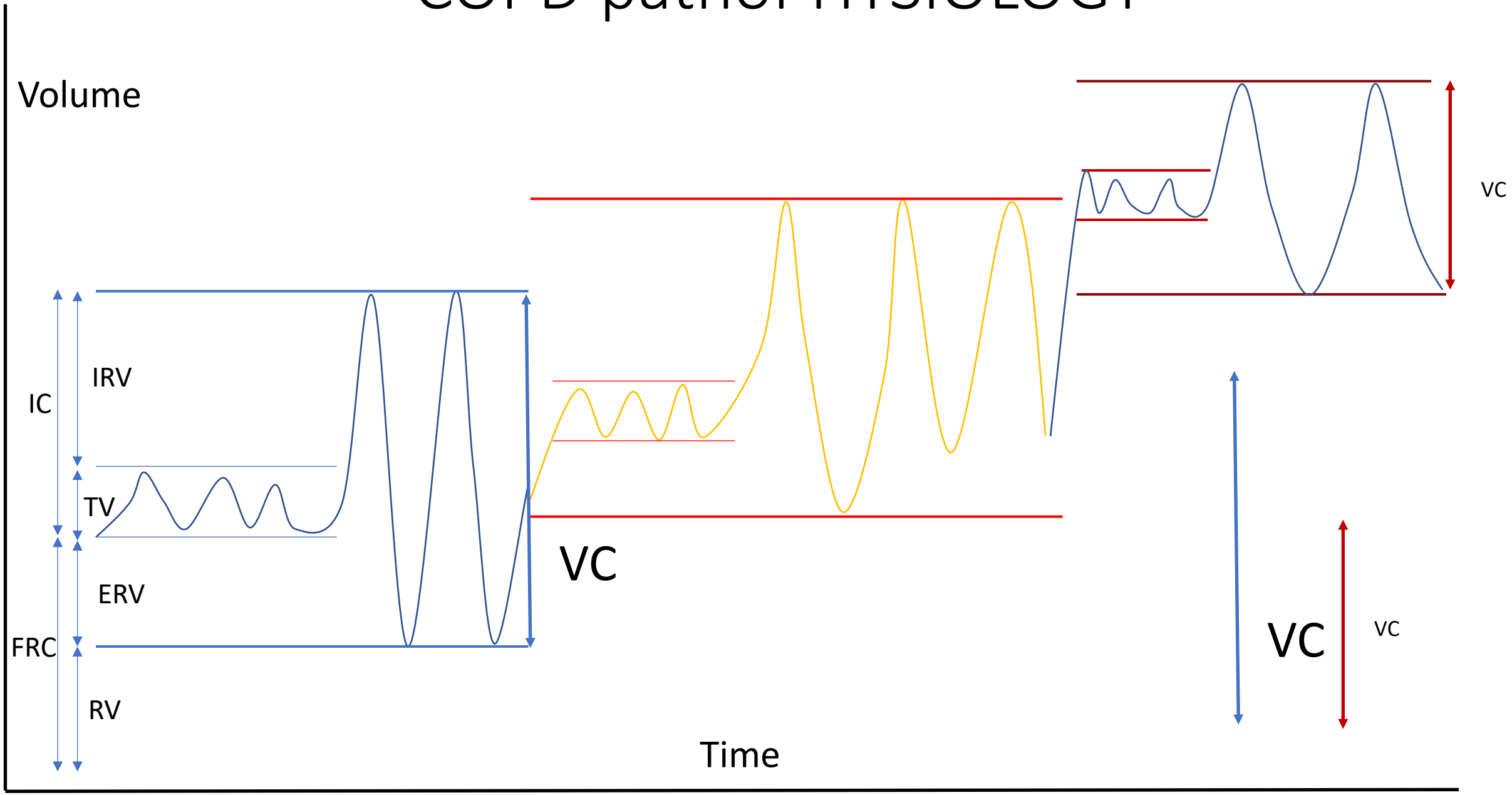
Causes

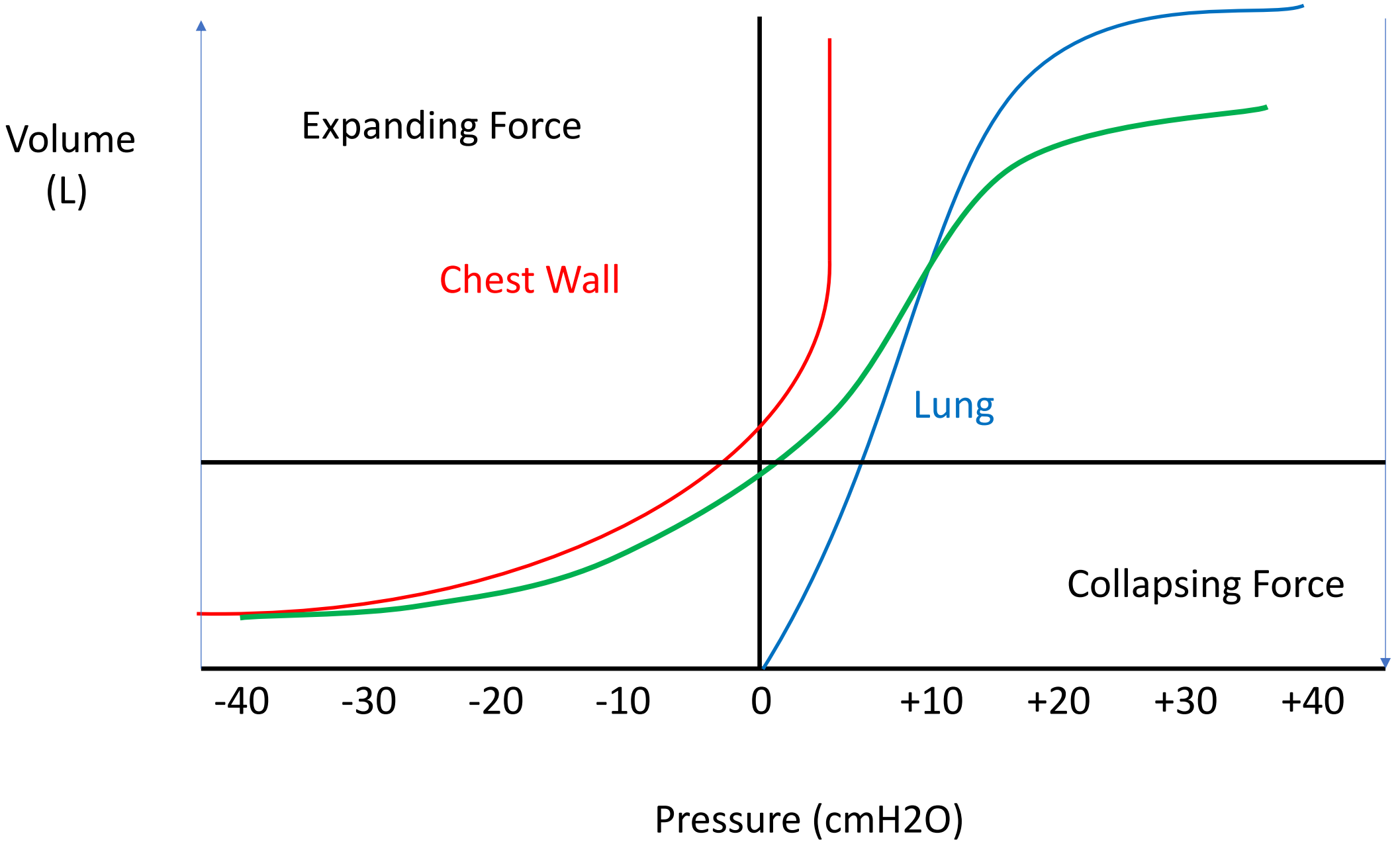
- Indoor biomass exposure to modern and traditional fuels used during cooking may predispose women to develop COPD in many developing countries. (Sana *et al.* 2018)
- Poverty is consistently associated with airflow obstruction and lower socioeconomic status is associated with an increased risk of developing COPD. (Townend *et al.* 2017)
- HIV patients are at increased risk of COPD compared to HIV negative controls (11 studies; pooled odds ratio for 1.14 (95% CI 1.05,1.25). (Bigna *et al.* 2018)

