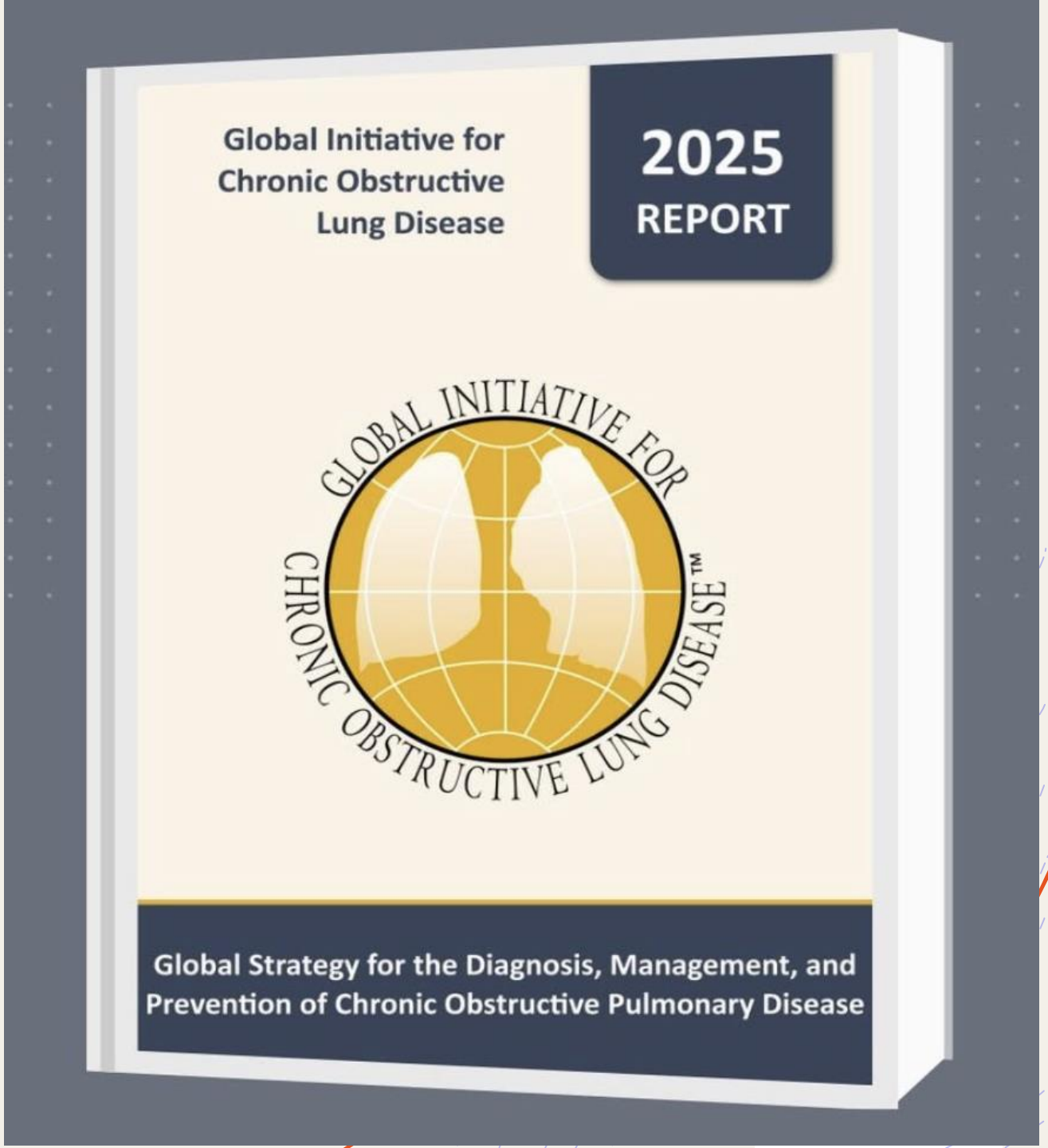
What is new in GOLD 2025 Guidelines?

