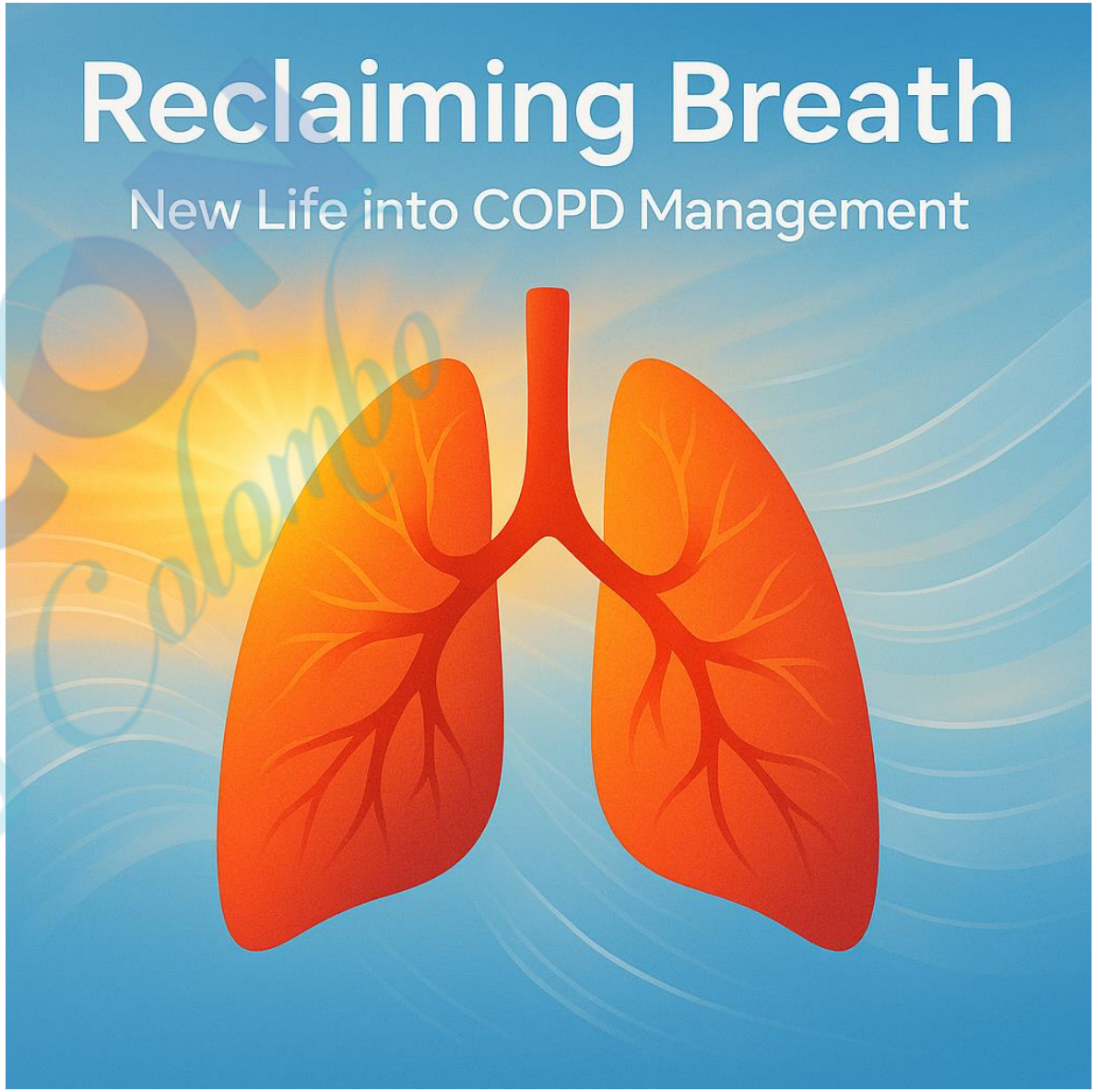
Reclaiming Breath

New Life into COPD Management



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Disclosures

None

Objectives

- What is COPD?
- Why it is significant ?
- How to approach?

What is COPD ?

- COPD is a **heterogeneous** lung condition characterized by **chronic respiratory symptoms** (dyspnea, cough, sputum production and/or exacerbations) due to **abnormalities of the airways** (bronchitis, bronchiolitis) **and/or alveoli** (emphysema) that cause **persistent, often progressive, airflow obstruction.**

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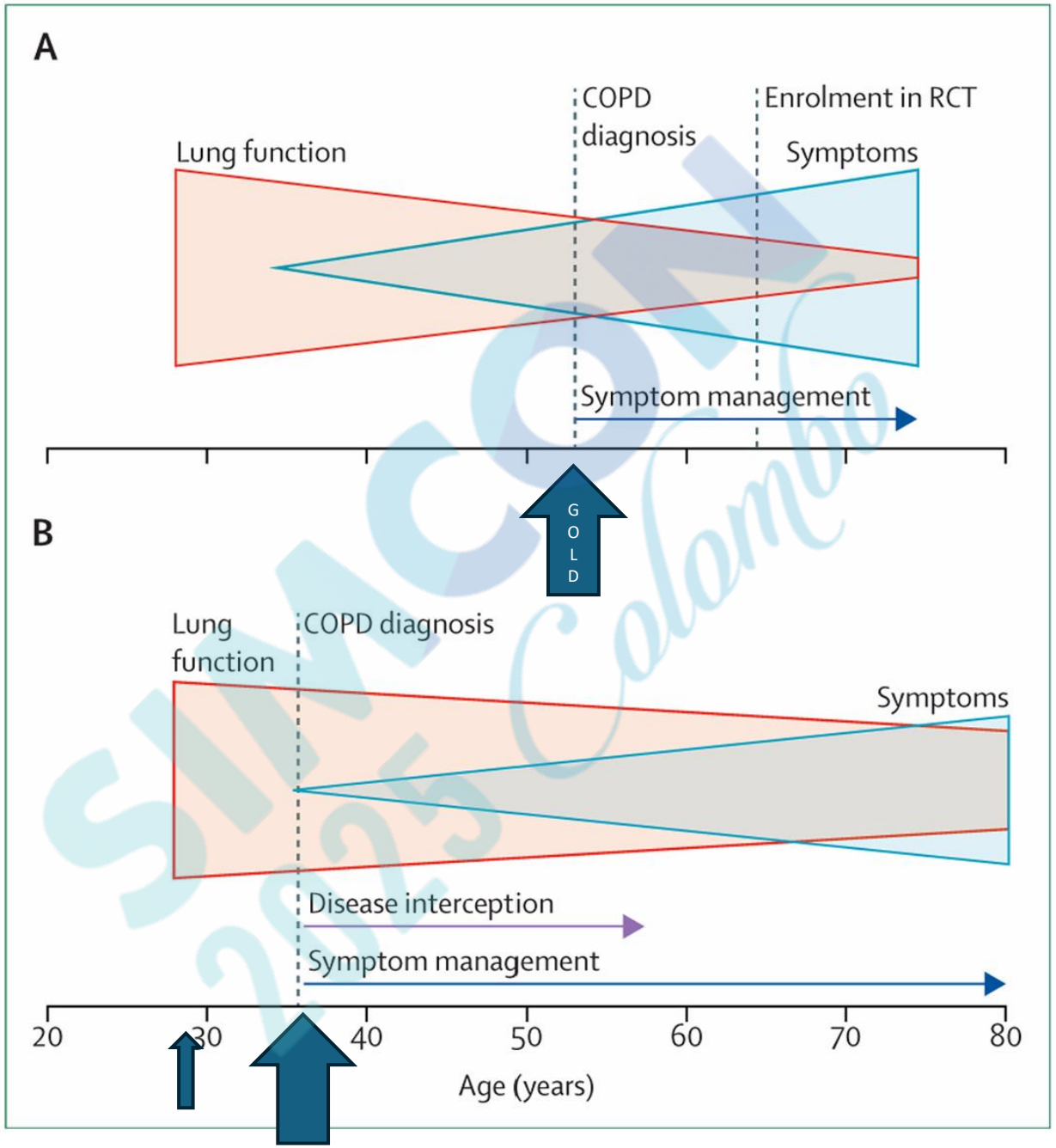
However,…

- COPD results from gene(G)-environment(E) interactions occurring over the lifetime(T) of the individual (**GET omics**) that can damage the lungs and/or alter their normal development/aging processes.



Stolz D, Mkorombindo T, at al. **Towards the elimination of chronic obstructive pulmonary disease: a Lancet Commission**. Lancet. 2022 Sep 17;400(10356):921-972. doi: 10.1016/S0140-6736(22)01273-9. Epub 2022 Sep 5. PMID: 36075255; PMCID: PMC11260396.

Lee and Rhee. COPD in Korea

Diagnosed COPD

- Estimated number: 100,000−200,000
- Epidemiology
  - Male predominant
  - Increase with age
  - More prevalent in low income
- Burden
  - 3rd leading cause of DALYs
  - Total cost: $1,245 million in 2015
  - Higher cost in tertiary hospitals
  - Increased by 1.85 times during 10 years
- Policy
  - Reimbursed by national insurance
  - Nationwide quality assessment

Underdiagnosed COPD

- Estimated number: more than 3 million
- Causes of underdiagnosis
  - Low awareness
  - Lack of PFT
  - Mild symptom
- Causes of undertreatment
  - Insufficient education to GPs
  - Strict reimbursement criteria

Lee EG, Rhee CK. **Epidemiology, burden, and policy of chronic obstructive pulmonary disease in South Korea: a narrative review**. J Thorac Dis. 2021 Jun;13(6):3888-3897. doi: 10.21037/jtd-20-2100. PMID: 34277078; PMCID: PMC8264691.

Why ?

Impact of COPD on Patients

COPD is the third leading cause of death globally[1]

Over 150,000 US deaths annually[2]

Considerable influence on patients' activities, health status, and quality of life[3]

COPD, chronic obstructive pulmonary disease.

1. WHO. 2023. Accessed January 5, 2024. https://www.who.int/news-room/fact-sheets/detail/chronic-obstructive-pulmonary-disease-(copd); 2. Croft JB, et al. MMWR Morb Mortal Wkly Rep. 2018;67:205-211; 3. Vogelmeier CF, et al. Respir Med. 2020;166:105938.