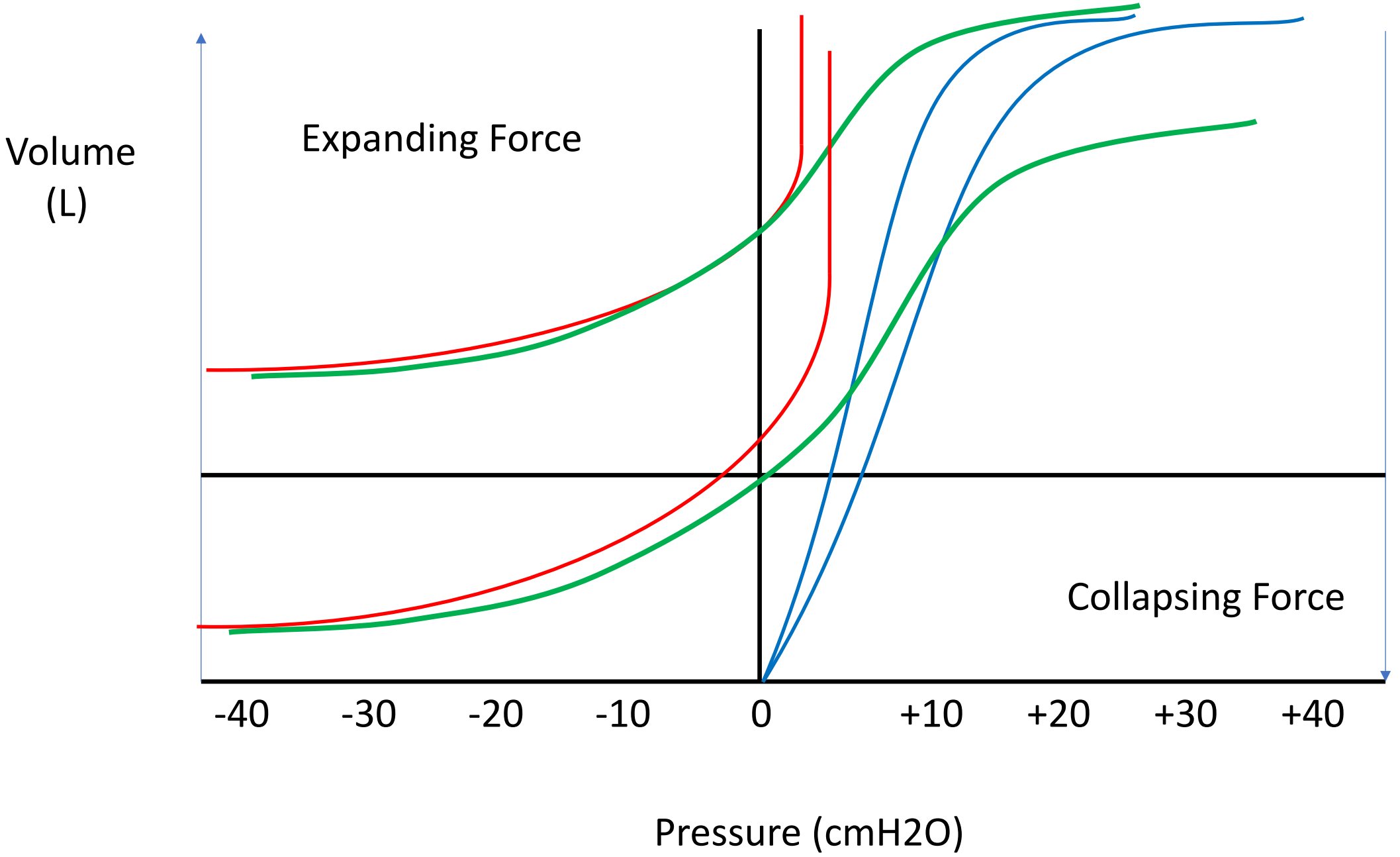
COPD pathoPHYSIOLOGY



COPD pathoPHYSIOLOGY




Volume
(L)
Expanding Force
Chest Wall
Lung
Collapsing Force
-40
-30
-20
-10
0
+10
+20
+30
+40
Pressure (cmH2O)


Volume
(L)
Expanding Force
Collapsing Force
-40
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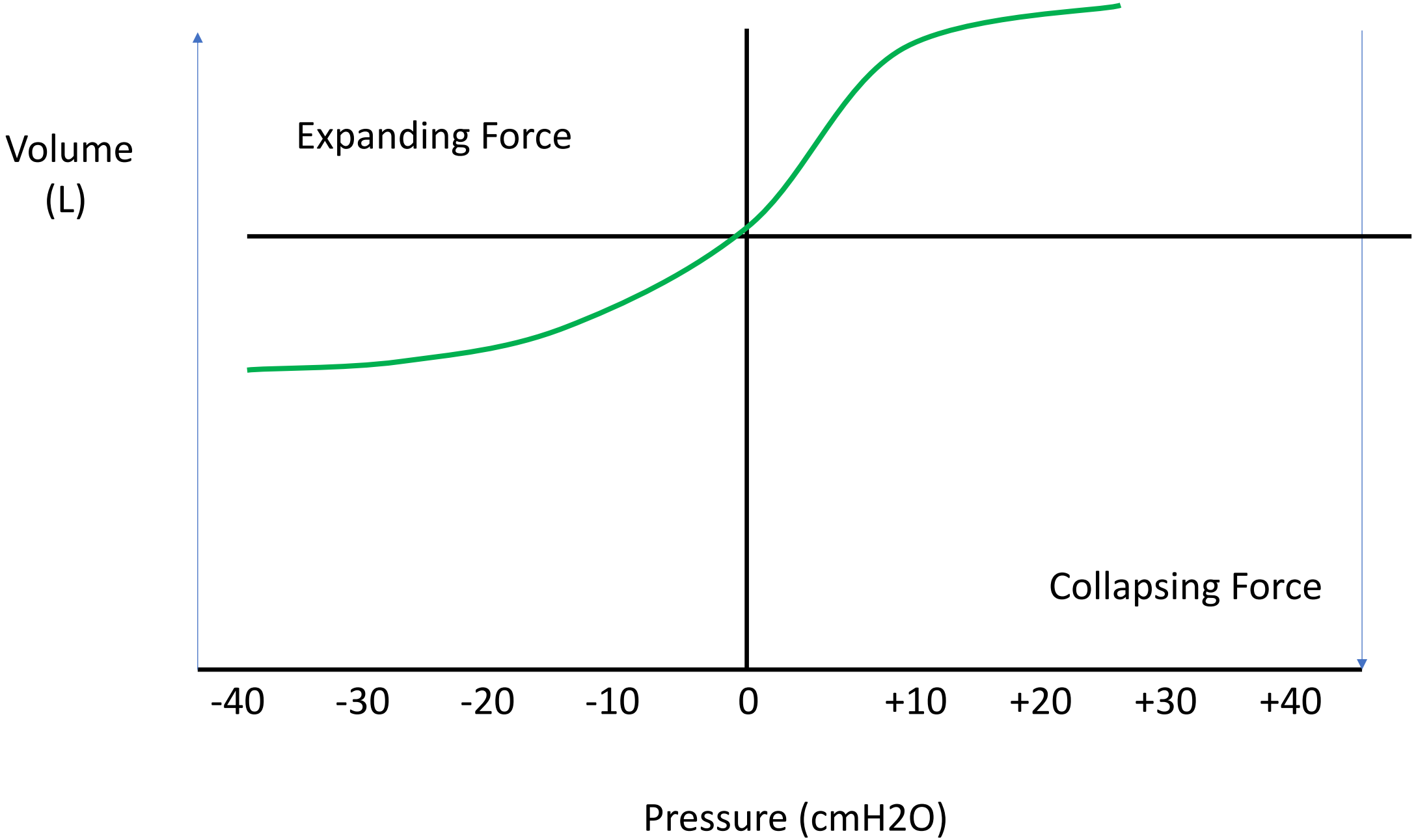
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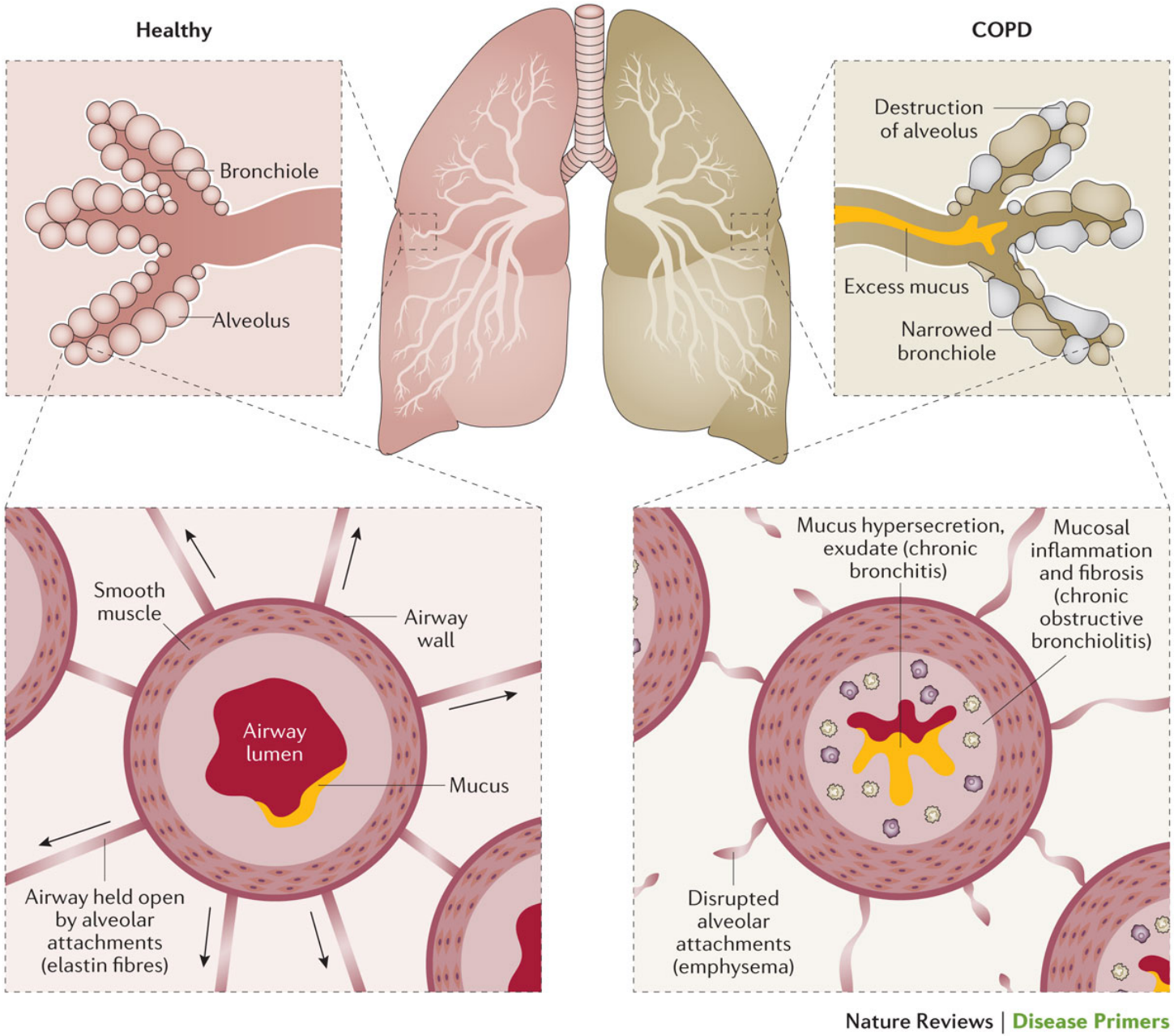