Dr Dhruv Talwar



Introduction

- Global initiative for Chronic Obstructive Lung Disease (GOLD) program initiated in 1998.
- First report of Global Strategy for Diagnosis,Management and Prevention of COPD published in 2001.
- GOLD Science committee established in 2002 to review research published on COPD.
- The GOLD Science committee meets twice yearly to discuss each publication that was considered by at least one member to have an impact on management of COPD.

COPD-A Global Health Crisis

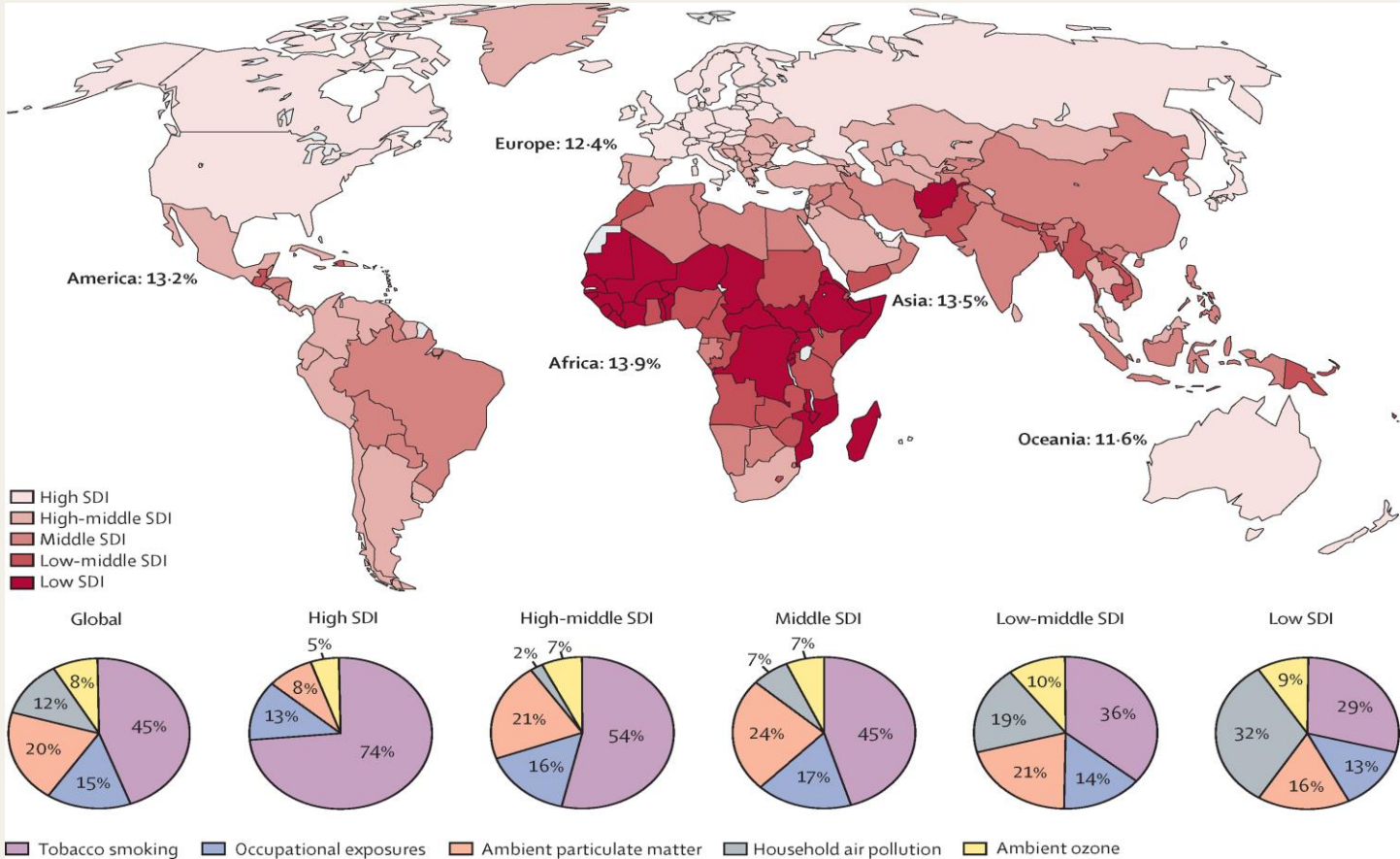
+ Urban areas having heavy pollution and rural areas relying on biomass fuels are most affected.