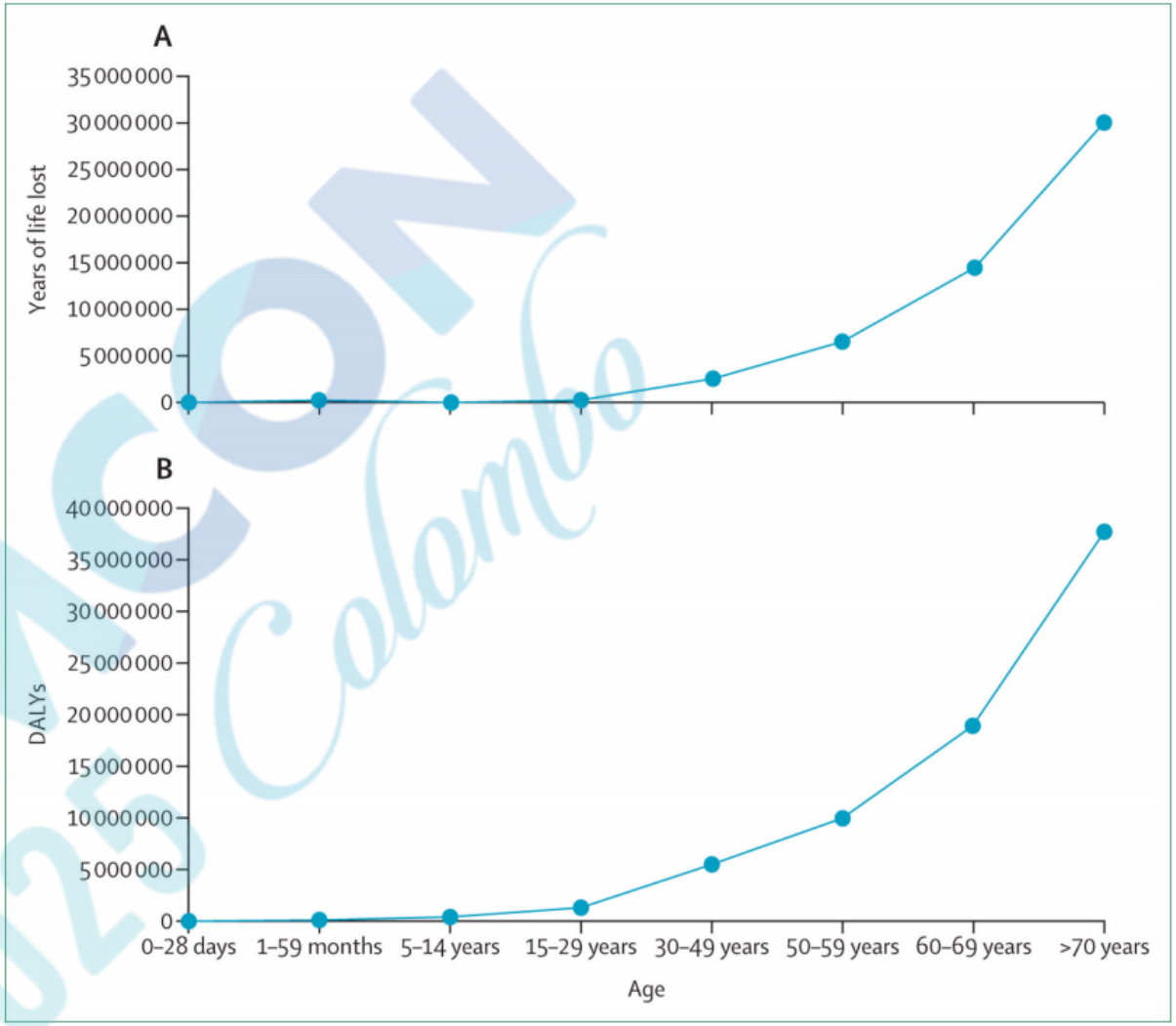
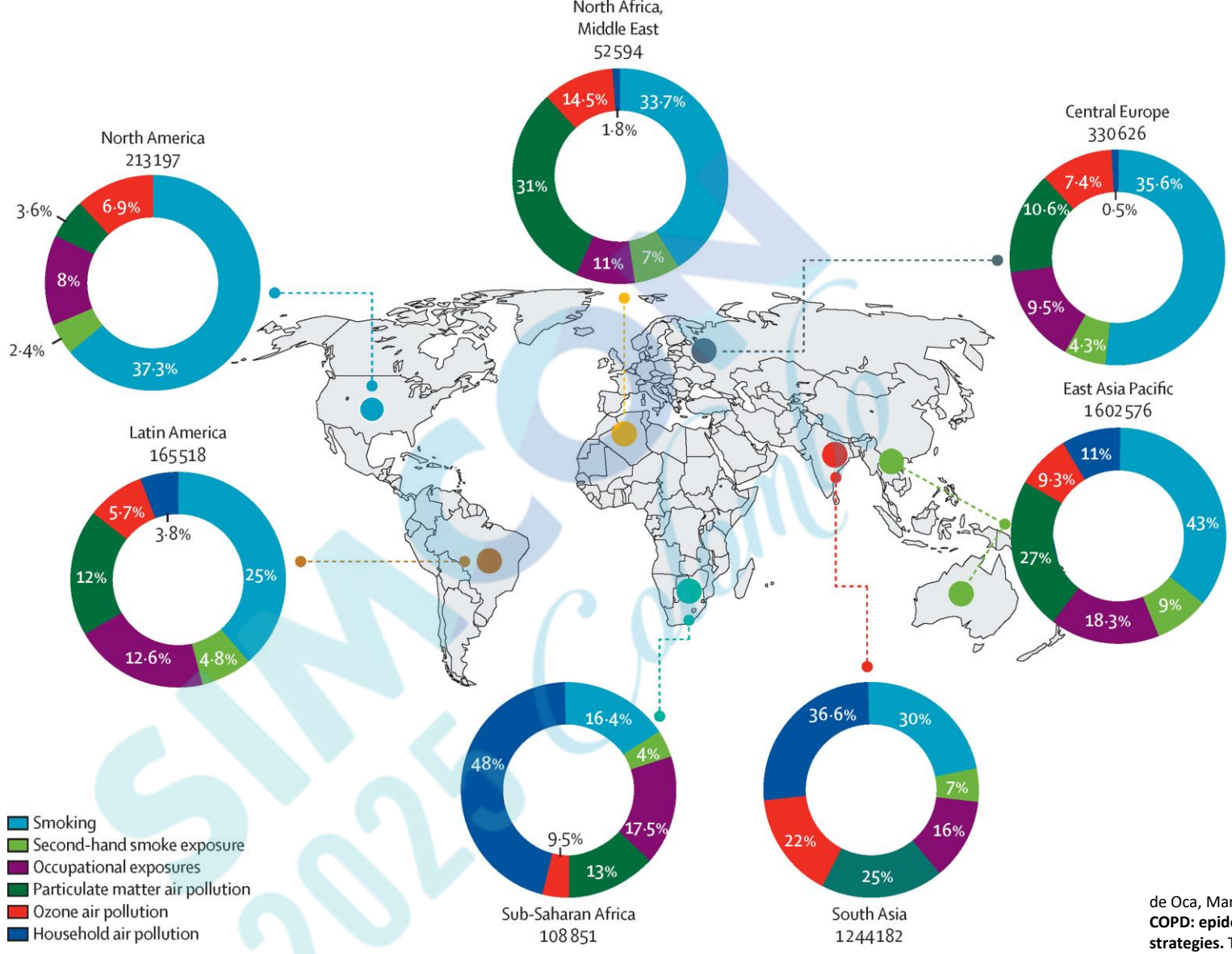


Figure 1: DALYs (A) and years of life lost (B) to COPD
In 2019, COPD was the seventh leading cause of DALYs globally and the eighth leading cause of years of life lost.[4] DALYs=disability-adjusted life-years. COPD=chronic obstructive pulmonary disease.

Stolz D, Mkorombindo T, at al. **Towards the elimination of chronic obstructive pulmonary disease: a Lancet Commission**. Lancet. 2022 Sep 17;400(10356):921-972. doi: 10.1016/S0140-6736(22)01273-9. Epub 2022 Sep 5. PMID: 36075255; PMCID: PMC11260396.



de Oca, Maria Montes et al. **The global burden of COPD: epidemiology and effect of prevention strategies.** The Lancet Respiratory Medicine, Volume 13, Issue 8, 709 - 724

COPD in Sri Lanka

- The overall prevalence of COPD was 10.5% (95% CI 8.8%-12.2%)
- The male prevalence was 16.4% [95% CI 13.2%-19.5%] compared to 6.0% [95% CI 4.2%-7.7%] in females.
- 57.1% of the COPD patients were non-smokers.
- In males, the presence of COPD was significantly associated with a history of smoking and a past history of tuberculosis.

Multimorbidity in COPD

Multimorbidity[1]

Presence of 2 or more chronic diseases occurring in the same person at the same time

Multimorbidity in COPD[2]

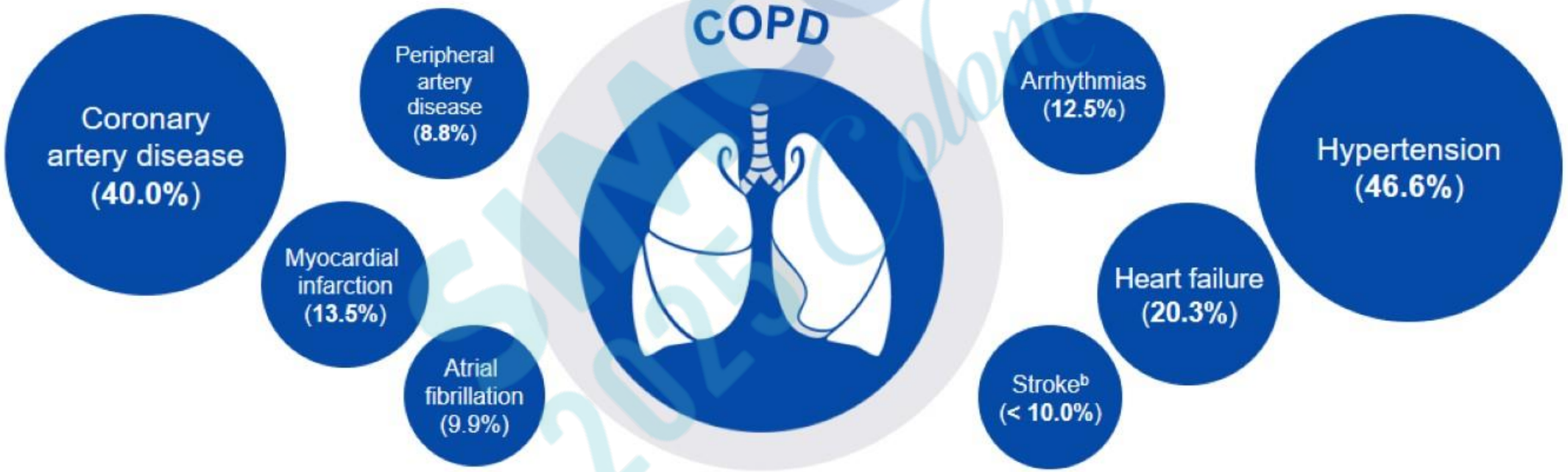
On average, patients with COPD experience 5 different comorbidities

1. Harrison C, et al. J Multimorb Comorb. 2021;11:2633556521993993; 2. Fabbri LM, et al. Lancet Respir Med. 2023;11:1020-1034.