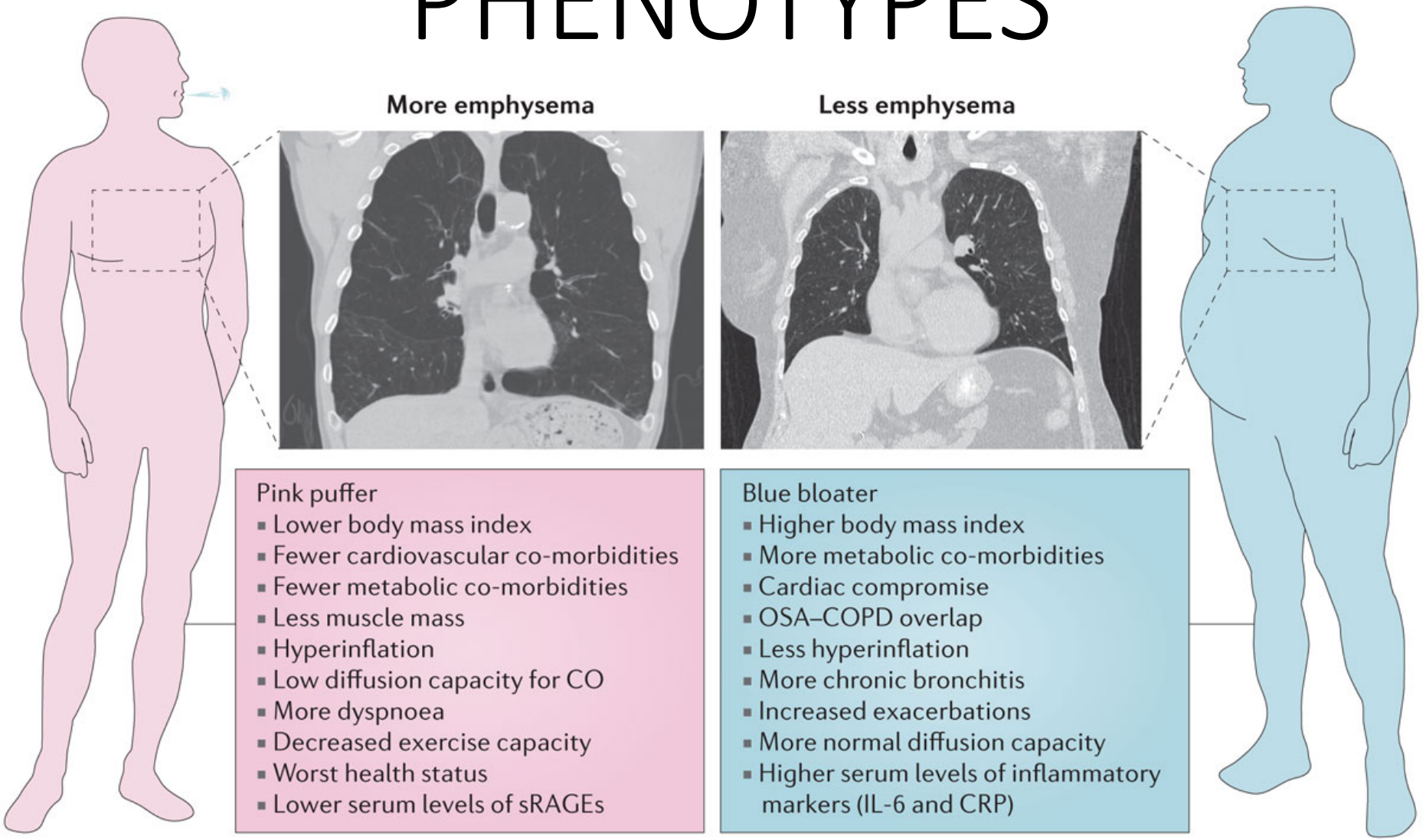
Barnes, P. J. *et al. Nat. Rev.*2015

CLINICAL PRESENTATION

- Cough with sputum production is present in up to 30% of patients
- Dyspnea
- Wheezing and chest tightness
- Fatigue, weight loss and anorexia

- History of exacerbations or previous hospitalizations for respiratory disorder
- Smoking History
- Family History

PHENOTYPES



Nature Reviews | Disease Primers

Barnes, P. J. *et al. Nat. Rev.*2015

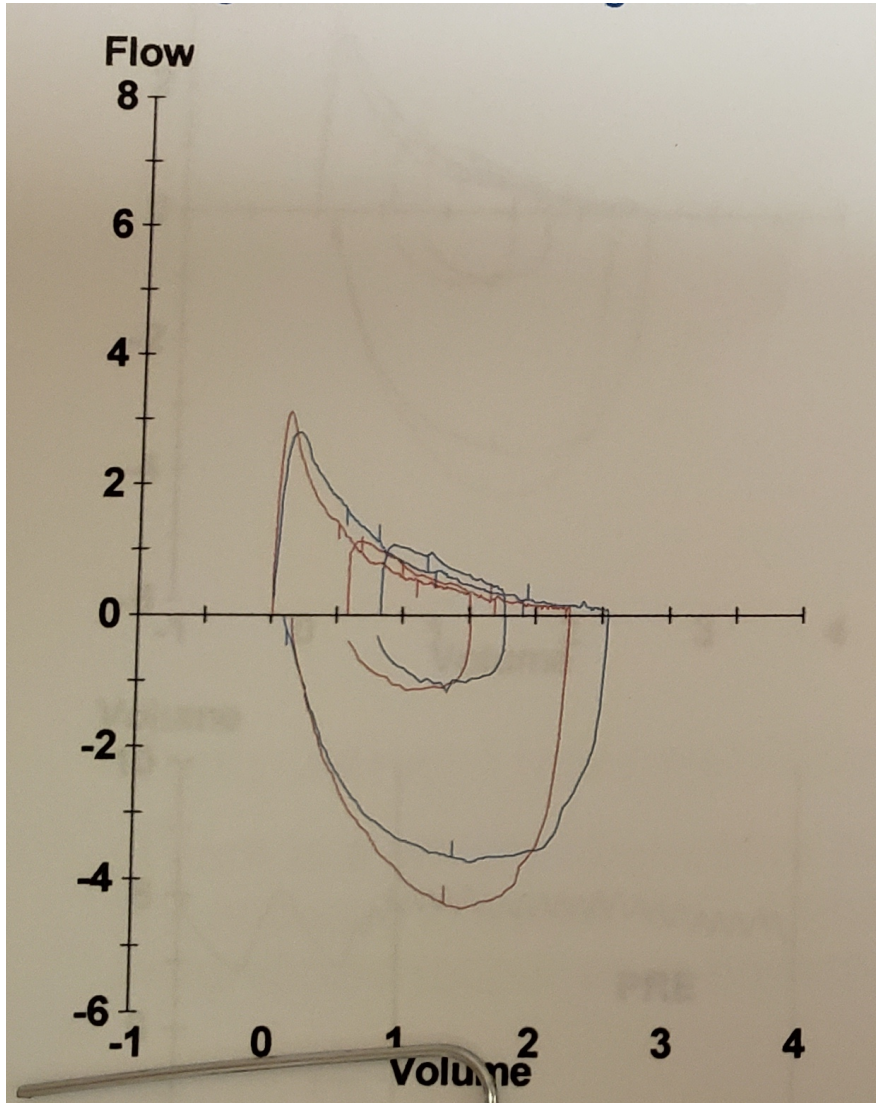
DIAGNOSIS

- Expiratory airflow limitation during a forced expiratory manoeuvre from total lung capacity to residual volume

- Low FEV_1
- Ratio of $FEV_1/FVC < 0.7$

Spirometry

- Diagnosis
- Assessment of severity
- Follow up assessment
  - Therapeutic decision
  - Identify rapid decline
  - Is this COPD?