+ Over 500,000 hospitalisations and ¼ readmitted within 30 days

+ One tenth of population

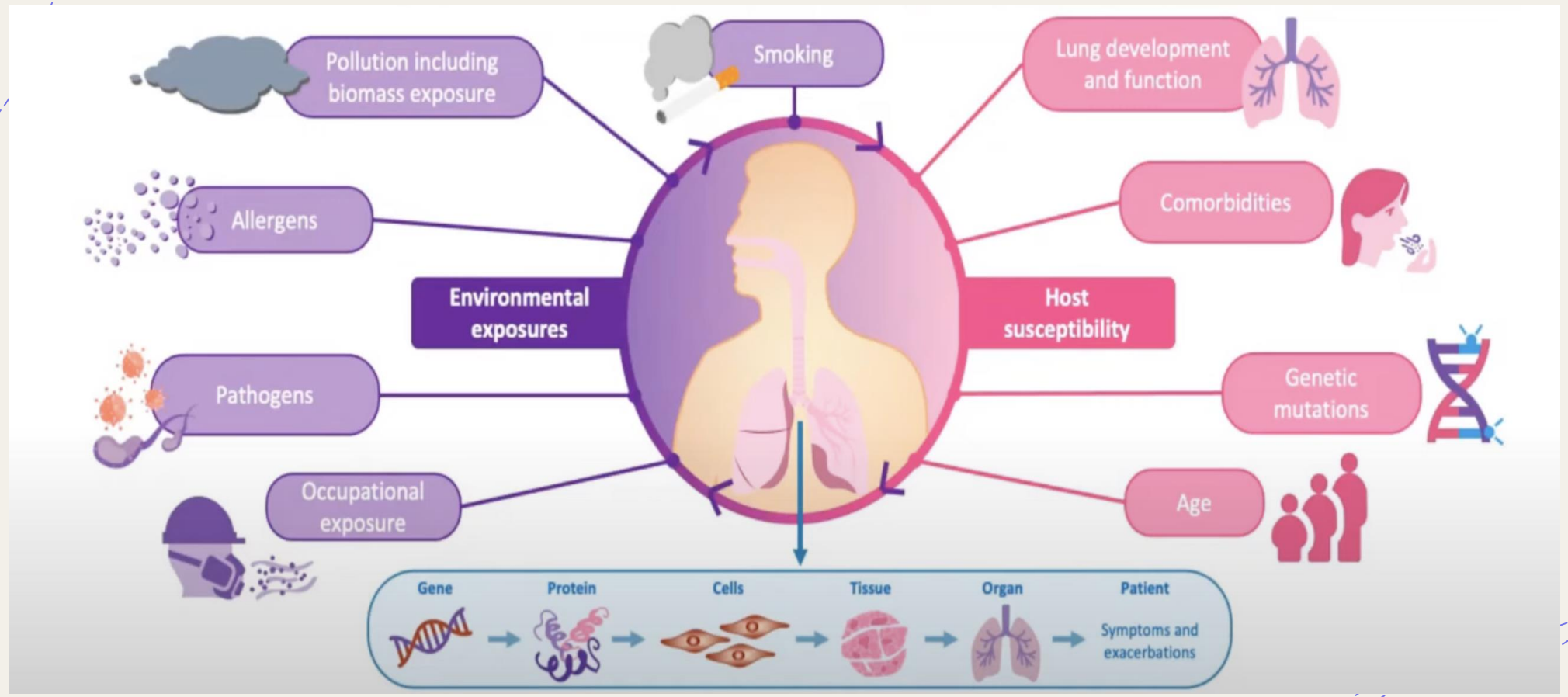
+ 3rd leading cause of mortality