There Is a Close Relationship Between CVD and COPD

Different pathophysiological mechanisms and triggering factors link the 2 disorders and contribute to the increased CV risk in patients with COPD

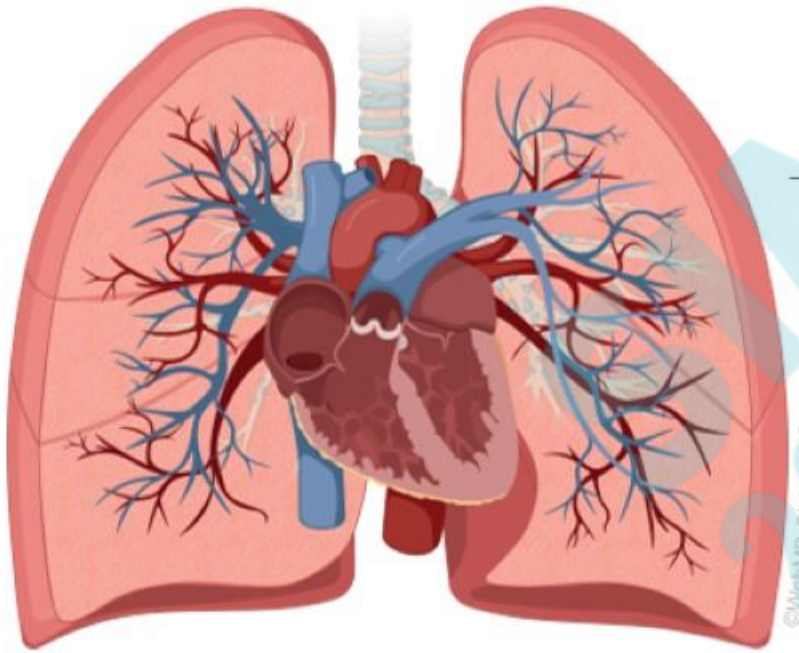
Prevalence of CVD in Patients With COPD[a]



[a]The percentage relative to CVD was calculated as the mean of the upper and lower estimates found in the literature; [b]Prevalence estimated to be ≤ 15.0% in hospitalized patients with COPD.
CV, cardiovascular.
Rogliani P, et al. Expert Rev Respir Med. 2021;15:59-70.

Potential Mechanisms of COPD-Driven Cardiopulmonary Risk

Exacerbations amplify 3 drivers of cardiopulmonary risk in patients with COPD, contributing to an increased risk for lung and heart events[1,2]



Inflammation[3,4]

COPD lung inflammation **drives systemic inflammation**, promoting atherosclerotic damage in the heart and vasculature

Hyperinflation[5-7]

Hyperinflation compresses the lung vessels, which can result in **reduced cardiac output**

Hypoxemia[2]

Hypoxemia can lead to pulmonary hypertension and right **heart failure**

1. Aisanov Z, et al. J Thorac Dis. 2020;12:2791-2802; 2. Kent BD, et al. Int J Chron Obstruct Pulmon Dis. 2011;6:199-208; 3. Barnes PJ, et al. Nat Rev Dis Primers. 2015;1:15076; 4. Van Eeden S, et al. Am J Respir Crit Care Med. 2012;186:11-16; 5. O'Donnell DE, et al. COPD Res Pract. 2015;1:4; 6. García-Río F. BRN Rev. 2020;6:67-86; 7. Solidoro P, et al. Front Med (Lausanne). 2022;9:816843.

What is COPD ?

- COPD is a **heterogeneous** lung condition characterized by **chronic respiratory symptoms** (dyspnea, cough, sputum production and/or exacerbations) due to **abnormalities of the airways** (bronchitis, bronchiolitis) **and/or alveoli** (emphysema) that cause **persistent, often progressive, airflow obstruction.**
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COPD develops progressively due to the interaction between genetic factors and environmental influences throughout an individual's lifetime.

COPD is a multimorbidity

COPD is a disease with

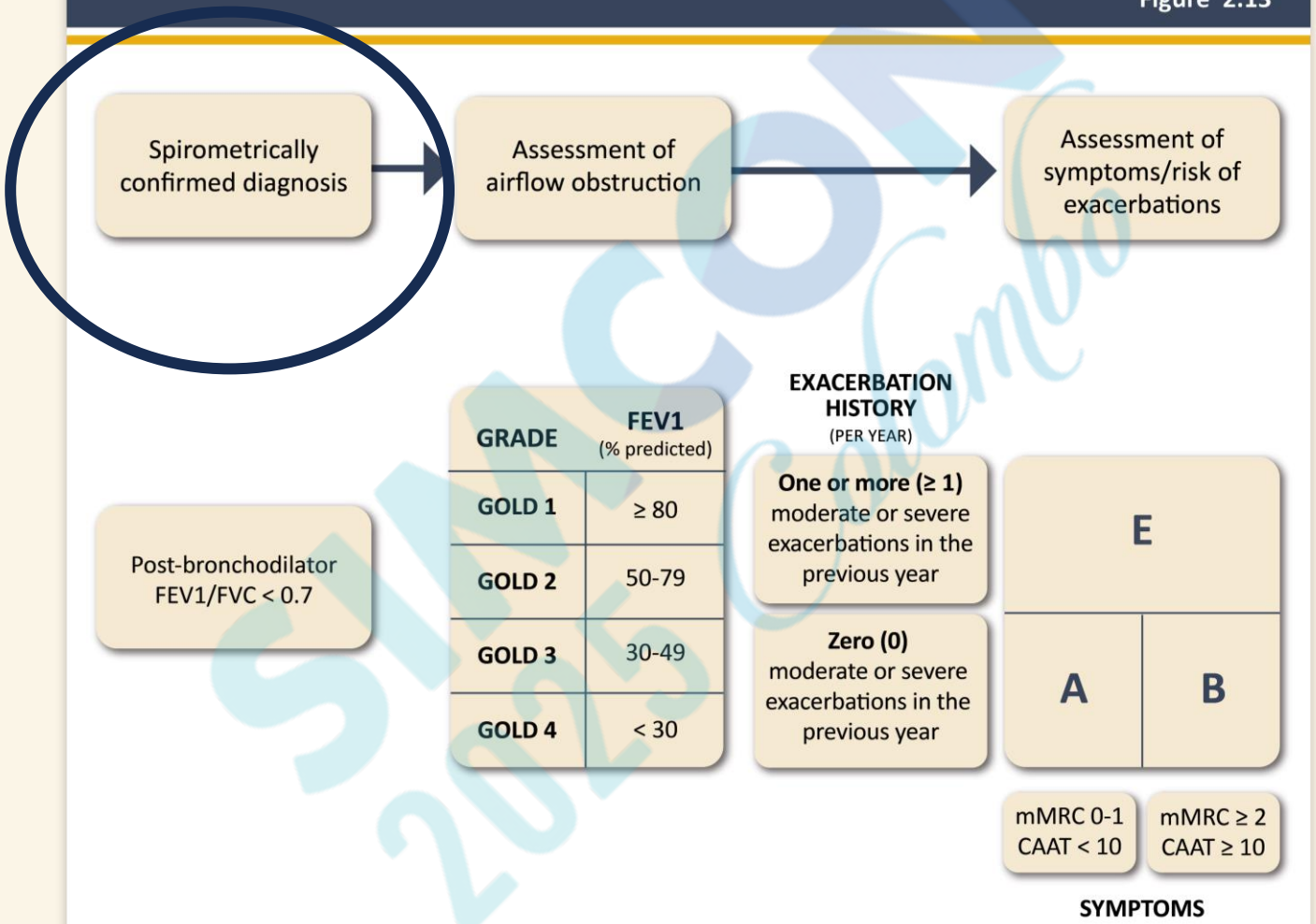
- High impact on survival and quality of life
- High impact on health care systems
- Potentially irreversible
- But can achieve stability

How ?