CONSIDERATIONS IN PERFORMING SPIROMETRY

PREPARATION

- Spirometers need calibration on a regular basis.
- Spirometers should produce hard copy or have a digital display of the expiratory curve to permit detection of technical errors or have an automatic prompt to identify an unsatisfactory test and the reason for it.
- The supervisor of the test needs training in optimal technique and quality performance.
- Maximal patient effort in performing the test is required to avoid underestimation of values and hence errors in diagnosis and management.

BRONCHODILATION

- Possible dosage protocols are 400 mcg short-acting beta$_2$-agonist, 160 mcg short-acting anticholinergic, or the two combined.[a] FEV_1 should be measured 10-15 minutes after a short-acting beta$_2$-agonist is given, or 30-45 minutes after a short-acting anticholinergic or a combination of both classes of drugs.

PERFORMANCE

- Spirometry should be performed using techniques that meet published standards.[b]
- The expiratory volume/time traces should be smooth and free from irregularities. The pause between inspiration and expiration should be < 1 second.
- The recording should go on long enough for a volume plateau to be reached, which may take more than 15 seconds in severe disease.
- Both FVC and FEV_1 should be the largest value obtained from any of three technically satisfactory curves and the FVC and FEV_1 values in these three curves should vary by no more than 5% or 150 ml, whichever is greater.
- The FEV_1/FVC ratio should be taken from the technically acceptable curve with the largest sum of FVC and FEV_1.

EVALUATION

- Spirometry measurements are evaluated by comparison of the results with appropriate reference values based on age, height, sex, and race.
- The presence of a postbronchodilator FEV_1/FVC < 0.70 confirms the presence of airflow limitation.

a Pellegrino et al. Eur Respir J 2005; 26(5): 948-68;
b Miller et al. Eur Respir J 2005; 26(2): 319-38.

TABLE 2.3

Additional Investigations

- Alpha 1 anti-trypsin
- Imaging CXR/CT scans
- Lung Volumes / Diffusing Capacity
- Pulse Oximetry
- Exercise Testing
- BODE index

Table 2. Variables and Point Values Used for the Computation of the Body-Mass Index, Degree of Airflow Obstruction and Dyspnea, and Exercise Capacity (BODE) Index.*

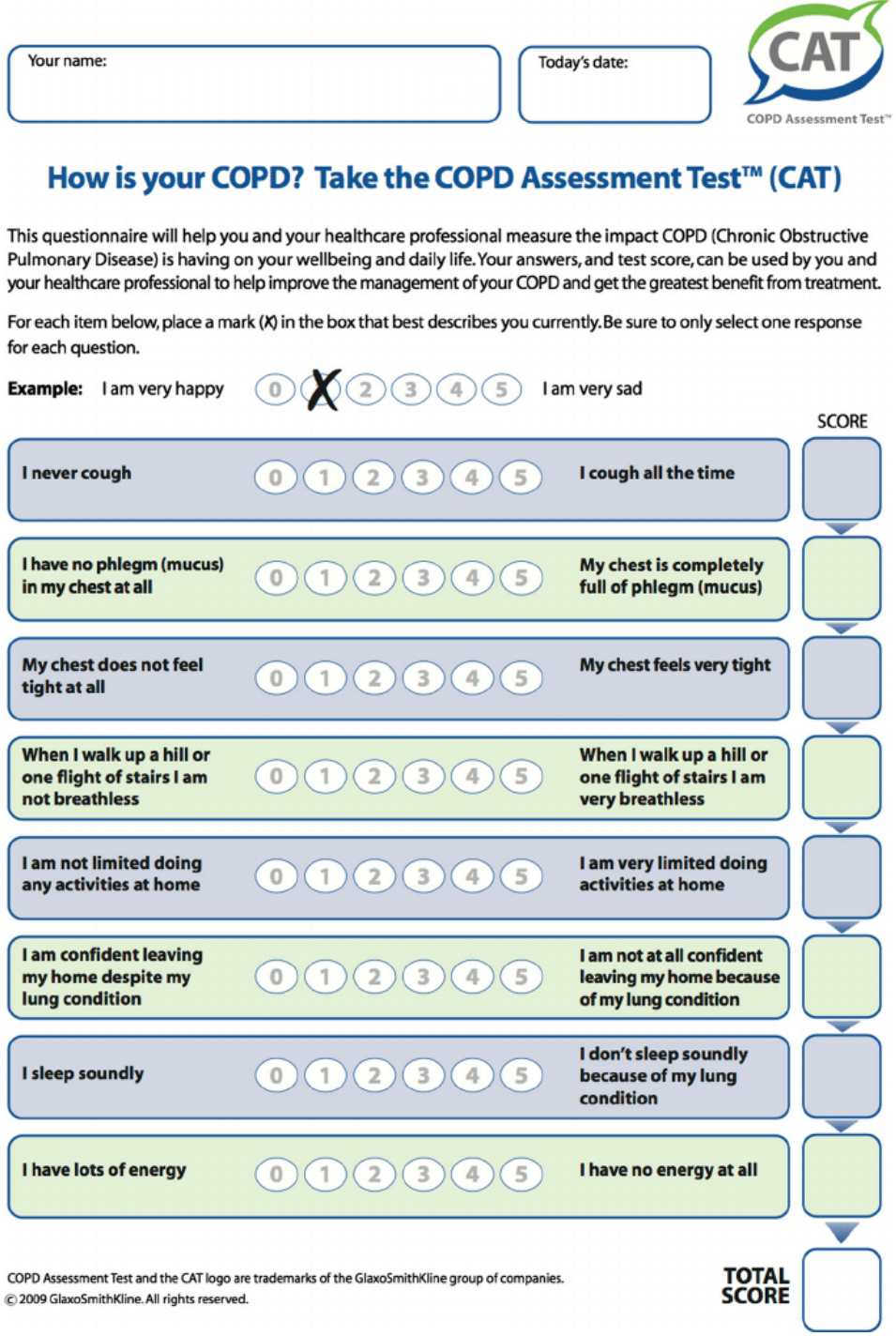
Variable	Points on BODE Index			
	0	1	2	3
FEV_1 (% of predicted)†	≥65	50–64	36–49	≤35
Distance walked in 6 min (m)	≥350	250–349	150–249	≤149
MMRC dyspnea scale‡	0–1	2	3	4
Body-mass index§	>21	≤21		

4 year survival 5-6 points 57%

Celli, B. NEJM. 2004

Assessment Tools

- COPD Assessment Test (CAT™)
- Chronic Respiratory Questionnaire (CCQ®)
- St George's Respiratory Questionnaire (SGRQ)
- Chronic Respiratory Questionnaire (CRQ)
- Modified Medical Research Council (mMRC) questionnaire



Your name:

Today's date:

CAT
COPD Assessment Test™

How is your COPD? Take the COPD Assessment Test™ (CAT)

This questionnaire will help you and your healthcare professional measure the impact COPD (Chronic Obstructive Pulmonary Disease) is having on your wellbeing and daily life. Your answers, and test score, can be used by you and your healthcare professional to help improve the management of your COPD and get the greatest benefit from treatment.

For each item below, place a mark (X) in the box that best describes you currently. Be sure to only select one response for each question.

Example: I am very happy 0 X 2 3 4 5 I am very sad

			SCORE
I never cough	0 1 2 3 4 5	I cough all the time	
I have no phlegm (mucus) in my chest at all	0 1 2 3 4 5	My chest is completely full of phlegm (mucus)	
My chest does not feel tight at all	0 1 2 3 4 5	My chest feels very tight	
When I walk up a hill or one flight of stairs I am not breathless	0 1 2 3 4 5	When I walk up a hill or one flight of stairs I am very breathless	
I am not limited doing any activities at home	0 1 2 3 4 5	I am very limited doing activities at home	
I am confident leaving my home despite my lung condition	0 1 2 3 4 5	I am not at all confident leaving my home because of my lung condition	
I sleep soundly	0 1 2 3 4 5	I don't sleep soundly because of my lung condition	
I have lots of energy	0 1 2 3 4 5	I have no energy at all	
			TOTAL SCORE

THE GOLD REFINED ABCD ASSESSMENT TOOL

Diagnosis = **Assessment of airflow limitation** + **Assessment of symptoms/risk of exacerbations**

FEV1/FVC<0.7

Grade	FEV_1 (% pred.)
1	≥80
2	50-79
3	30-49
4	<30

Exacerbation History

- ≥ 2 or ≥1 leading to hospitalization
- 0 or 1 (not leading to hospital admission)

C	D
A	B

- mMRC 0-1, CAT < 10, CCQ < 1
- mMRC 2+, CAT 10+, CCQ 1+

Prevention and Maintenance Therapy

- Smoking cessation is key. Pharmacotherapy and nicotine replacement reliably increase long-term smoking abstinence rates. Legislative smoking bans and counselling, delivered by healthcare professionals improve quit rates.