+ 20-40% COPD worldwide are never smokers



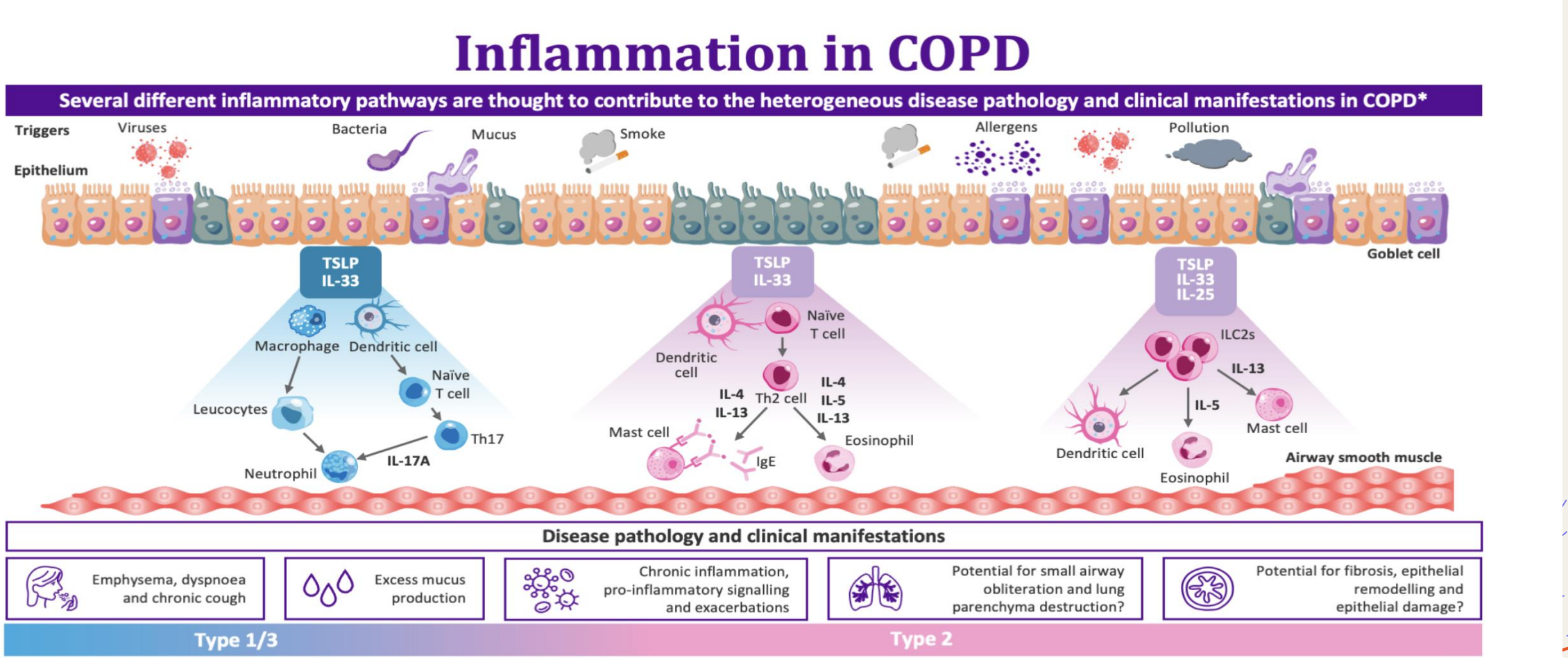
Ian A Yang et al 2022 LANCET

Contributors to disease phenotypes in COPD