Diagnosis

GOLD ABE Assessment Tool

Figure 2.13



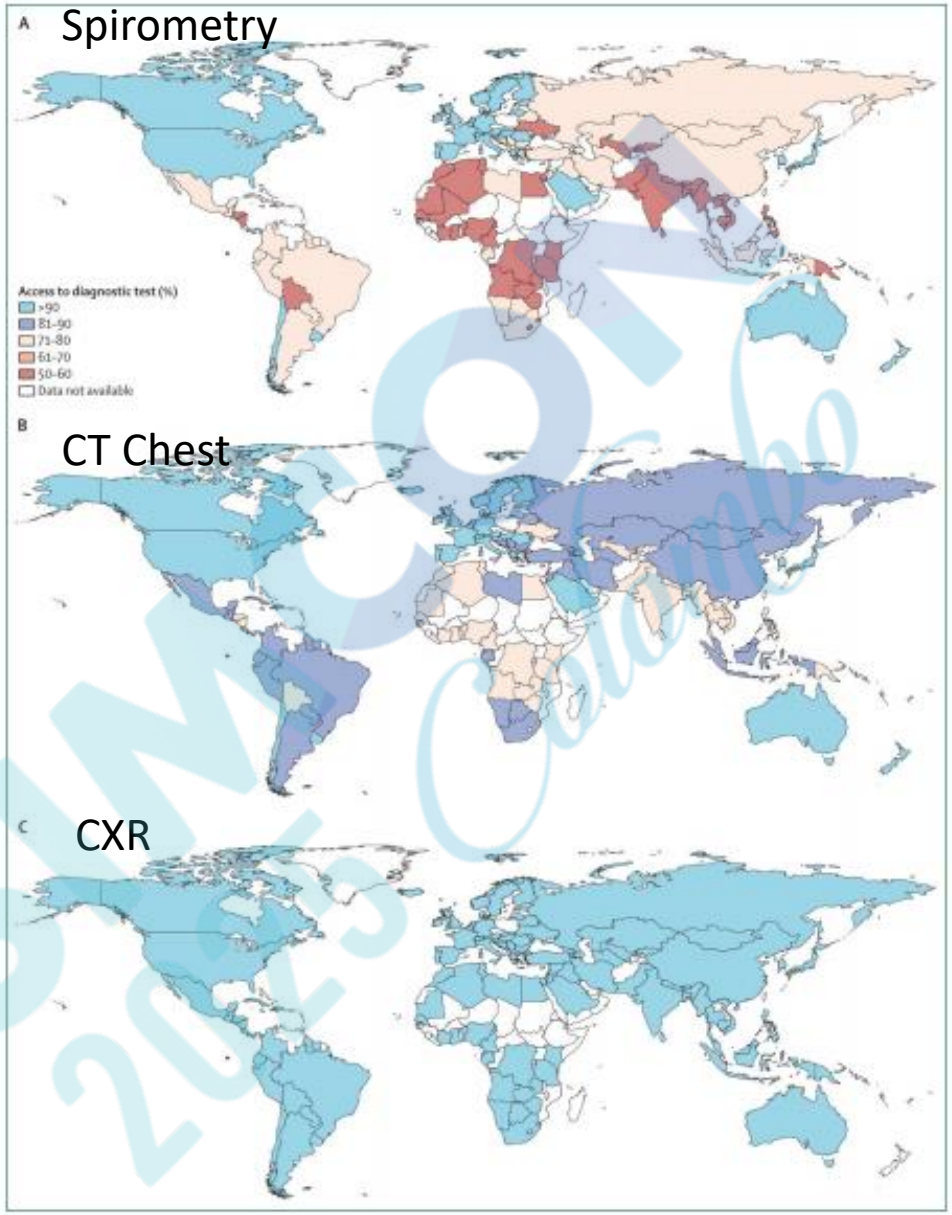
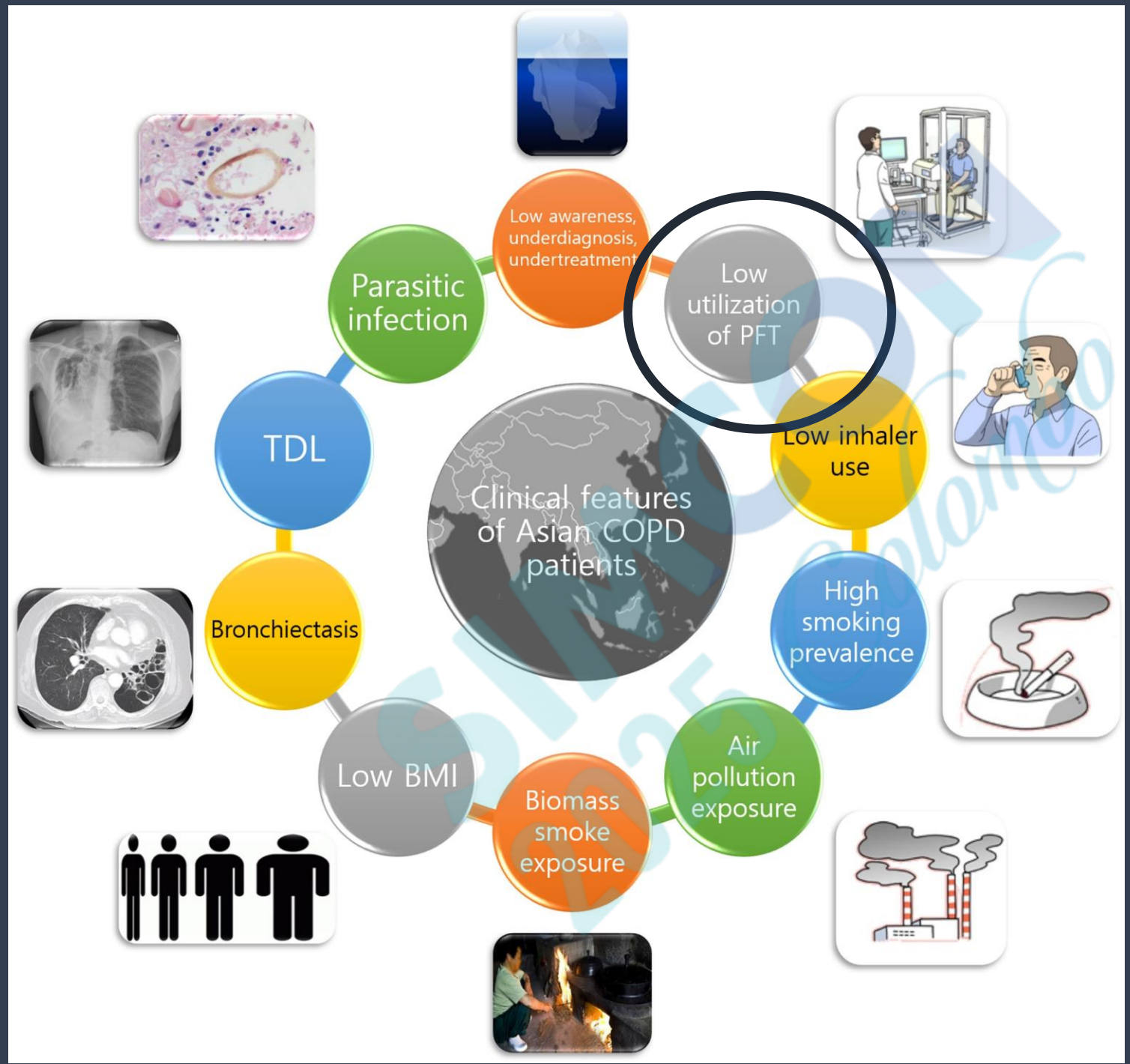


Figure 3: Proportion of global population with access to spirometry (A), chest CT (B), and chest radiography (C) for diagnosis of chronic obstructive pulmonary disease

Data were obtained from the survey done by the Commission (appendix pp 1–5).

Stolz D, Mkorombindo T, et al **Towards the elimination of chronic obstructive pulmonary disease: a Lancet Commission. Lancet.** 2022 Sep 17;400(10356):921-972. doi: 10.1016/S0140-6736(22)01273-9. Epub 2022 Sep 5. PMID: 36075255; PMCID: PMC11260396.



de Oca MM, Perez-Padilla R, Celli B, Aaron SD, Wehrmeister FC, Amaral AFS, Mannino D, Zheng J, Salvi S, Obaseki D, Buist AS, Menezes A. **The global burden of COPD: epidemiology and effect of prevention strategies.** Lancet Respir Med. 2025 Aug;13(8):709-724. doi: 10.1016/S2213-2600(24)00339-4. Epub 2025 Jul 17. PMID: 40684784.

Proposed diagnostic pathway…

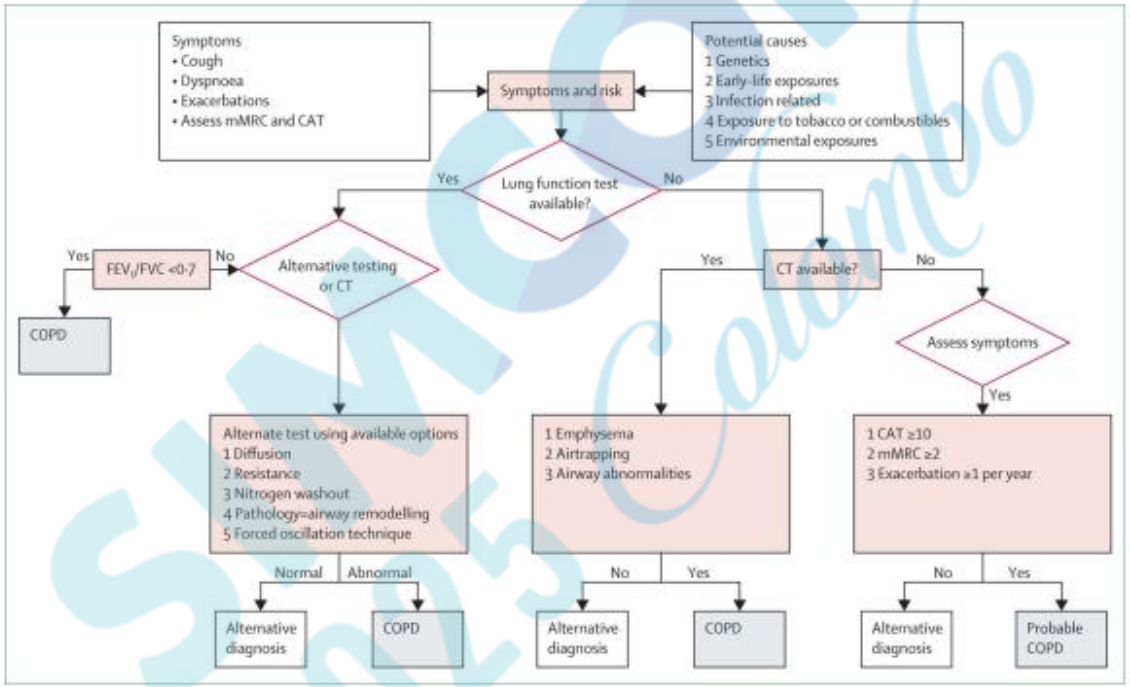


Figure 11: Proposed diagnostic algorithm for COPD
COPD=chronic obstructive pulmonary disease. mMRC=modified medical research council scale. CAT=COPD assessment test. FEV_1=forced expiratory volume in 1 s. FVC=forced vital capacity.

Stolz D, Mkorombindo T, et al **Towards the elimination of chronic obstructive pulmonary disease: a Lancet Commission. Lancet.** 2022 Sep 17;400(10356):921-972. doi: 10.1016/S0140-6736(22)01273-9. Epub 2022 Sep 5. PMID: 36075255; PMCID: PMC11260396.