- The effectiveness and safety of e-cigarettes as a smoking cessation aid is uncertain at present.

Prevention

- Smoking cessation
  - Ask
  - Advise
  - Assess
  - Assist
  - Arrange

- Counseling delivered by physicians and other health professionals significantly increases quit rates over self-initiated strategies

Table 1. Brief Strategies to Help the Patient Willing to Quit Tobacco Use—The "5 As"

Action	Strategies for Implementation
	Step 1: Ask—systematically identify all tobacco users at every visit.
Implement an office-wide system that ensures that, for every patient at every clinic visit, tobacco-use status is queried and documented.	Expand the vital signs to include tobacco use or use an alternative universal identification system. VITAL SIGNS Blood Pressure: _____ Pulse: _____ Weight: _____ Temperature: _____ Respiratory Rate: _____ Tobacco Use: Current Former Never (circle one) Alternatives to expanding the vital signs are to place tobacco-use status stickers on all patient charts or to indicate tobacco-use status using electronic medical records or computer reminder systems.
	Step 2: Advise—strongly urge all tobacco users to quit.
In a clear, strong, and personalized manner, urge every tobacco user to quit.	Advice should be: *Clear*—"I think it is important for you to quit smoking now, and I can help you." "Cutting down while you are ill is not enough." *Strong*—"As your clinician, I need you to know that quitting smoking is the most important thing you can do to protect your health now and in the future. The clinic staff and I will help you." *Personalized*—Tie tobacco use to current health/illness, and/or its social and economic costs, motivation level/readiness to quit, and/or the impact of tobacco use on children and others in the household.
	Step 3: Assess—determine willingness to make a quit attempt.
Ask every tobacco user if he/she is willing to make a quit attempt at this time (eg, within the next 30 days).	Assess patient's willingness to quit: If the patient is willing to make a quit attempt at this time, provide assistance. If the patient will participate in an intensive treatment, deliver such a treatment or refer to an intensive intervention. If the patient clearly states he/she is unwilling to make a quit attempt at this time, provide a motivational intervention. If the patient is a member of a special population (eg, adolescent, pregnant smoker, racial/ethnic minority), consider providing additional information.
	Step 4: Assist—aid the patient in quitting.
Help the patient with a quit plan.	A patient's preparations for quitting: *Set a quit date*; ideally, the quit date should be within 2 weeks. *Tell* family, friends, and coworkers about quitting, and request understanding and support. *Anticipate* challenges to planned quit attempt, particularly during the critical first few weeks. These include nicotine withdrawal symptoms. *Remove* tobacco products from your environment. Prior to quitting, avoid smoking in places where you spend a lot of time (eg, work, home, car).
Provide practical counseling (problem solving/skills training). (See Table 2)	*Abstinence*—Total abstinence is essential. "Not even a single puff after the quit date." *Past quit experience*—Identify what helped and what hurt in previous quit attempts. *Anticipate triggers or challenges in upcoming attempt*—Discuss challenges/triggers and how patient will successfully overcome them. *Alcohol*—Since alcohol can cause relapse, the patient should consider limiting/abstaining from alcohol while quitting. *Other smokers in the household*—Quitting is more difficult when there is another smoker in the household. Patients should encourage housemates to quit with them or not smoke in their presence.
Provide intratreatment social support. (See Table 2)	Provide a supportive clinical environment while encouraging the patient in his/her quit attempt. "My office staff and I are available to assist you."
Help patient obtain extratreatment social support. (See Table 2)	Help patient develop social support for his/her quit attempt in his/her environment outside of treatment. "Ask your spouse/partner, friends, and coworkers to support you in your quit attempt."
Recommend the use of approved pharmacotherapy except in special circumstances. (See Tables 3 and 4)	Recommend the use of pharmacotherapies found to be effective. Explain how these medications increase smoking cessation success and reduce withdrawal symptoms. The first-line pharmacotherapy medications include: sustained-release bupropion hydrochloride, nicotine gum, nicotine inhaler, nicotine nasal spray, and nicotine patch.
Provide supplementary materials.	*Sources*—Federal agencies, nonprofit agencies, or local/state health departments. *Type*—Culturally/racially/educationally/age-appropriate for the patient. *Location*—Readily available at every clinician's workstation.
	Step 5: Arrange—schedule follow-up contact.
Schedule follow-up contact, either in person or via telephone.	*Timing*—Follow-up contact should occur soon after the quit date, preferably during the first week. A second follow-up contact is recommended within the first month. Schedule further follow-up contacts as indicated. *Actions during follow-up contact*—Congratulate success. If tobacco use has occurred, review circumstances and elicit recommitment to total abstinence. Remind patient that a lapse can be used as a learning experience. Identify problems already encountered and anticipate challenges in the immediate future. Assess pharmacotherapy use and problems. Consider use or referral to more intensive treatment.

Consensus Statement. JAMA. 2000

Stead, LF. Cochrane Database Syst Rev 2013

Prevention and Maintenance Therapy

- Pharmacologic therapy can reduce COPD symptoms, reduce the frequency and severity of exacerbations, and improve health status and exercise tolerance.

- Each pharmacologic treatment regimen should be individualized and guided by the severity of symptoms, risk of exacerbations, side-effects, comorbidities, drug availability and cost, and the patient's response, preference and ability to use various drug delivery devices.

COMMONLY USED MAINTENANCE MEDICATIONS IN COPD*

		DELIVERY OPTIONS			
Generic Drug Name	**Inhaler Type**	***Nebulizer***	***Oral***	***Injection***	**Duration Of Action**
BETA$_2$-AGONISTS					
SHORT-ACTING (SABA)					
Fenoterol	MDI	√	pill, syrup		4-6 hours
Levalbuterol	MDI	√			6-8 hours
Salbutamol (albuterol)	MDI & DPI	√	pill, syrup, extended release tablet	√	4-6 hours 12 hours (ext. release)
Terbutaline	DPI		pill	√	4-6 hours
LONG-ACTING (LABA)					
Arformoterol		√			12 hours
Formoterol	DPI	√			12 hours
Indacaterol	DPI				24 hours
Olodaterol	SMI				24 hours
Salmeterol	MDI & DPI				12 hours
ANTICHOLINERGICS					
SHORT-ACTING (SAMA)					
Ipratropium bromide	MDI	√			6-8 hours
Oxitropium bromide	MDI				7-9 hours
LONG-ACTING (LAMA)					
Aclidinium bromide	DPI, MDI				12 hours
Glycopyrronium bromide	DPI		solution	√	12-24 hours
Tiotropium	DPI, SMI				24 hours
Umeclidinium	DPI				24 hours

COMBINATION SHORT-ACTING BETA$_2$-AGONIST PLUS ANTICHOLINERGIC IN ONE DEVICE (SABA/SAMA)					
Fenoterol/ipratropium	SMI	√			6-8 hours
Salbutamol/ipratropium	SMI, MDI	√			6-8 hours
COMBINATION LONG-ACTING BETA$_2$-AGONIST PLUS ANTICHOLINERGIC IN ONE DEVICE (LABA/LAMA)					
Formoterol/aclidinium	DPI				12 hours
Formoterol/glycopyrronium	MDI				12 hours
Indacaterol/ glycopyrronium	DPI				12-24 hours
Vilanterol/umeclidinium	DPI				24 hours
Olodaterol/tiotropium	SMI				24 hours
METHYLXANTHINES					
Aminophylline			solution	√	Variable, up to 24 hours
Theophylline (SR)			pill	√	Variable, up to 24 hours
COMBINATION OF LONG-ACTING BETA$_2$-AGONIST PLUS CORTICOSTEROIDS IN ONE DEVICE (LABA/ICS)					
Formoterol/beclometasone	MDI				
Formoterol/budesonide	MDI, DPI				
Formoterol/mometasone	MDI				
Salmeterol/fluticasone	MDI, DPI				
Vilanterol/fluticasone furoate	DPI				
TRIPLE COMBINATION IN ONE DEVICE (LABA/LAMA/ICS)					
Fluticasone/umeclidinium/vilanterol	DPI				
Beclometasone/formoterol/glycopyrronium	MDI				
PHOSPHODIESTERASE-4 INHIBITORS					
Roflumilast			pill		
MUCOLYTIC AGENTS					
Erdosteine			pill		

**Not all formulations are available in all countries. In some countries other formulations and dosages may be available.*
MDI = metered dose inhaler; DPI = dry powder inhaler; SMI = soft mist inhaler.

TABLE 3.3

aanma.org • 800.878.4403

A = ASTHMA
C = COPD

Short-acting bronchodilators
relax tight muscles in airways and offer quick relief of symptoms such as coughing, wheezing and shortness of breath for 3-6 hours

ProAir® HFA
albuterol sulfate
A

Proventil® HFA
albuterol sulfate
A

Ventolin® HFA
albuterol sulfate
A

Xopenex HFA®
levalbuterol tartrate
A

Long-acting bronchodilators
lasting relief of symptoms such as coughing, wheezing and shortness of breath for at least 12 hours relax tight muscles in airways and offer

Arcapta™ Neohaler™
indacaterol inhalation powder
C

Foradil® Aerolizer®
formoterol fumarate inhalation powder
A C

Serevent® Diskus®
salmeterol xinafoate inhalation powder
A C

Inhaled corticosteroids
reduce and prevent swelling of airway tissue; they do not relieve sudden symptoms of coughing, wheezing or shortness of breath

Asmanex® Twisthaler®
110 mcg
220 mcg
mometasone furoate inhalation powder
A

Alvesco® HFA
80 mcg
160 mcg
ciclesonide
A

Flovent® Diskus®
50 mcg
100 mcg
250 mcg
fluticasone propionate inhalation powder
A

Flovent® HFA
44 mcg
110 mcg
220 mcg
fluticasone propionate
A

Pulmicort Flexhaler®
90 mcg
180 mcg
budesonide inhalation powder
A

QVAR® (HFA)
40 mcg
80 mcg
beclomethasone dipropionate
A C

Combination medications
contain both long-acting bronchodilator and inhaled corticosteroid

Advair Diskus®
100/50
250/50
500/50
fluticasone propionate and salmeterol inhalation powder
A C

Advair® HFA
45/21
115/21
230/21
fluticasone propionate and salmeterol
A

Breo™ Ellipta™
100/25 mcg
fluticasone furoate and vilanterol
C

Dulera®
100/5
200/5
mometasone furoate and formoterol fumarate
A

Symbicort® (HFA)
80/4.5
160/4.5
budesonide and formoterol fumarate dihydrate
A C

Anticholinergics
relieve cough, sputum production, wheeze and chest tightness associated with chronic lung diseases

Atrovent® HFA
ipratropium bromide
C

Combivent® Respimat®
ipratropium bromide and albuterol
C

Spiriva® HandiHaler®
tiotropium bromide inhalation powder
C

Tudorza™ Pressair™
aclidinium bromide inhalation powder
C

Reviewed by Dennis Williams, PharmD

MOUTHPIECE

AIR VENT

COVER

Cover slides down with a "click" exposing the mouthpiece

COUNTER

Displays the number of doses remaining

Prevention and Maintenance Therapy

- Inhaler technique needs to be assessed regularly.
- Influenza vaccination decreases the incidence of lower respiratory tract infections.
- Pneumococcal vaccination decreases lower respiratory tract infections.
- Pulmonary rehabilitation improves symptoms, quality of life, and physical and emotional participation in everyday activities.

Prevention and Maintenance Therapy

THE INHALED ROUTE

- When a treatment is given by the inhaled route, the importance of education and training in inhaler device technique cannot be over-emphasized.
- The choice of inhaler device has to be individually tailored and will depend on access, cost, prescriber, and most importantly, patient's ability and preference.
- It is essential to provide instructions and to demonstrate the proper inhalation technique when prescribing a device, to ensure that inhaler technique is adequate and re-check at each visit that patients continue to use their inhaler correctly.
- Inhaler technique (and adherence to therapy) should be assessed before concluding that the current therapy is insufficient.

TABLE 3.6

Prevention and Maintenance Therapy

VACCINATION FOR STABLE COPD

- Influenza vaccination reduces serious illness and death in COPD patients **(EvidenceB)**.
- The 23-valent pneumococcal polysaccharide vaccine (PPSV23) has been shown to reduce the incidence of community - acquired pneumonia in COPD patients aged < 65 years with an FEV_1 < 40% predicted and in those with comorbidities **(Evidence B)**.
- In the general population of adults ≥65 years the 13-valent conjugated pneumococcal vaccine (PCV13) has demonstrated significant efficacy in reducing bacteremia & serious invasive pneumococcal disease **(Evidence B)**.

Prevention and Maintenance Therapy

- Pulmonary rehabilitation improves symptoms, quality of life, and physical and emotional participation in everyday activities.
- The components of pulmonary rehabilitation may vary but evidence-based best practice for program delivery includes: structured and supervised exercise training, smoking cessation, nutrition counseling, and self-management education.

Rehabilitation, education & self-management

PULMONARY REHABILITATION, SELF-MANAGEMENT AND INTEGRATIVE CARE IN COPD

PULMONARY REHABILITATION

- Pulmonary rehabilitation improves dyspnea, health status and exercise tolerance in stable patients **(Evidence A)**.
- Pulmonary rehabilitation reduces hospitalization among patients who have had a recent exacerbation (≤4 weeks from prior hospitalization) **(Evidence B)**.

EDUCATION AND SELF-MANAGEMENT

- Education alone has not been shown to be effective **(Evidence C)**.
- Self-management intervention with communication with a health care professional improves health status and decreases hospitalizations and emergency department visits **(Evidence B)**.

INTEGRATED CARE PROGRAMS

- Integrated care and telehealth have no demonstrated benefit at this time **(Evidence B)**.

TABLE 3.8

International Journal of COPD

Dovepress
open access to scientific and medical research

Open Access Full Text Article

ORIGINAL RESEARCH

Chronic disease self-management and exercise in COPD as pulmonary rehabilitation: a randomized controlled trial

This article was published in the following Dove Press journal:
International Journal of COPD
19 May 2014
Number of times this article has been viewed

Table 5 Change in outcomes: CDSMP + exercise versus CDSMP-only

Variable	CDSMP + exercise (intervention)			CDSMP-only (control)			Change		
	Baseline	Post	*P*-value	Baseline	Post	*P*-value	CDSMP + exercise	CDSMP-only	*P*-value
6MWD, m	351.6±122.9	370.2±128.2	**0.013**	353.0±97.4	373.0±97.7	**0.017**	18.6±46.2	20.0±50.6	0.90
Moderate exercise duration, hours (pw)	0.50 (0.0–19.5)	1.75 (0.0–30.8)	**0.002**	1.50 (0.0–10.3)	1.38 (0.0–15.8)	0.350	1.00 (–5.8–14.0)	0.000 (–9.8–10.3)	0.230
Moderate exercise frequency, times (pw)	2.0 (0.0–20.0)	3.0 (0.0–22.0)	**0.007**	2.0 (0.0–23.0)	3.0 (0.0–22.0)	0.290	1.0 (–8.0–11.0)	0.5 (–23.0–16.0)	0.766
Exercise self-efficacy, scale 0–5	2.7±1.1	2.9±1.1	0.354	2.8±1.0	3.0±1.0	0.290	0.2±1.1	0.2±1.1	0.892
Self-management behaviors, scale 0–8	6.1±1.1	6.3±0.8	**0.037**	6.2±1.0	6.4±1.0	**0.076**	0.3±0.8	0.2±0.7	0.698