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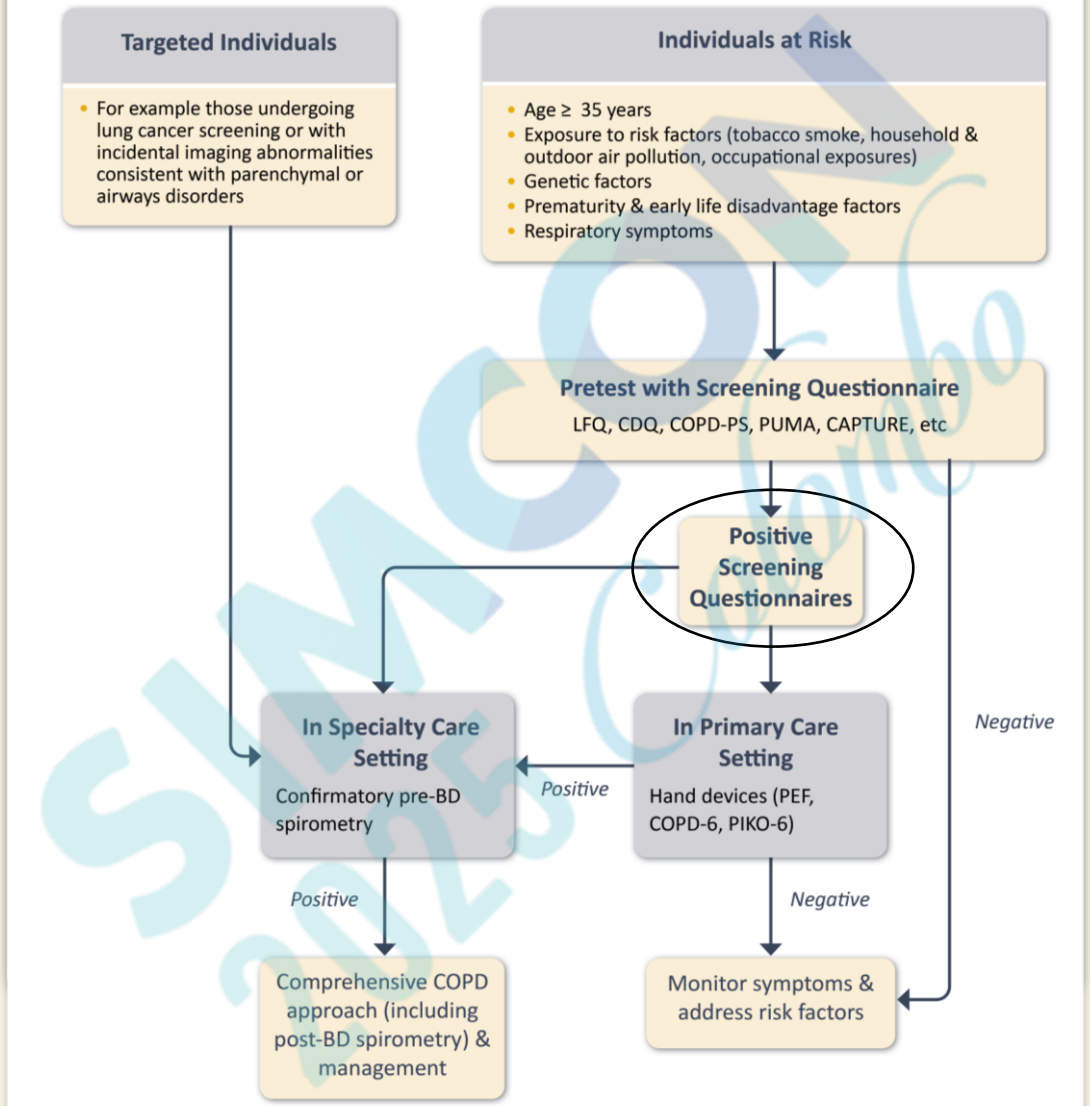
An Algorithm for COPD Case-finding

Figure 2.9



Adapted from: Aaron et al. Am J Respir Crit Care Med. 2024 Apr 15;209(8):928-937.

Treatment

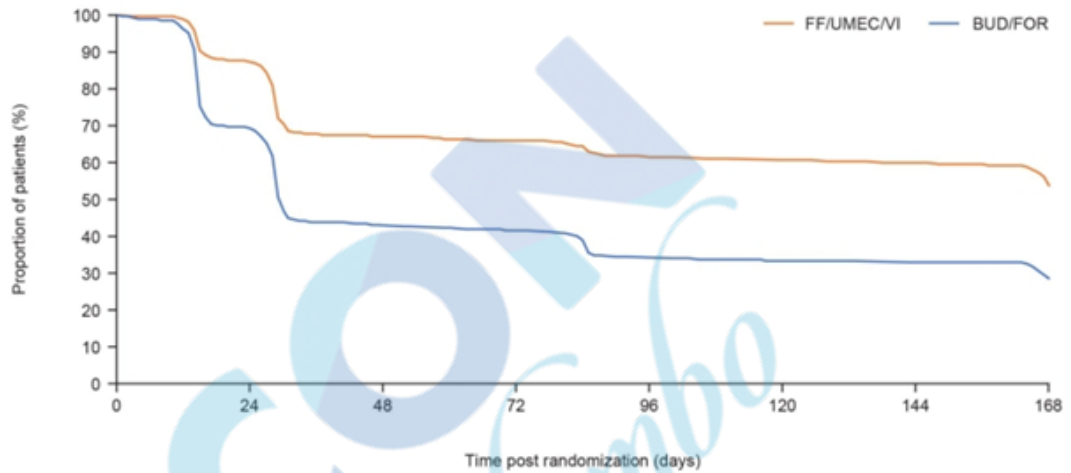
Goals for Treatment of Stable COPD

Figure 3.1

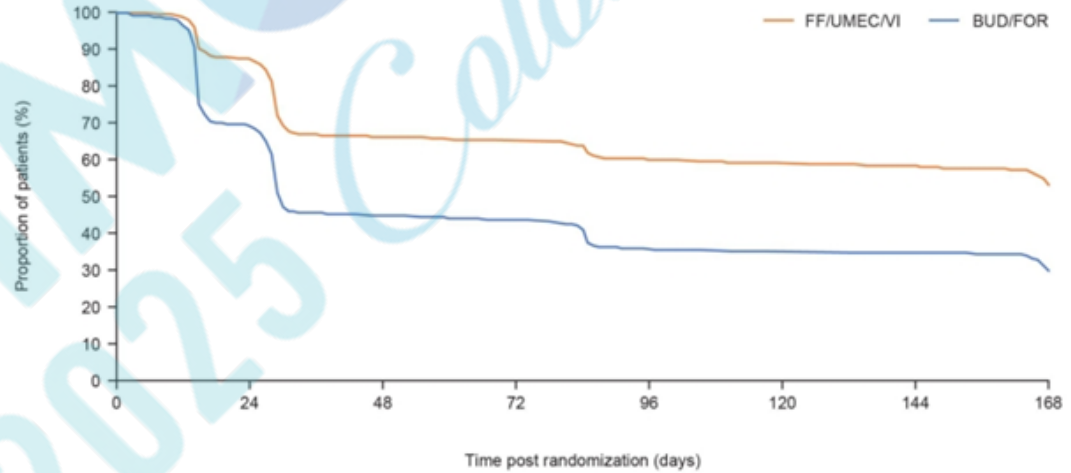
Achieving Disease Stability

Figure. Patients maintaining disease stability in FULFIL.

a. SGRQ-containing definition



b. CAT-containing definition



BUD, budesonide; CAT, COPD Assessment Test; FF, fluticasone furoate; FOR, formoterol; SGRQ, St George's Respiratory Questionnaire; UMEC, umeclidinium; VI, vilanterol.


American Journal of Respiratory and Critical Care Medicine

Home > American Journal of Respiratory and Critical Care Medicine > List of Issues > Volume 196, Issue 4

FULFIL Trial: Once-Daily Triple Therapy for Patients with Chronic Obstructive Pulmonary Disease

David A. Lipson, Helen Barnacle, Ruby Birk, Noushin Brealey, Nicholas Locantore, David A. Lomas, Andrea Ludwig-Sengpiel, Rajat Mohindra, Maggie Tabberer, Chang-Qing Zhu, and Steven J. Pascoe

+ Author Affiliations

https://doi.org/10.1164/rccm.201703-0449OC Published: 28375647

Received: March 01, 2017 Accepted: April 04, 2017

Comments

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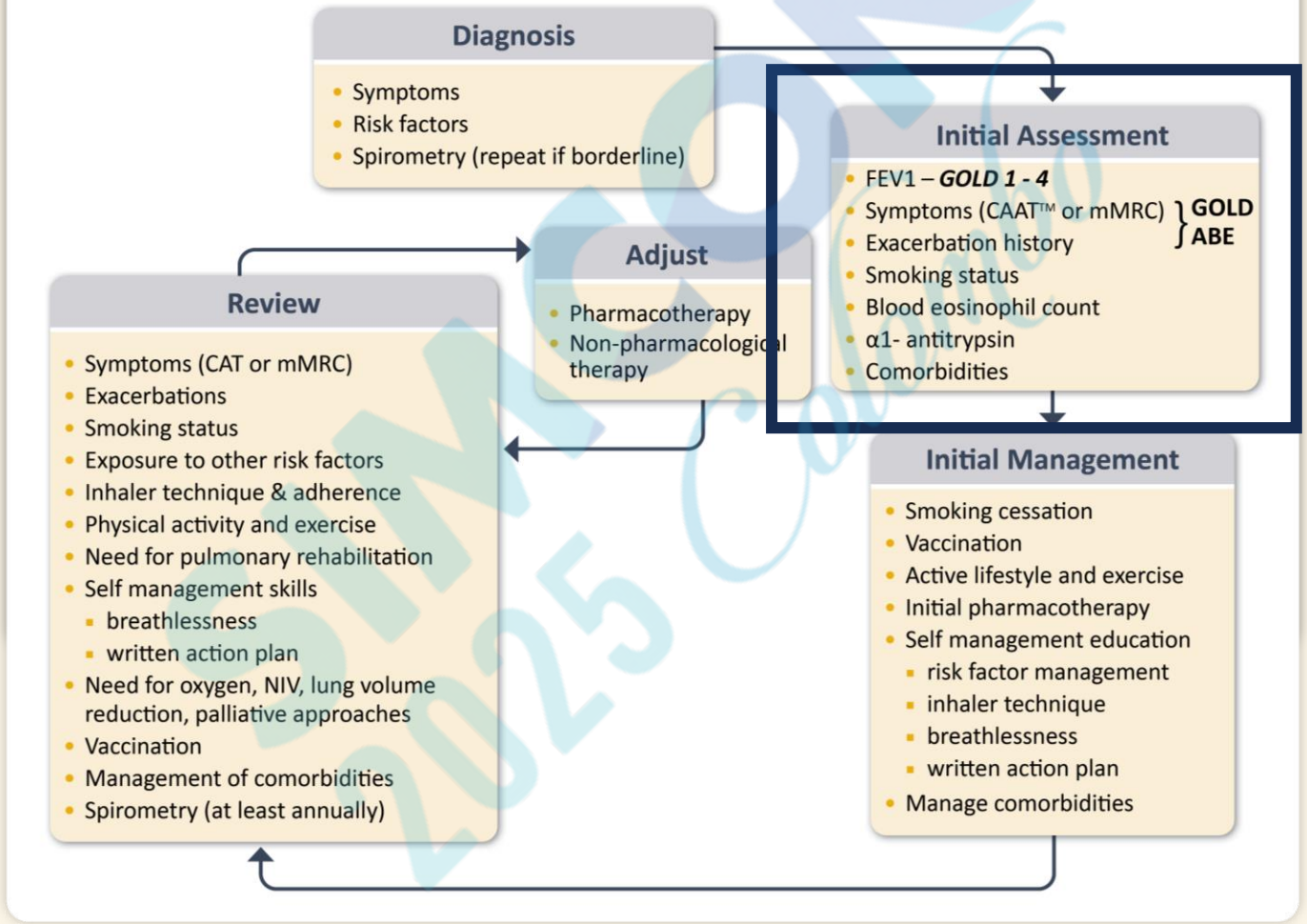
Management of COPD