COPD Management

- Reduce Symptoms
- Reduce Risk -→ inhaled pollutants and smoking

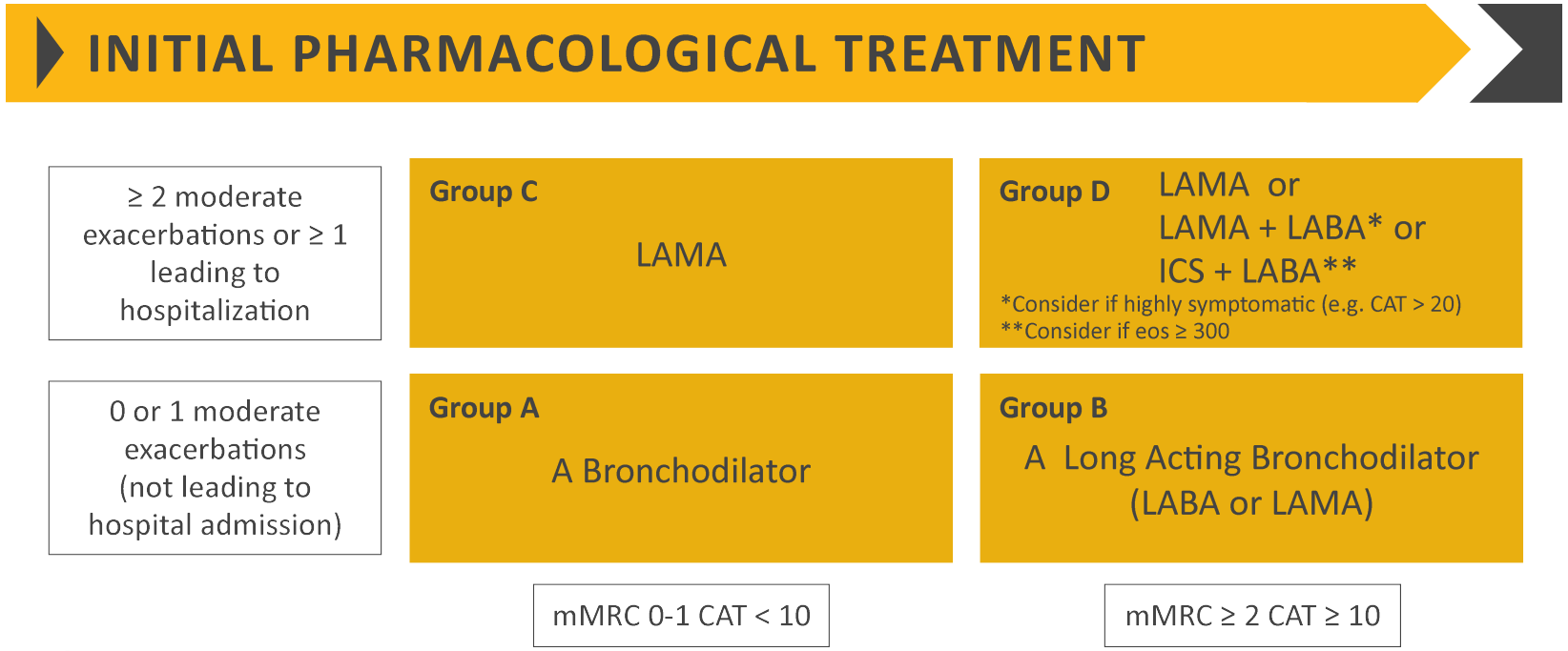
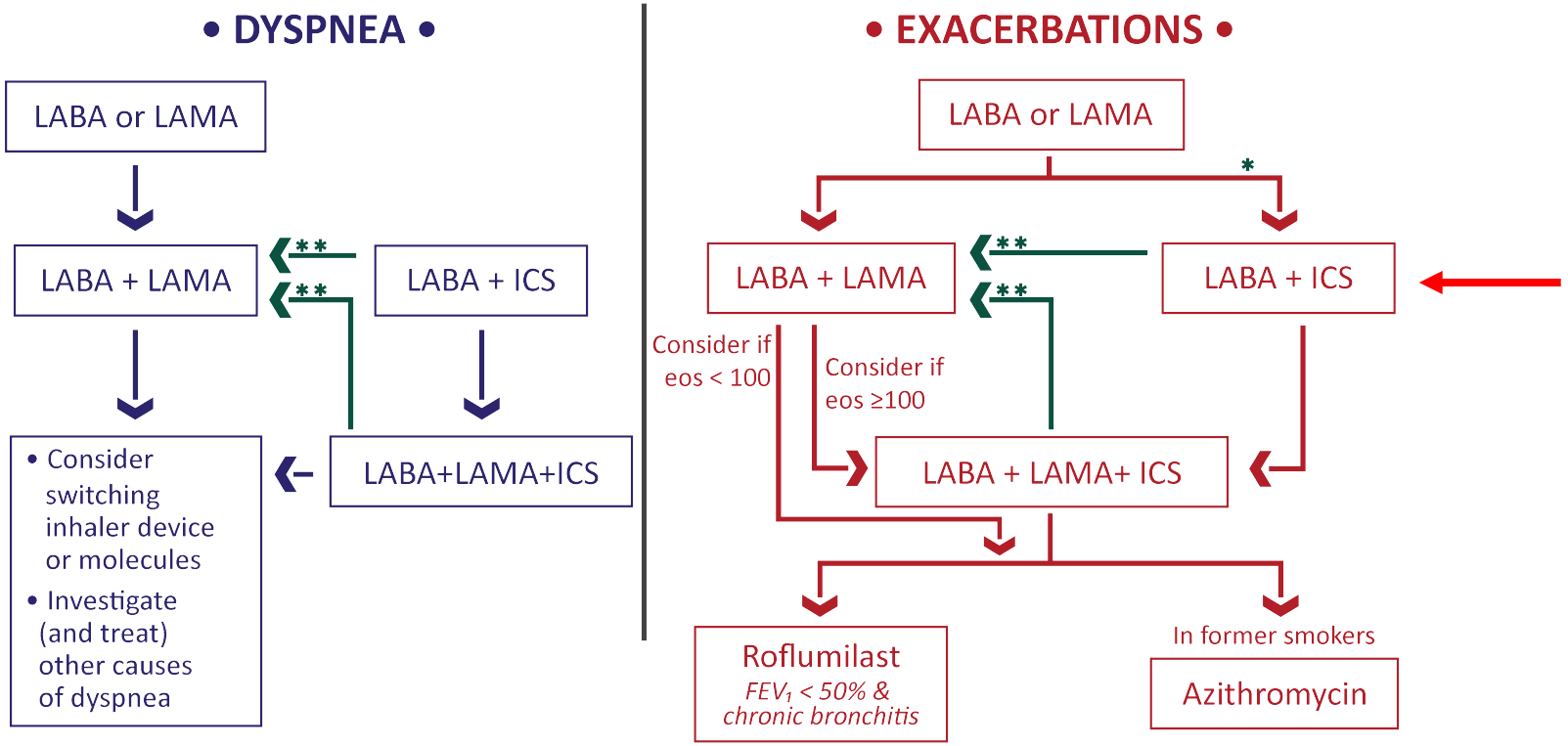


FIGURE 4.1

FOLLOW-UP PHARMACOLOGICAL TREATMENT

1. **IF RESPONSE TO INITIAL TREATMENT IS APPROPRIATE, MAINTAIN IT.**
2. **IF NOT:**
   - ✓ Consider the predominant treatable trait to target (dyspnea or exacerbations)
     - Use exacerbation pathway if both exacerbations and dyspnea need to be targeted
   - ✓ Place patient in box corresponding to current treatment & follow indications
   - ✓ Assess response, adjust and review
   - ✓ These recommendations do not depend on the ABCD assessment at diagnosis



eos = blood eosinophil count (cells/µL)

**** Consider if eos ≥ 300 or eos ≥ 100 AND ≥2 moderate exacerbations / 1 hospitalization***

***** Consider de-escalation of ICS or switch if pneumonia, inappropriate original indication or lack of response to ICS***

FIGURE 4.3

Prevention and Maintenance Therapy

- In patients with severe resting chronic hypoxemia, long-term oxygen therapy improves survival.
- In patients with stable COPD and resting or exercise-induced moderate desaturation, long-term oxygen treatment should not be prescribed routinely. However, individual patient factors must be considered when evaluating the patient's need for supplemental oxygen.
- In patients with severe chronic hypercapnia and a history of hospitalization for acute respiratory failure, long-term non-invasive ventilation may decrease mortality and prevent re-hospitalization.
- In select patients with advanced emphysema refractory to optimized medical care, surgical or bronchoscopic interventional treatments may be beneficial.
- Palliative approaches are effective in controlling symptoms in advanced COPD.