Figure 3.2



- History of premature birth
- History of biomass smoke exposure
- History of tuberculosis

- Parasitic infections should be ruled out in patients with severe eosinophilia

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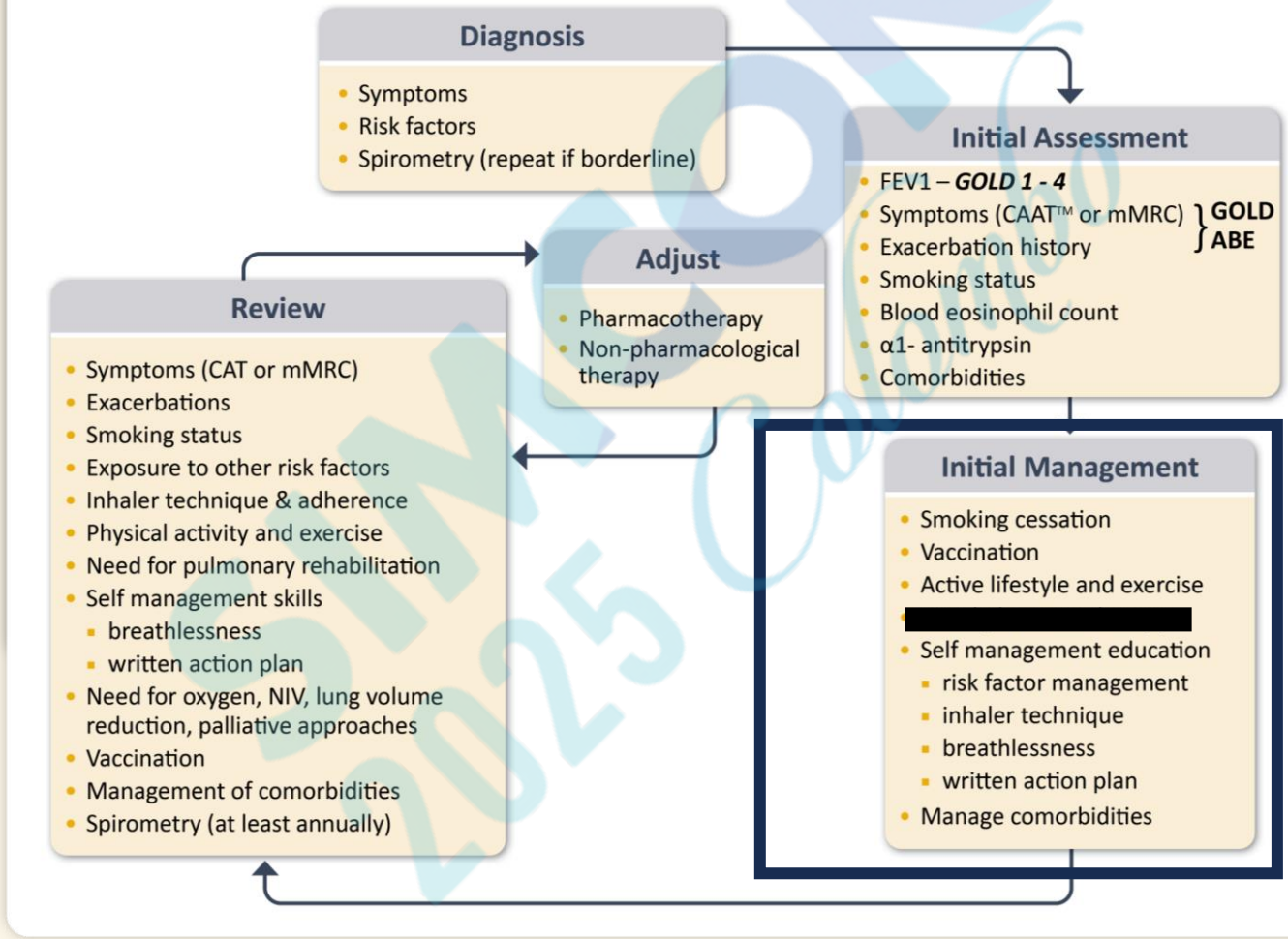
Management of COPD

Figure 3.2



- Encourage Mobility if PR not frequently available

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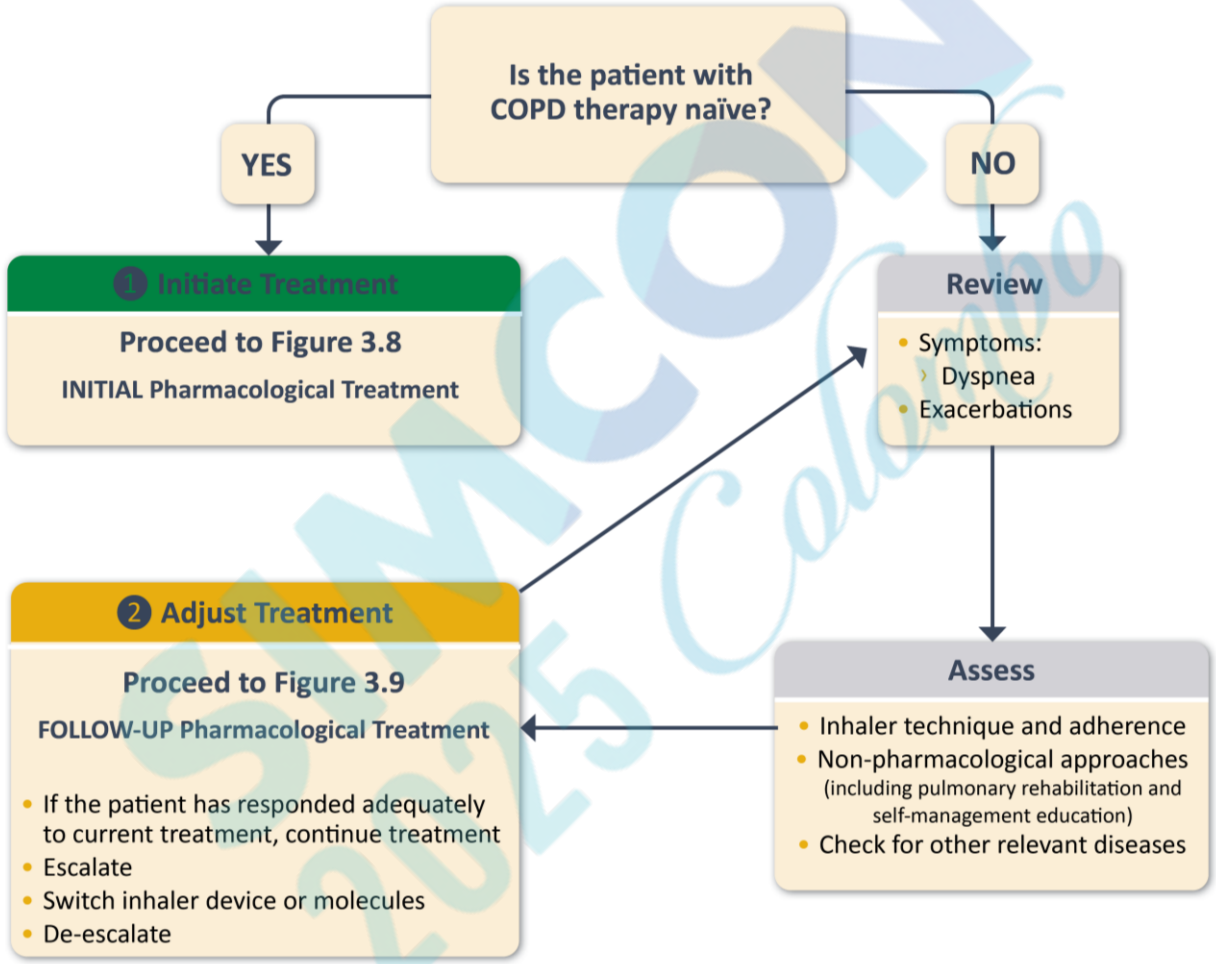
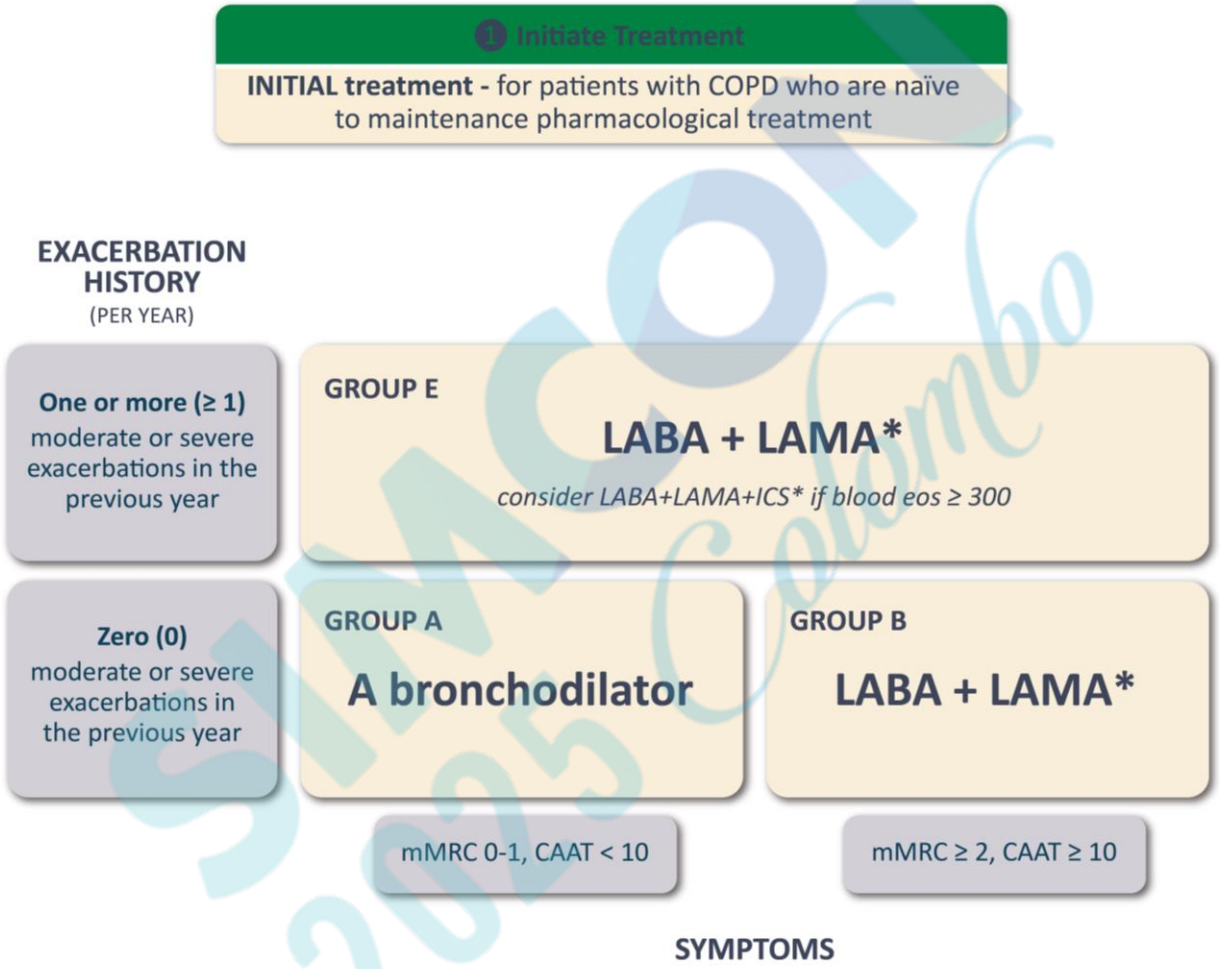
Diagnosis and Management Cycle

Figure 3.7



Initial Pharmacological Treatment

Figure 3.8



*Single inhaler therapy may be more convenient and effective than multiple inhalers; single inhalers improve adherence to treatment

Exacerbations refers to the number of exacerbations per year; eos: blood eosinophil count in cells per microliter; mMRC: modified Medical Research Council dyspnea questionnaire; CAAT™: Chronic Airways Assessment Test™.

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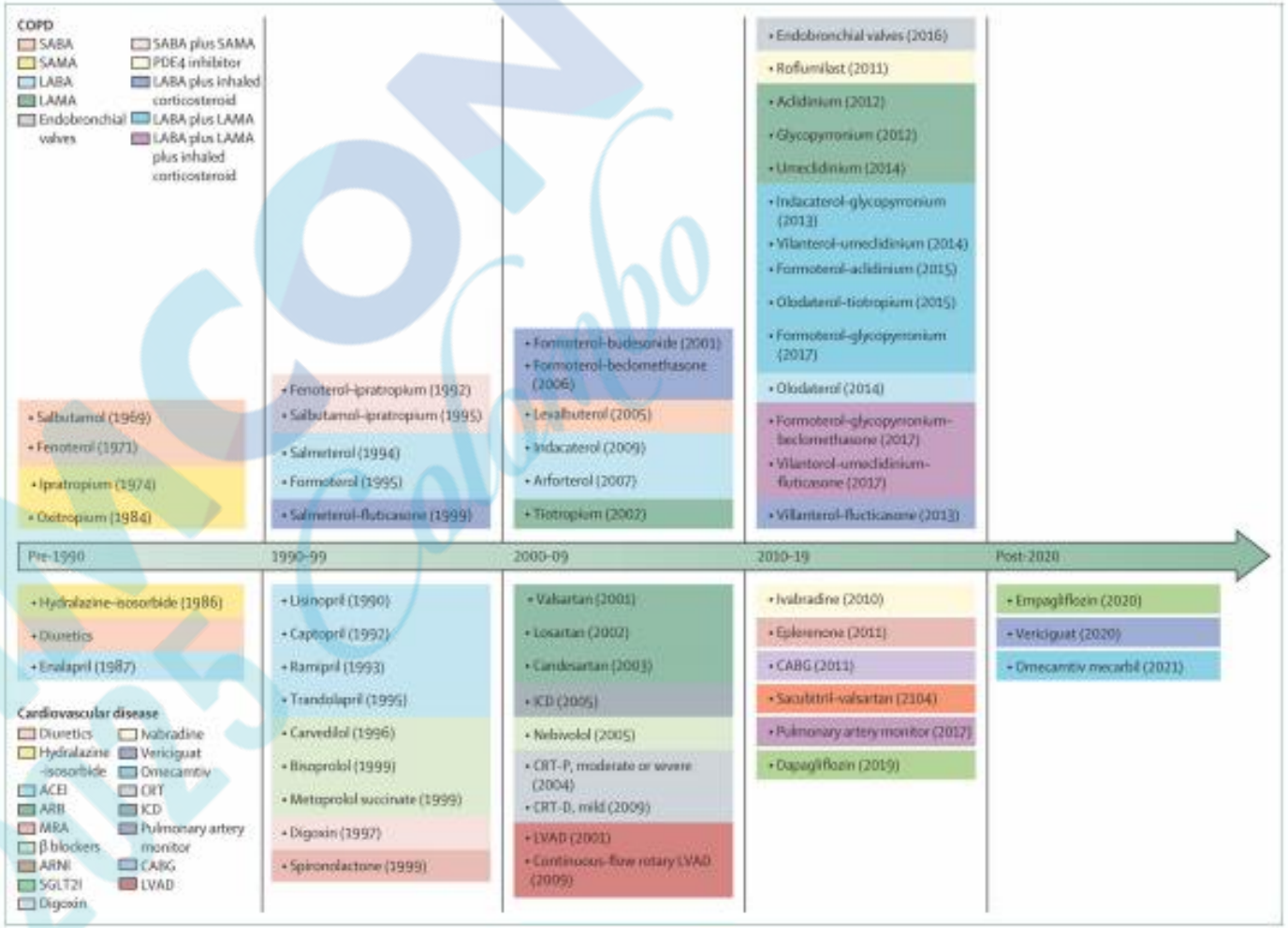
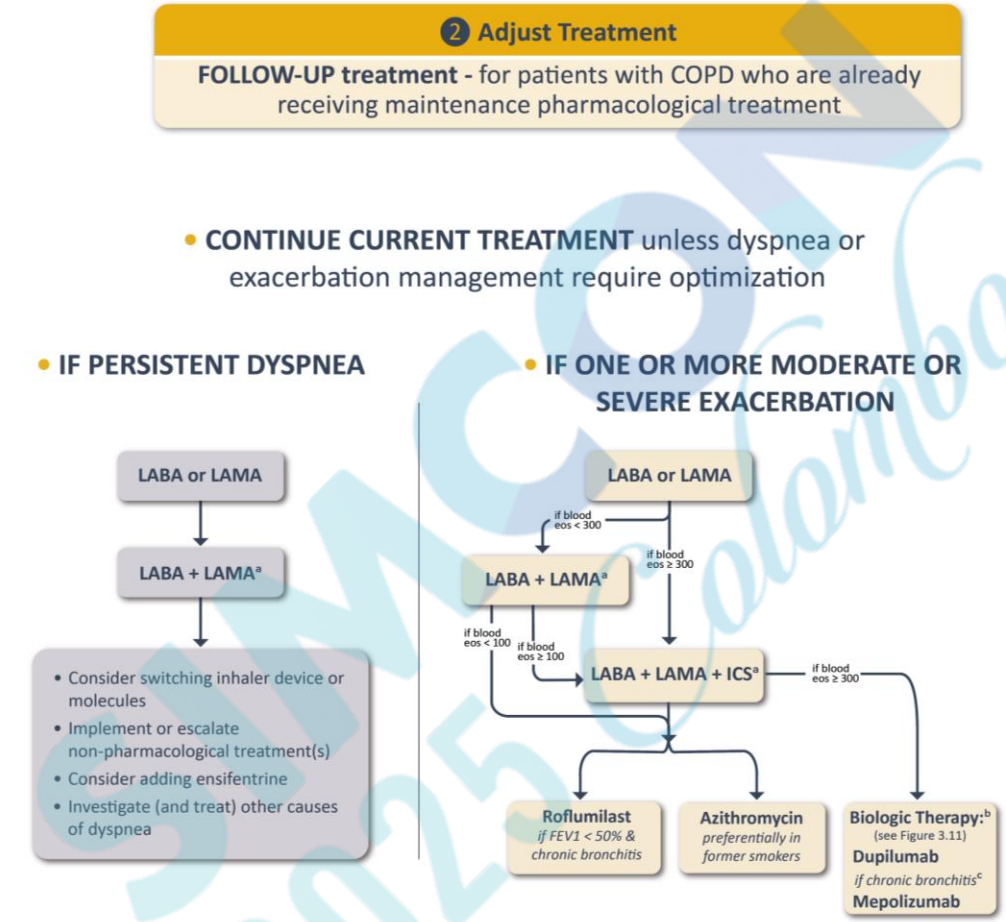
Timeline of medications entering the market for COPD vs cardiovascular disease



Follow-up Pharmacological Treatment

Figure 3.9



[a]Single inhaler therapy may be more convenient and effective than multiple inhalers; single inhalers improve adherence to treatment.

[b]Listed in order of approval in the US.