COPD Management

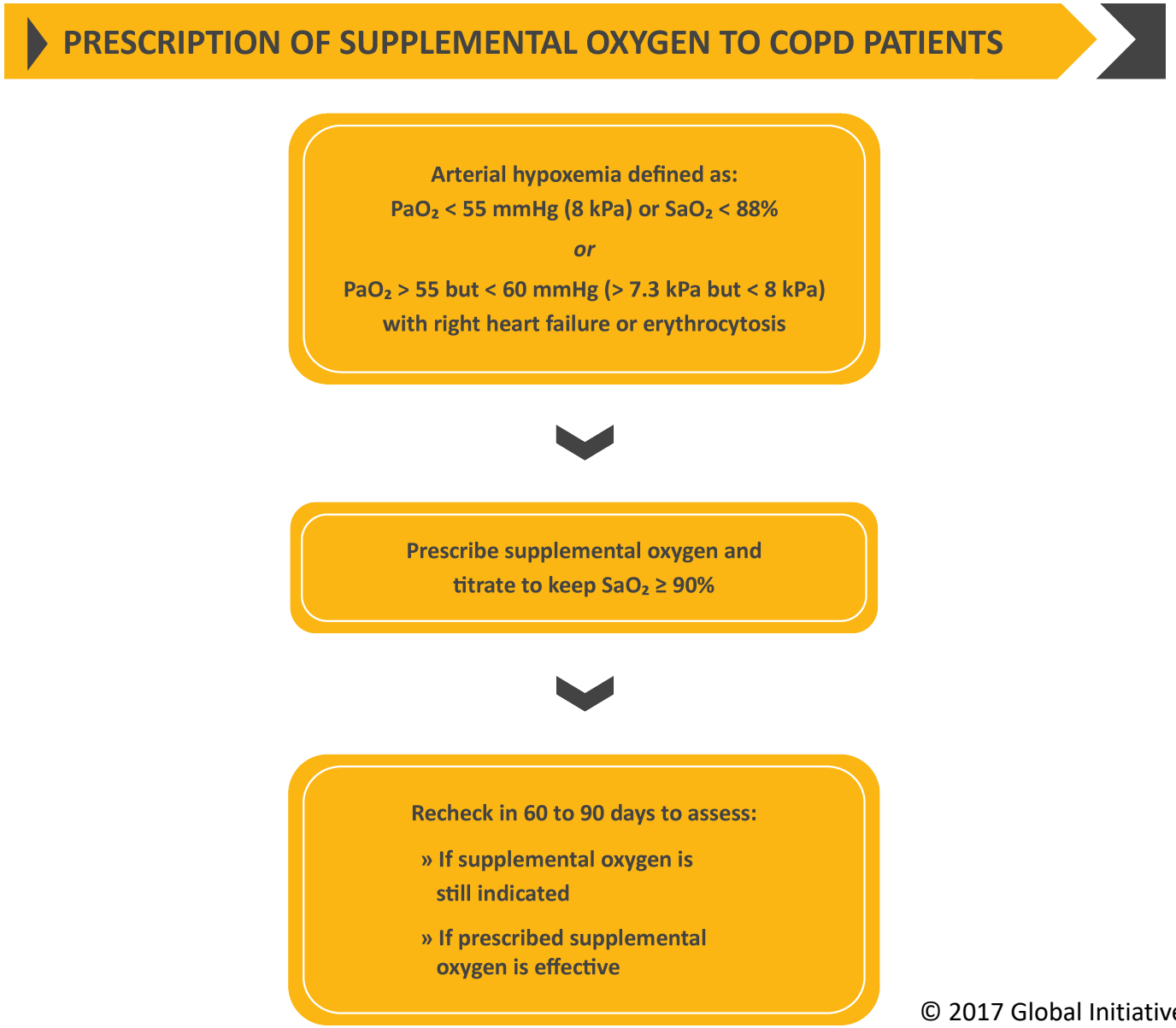
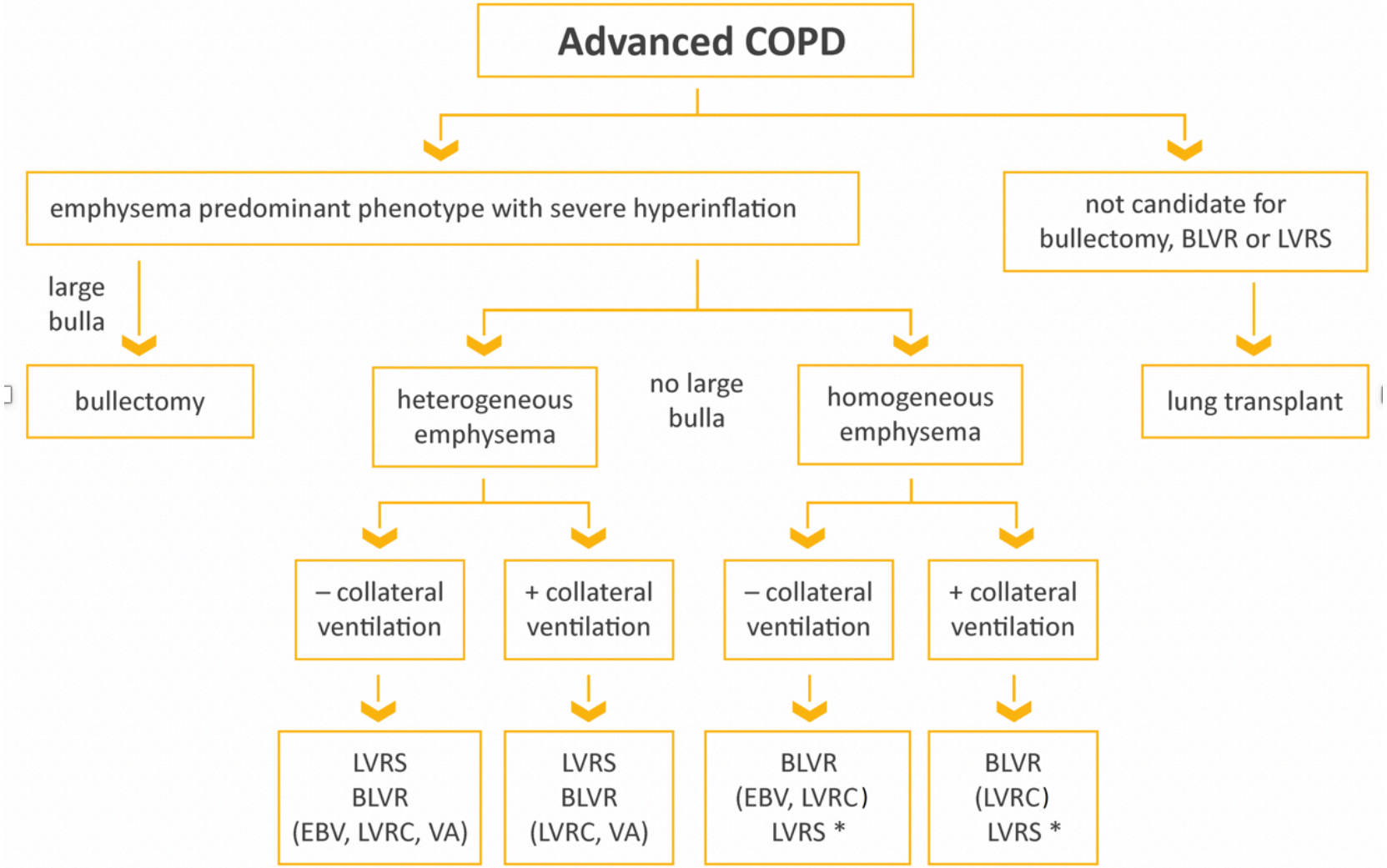


FIGURE 4-4

COPD Management



Definition of Abbreviations: BLVR, Bronchoscopic Lung Volume Reduction, EBV, endobronchial Valve, LVRS, Lung volume reduction surgery, LVRC, Lung volume reduction coil, VA, Vapor ablation

*at some but not all centers

Exacerbations of COPD

Defined as an acute worsening of respiratory symptoms that result in additional therapy.

- **Mild** (treated with short acting bronchodilators only, SABDs)
- **Moderate** (treated with SABDs plus antibiotics and/or oral corticosteroids) or
- **Severe** (patient requires hospitalization or visits the emergency room). Severe exacerbations may also be associated with acute respiratory failure.

Exacerbations of COPD

Bronchodilators

Although there is no high-quality evidence from RCTs, it is recommended that short-acting inhaled beta$_2$-agonists, with or without short-acting anticholinergics, are the initial bronchodilators for acute treatment of a COPD exacerbation.

Corticosteroids

Data from studies indicate that systemic glucocorticoids in COPD exacerbations shorten recovery time and improve lung function (FEV_1). They also improve oxygenation, the risk of early relapse, treatment failure, and the length of hospitalization.

Antibiotics

Exacerbations of COPD

SEVERE exacerbations

- Poor response to initial therapy
- Altered
- Persistent or worsening hypoxemia/hypercapnia
- Non invasive ventilation (NIV)
  - Severe dyspnea or signs of Fatigue
  - Respiratory Acidosis
  - Severe hypoxemia
- Hemodynamic instability

Need for invasive ventilation

- Contraindication for NIV
- NIV failure
- Arrest
- Severe HD instability
- Arrhythmias
- Life threatening hypoxemia

DISCHARGE CRITERIA AND RECOMMENDATIONS FOR FOLLOW-UP

- Full review of all clinical and laboratory data.
- Check maintenance therapy and understanding.
- Reassess inhaler technique.
- Ensure understanding of withdrawal of acute medications (steroids and/or antibiotics).
- Assess need for continuing any oxygen therapy.
- Provide management plan for comorbidities and follow-up.
- Ensure follow-up arrangements: early follow-up < 4weeks, and late follow-up < 12weeks as indicated.
- All clinical or investigational abnormalities have been identified.

1 – 4 WEEKS FOLLOW-UP

- Evaluate ability to cope in his/her usual environment.
- Review and understanding treatment regimen.
- Reassessment of inhaler techniques.
- Reassess need for long-term oxygen.
- Document the capacity to do physical activity and activities of daily living.
- Document symptoms: CAT or mMRC.
- Determine status of comorbidities.

12 – 16 WEEKS FOLLOW-UP

- Evaluate ability to cope in his/her usual environment.
- Review understanding treatment regimen.
- Reassessment of inhaler techniques.
- Reassess need for long-term oxygen.
- Document the capacity to do physical activity and activities of daily living.
- Measure spirometry: FEV_1.
- Document symptoms: CAT or mMRC.
- Determine status of comorbidities.

Co Morbidities

- Often Co-exist with Cardiovascular disease and Lung Cancer
- Anxiety and Depression often overlooked
- Gastroesophageal Reflux Disease
- Obstructive Sleep Apnea
- The presence of comorbidities should not alter COPD treatment and comorbidities should be treated per usual standards regardless of the presence of COPD

Summary

- COPD is a global disease with high morbidity and mortality
- Diagnosis and assessment of severity using Spirometry and symptoms are paramount for disease treatment
- Non pharmacological and pharmacological treatments should be tailored to the patient
- Management of exacerbations following guidelines help reduce morbidity and re admissions

Thanks!

Questions?

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