[c]Patient-reported history of chronic bronchitis (chronic productive cough) for 3 months in the year up to screening, absent other known causes.

Consider de-escalation of ICS if pneumonia or other considerable side-effects. In case of blood eosinophils ≥ 300 cells/µl de-escalation is more likely to be associated with the development of exacerbations.

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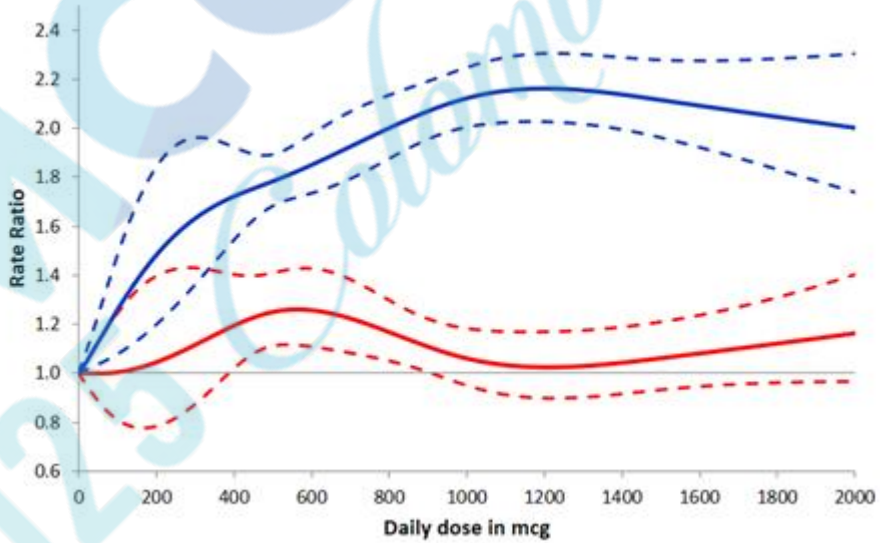
Figure 3 Dose–response curves for the rate ratio (solid lines) and 95% CIs (dashed lines) of pneumonia as a function of inhaled fluticasone (blue lines) and budesonide (red lines) dose in μg (measured in fluticasone equivalents) estimated by cubic splines model fit by conditional logistic regression.



Suissa S, Patenaude V, Lapi F, *et al*
Inhaled corticosteroids in COPD and the risk of serious pneumonia
Thorax 2013;**68:**1029-1036.

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Oxygen Therapy and Ventilatory Support in Stable COPD

Figure 3.17

Oxygen Therapy	• The long-term administration of oxygen increases survival in patients with severe chronic resting arterial hypoxemia **(Evidence A)** • In patients with stable COPD and moderate resting or exercise-induced arterial desaturation, prescription of long-term oxygen does not lengthen time to death or first hospitalization or provide sustained benefit in health status, lung function and 6-minute walk distance **(Evidence A)** • Sufficient resting oxygenation at sea level does not exclude the development of severe hypoxemia when traveling by air **(Evidence C)**
Ventilatory Support	• NPPV may improve hospitalization-free survival in selected patients after recent hospitalization, particularly in those with pronounced daytime persistent hypercapnia ($PaCO_2$ > 53 mmHg) **(Evidence B)** • In patients with severe chronic hypercapnia and a history of hospitalization for acute respiratory failure, long-term noninvasive ventilation may be considered **(Evidence B)**

Adaptation of Personalized care using treatable traits in LMIC

Cardoso J, Ferreira AJ, Guimarães M, Oliveira AS, Simão P, Sucena M. Treatable Traits in COPD - A Proposed Approach. Int J Chron Obstruct Pulmon Dis. 2021 Nov 18;16:3167-3182. doi: 10.2147/COPD.S330817. PMID: 34824530; PMCID: PMC8609199.

Pulmonary

- Eosinophilic airway inflammation[30]
- Bronchiectasis[118]
- Chronic bronchial infection[80]
- Airflow limitation[96,120]
- Lung hyperinflation[72,75]
- Chronic bronchitis[121,122]

Extrapulmonary

- Obstructive sleep apnea[123–125]
- Cardiovascular disease[59]
- Anxiety/ Depression[126]
- Persistent systemic inflammation[80]
- Cachexia[127]
- Exercise intolerance[128]
- Physical inactivity[129,130]

Behavioral

- Poor inhalation technique[131,132]
- Smoking and other environmental exposures[133]
- Non-adherence[134]
- Poor family/social support[135]

Introduce the aeitiology to COPD

Proposed Taxonomy (Etiotypes) for COPD

Figure 1.3

Classification	Description
Genetically determined COPD (COPD-G)	Alpha-1 antitrypsin deficiency (AATD) Other genetic variants with smaller effects acting in combination
COPD due to abnormal lung development (COPD-D)	Early life events, including premature birth and low birthweight, among others
Environmental COPD	
Cigarette smoking COPD (COPD-C)	• Exposure to tobacco smoke, including *in utero* or via passive smoking • Vaping or e-cigarette use • Cannabis
Biomass and pollution exposure COPD (COPD-P)	Exposure to household pollution, ambient air pollution, wildfire smoke, occupational hazards
COPD due to infections (COPD-I)	Childhood infections, tuberculosis-associated COPD, HIV-associated COPD
COPD & asthma (COPD-A)	Particularly childhood asthma
COPD of unknown cause (COPD-U)	

*Adapted from Celli et al. (2022) and Stolz et al. (2022)

Descriptive cross-sectional study on chronic obstructive pulmonary disease (COPD) treatable traits among COPD patients attending to the respiratory clinic National Hospital Galle

G K Kumarasinghe, S Dalpathadu. Amila Rathnapala

GOLD Categories

7.8% were in GOLD A,

58.8% in GOLD B,

33% were in GOLD E.

Domain	Treatable trait	Frequency	Percentage
Pulmonary	Dyspnea	47	92%
	Chronic bronchitis	32	31.6%
	Emphysema	8	15%
	Eosinophilic inflammation	27	52%
Extra-pulmonary	GORD	35	68.6%
	Obesity	1	1.9%
	Malnutrition(BMI<18)	16	31%
	OSA	3	5.8%
Behavioral Traits	Past smoking	33	64%
	Current smoking	6	11%
	Domestic biomass fuel exposure	16	31%
	Poor inhaler techniques	13	25.5%

Current therapies

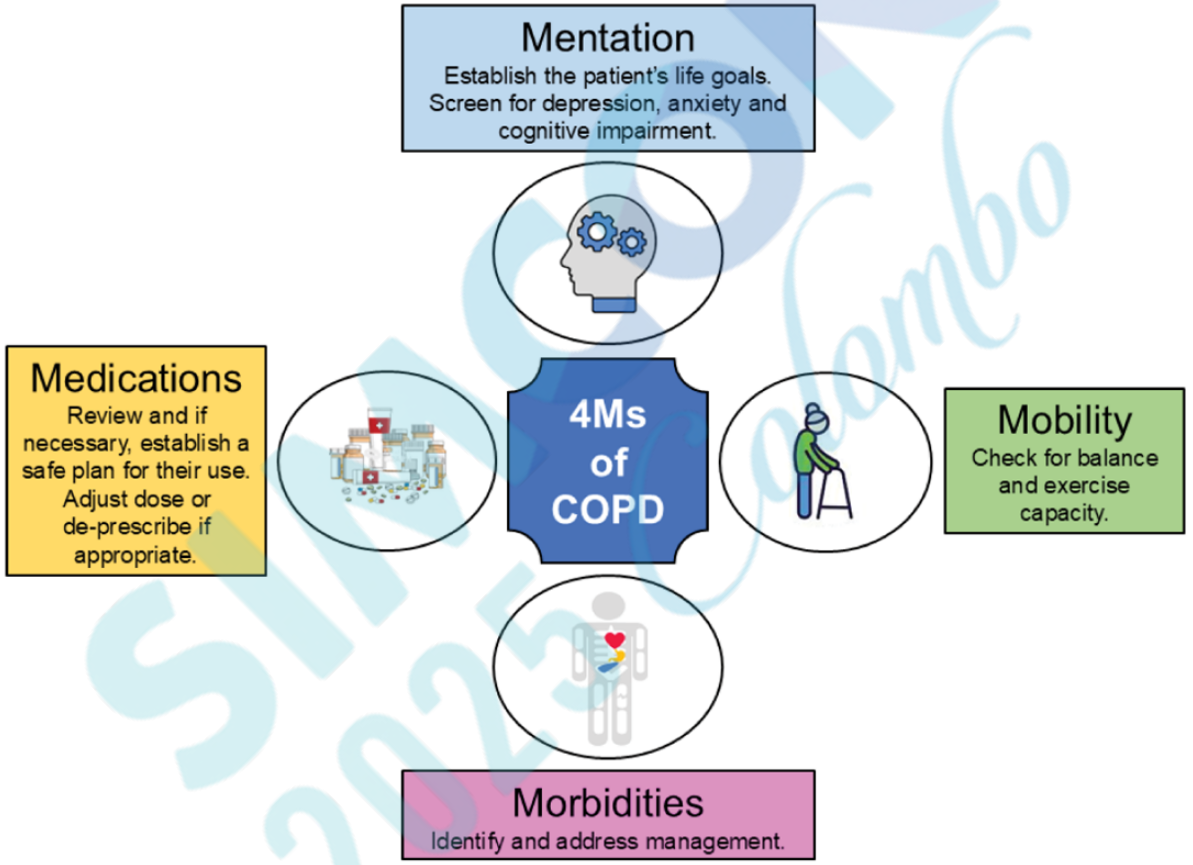
Treatment strategy	Frequency	Percentage
Inhaled corticosteroid+LABA	51	100%
LAMA	38	76%
LTOT	5	9.8%

Interventions at NHG

- Limit high dose ICS/LABA combinations
- Screening for extrapulmonary traits
- Introduced two nursing stations to address behavioral traits

Summary of the Modified 4Ms Person-centered Approach to Multimorbid Patients with COPD

Figure 5.1



Adapted from: Celli BR, Fabbri LM, Yohannes AM, Hawkins NM, Criner GJ, Bon J, Humbert M, Jenkins CR, Pantoni L, Papi A, Quint JK, Sethi S, Stolz D, Agusti A, Sin DD. A person-centred clinical approach to the multimorbid patient with COPD. Eur J Intern Med. 2025 Aug 12:106424. doi: 10.1016/j.ejim.2025.07.020.


Thank you