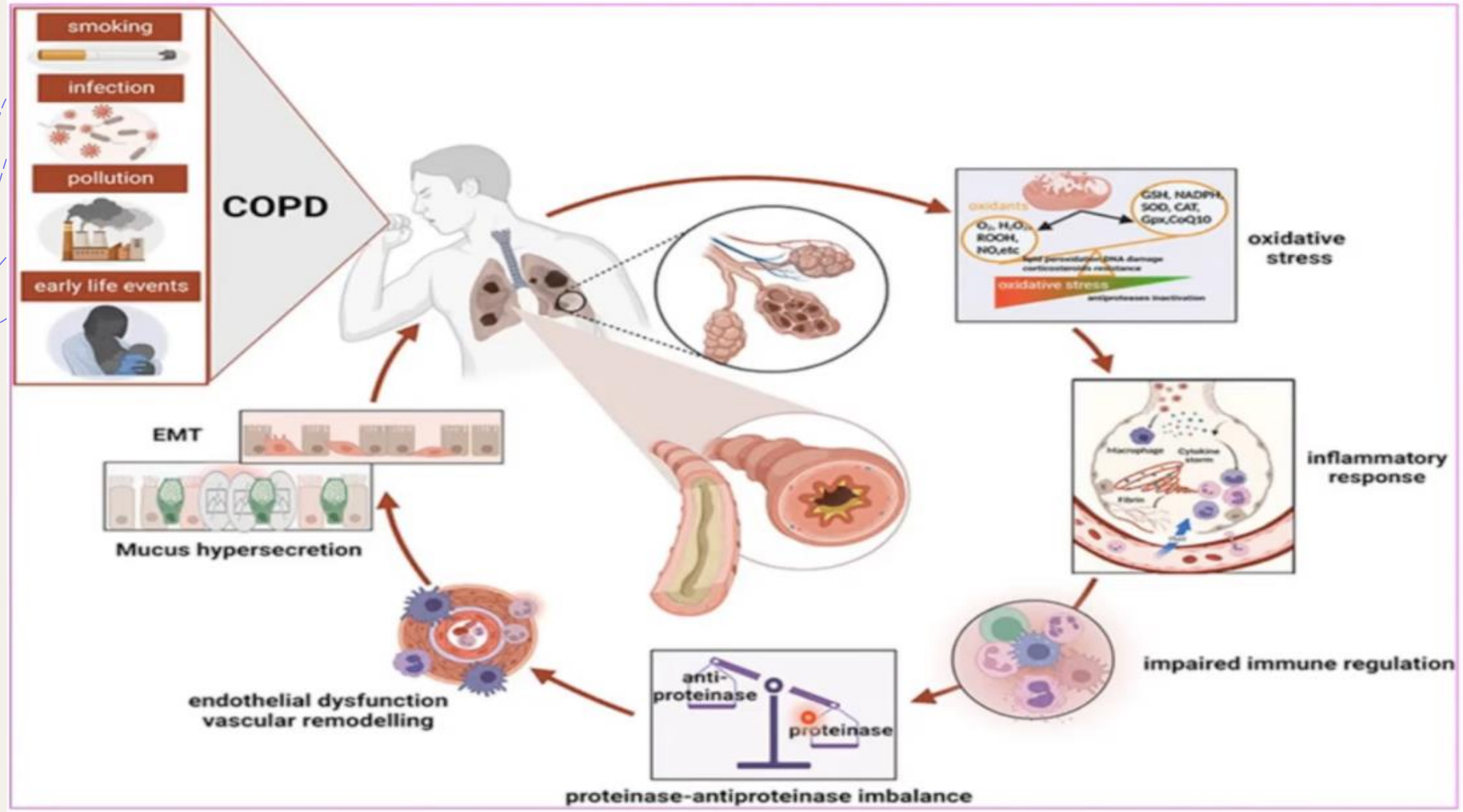


Brighting C,Greening N,Eur Respir J 2019

Role of epithelial cytokines in the inflammatory cascade



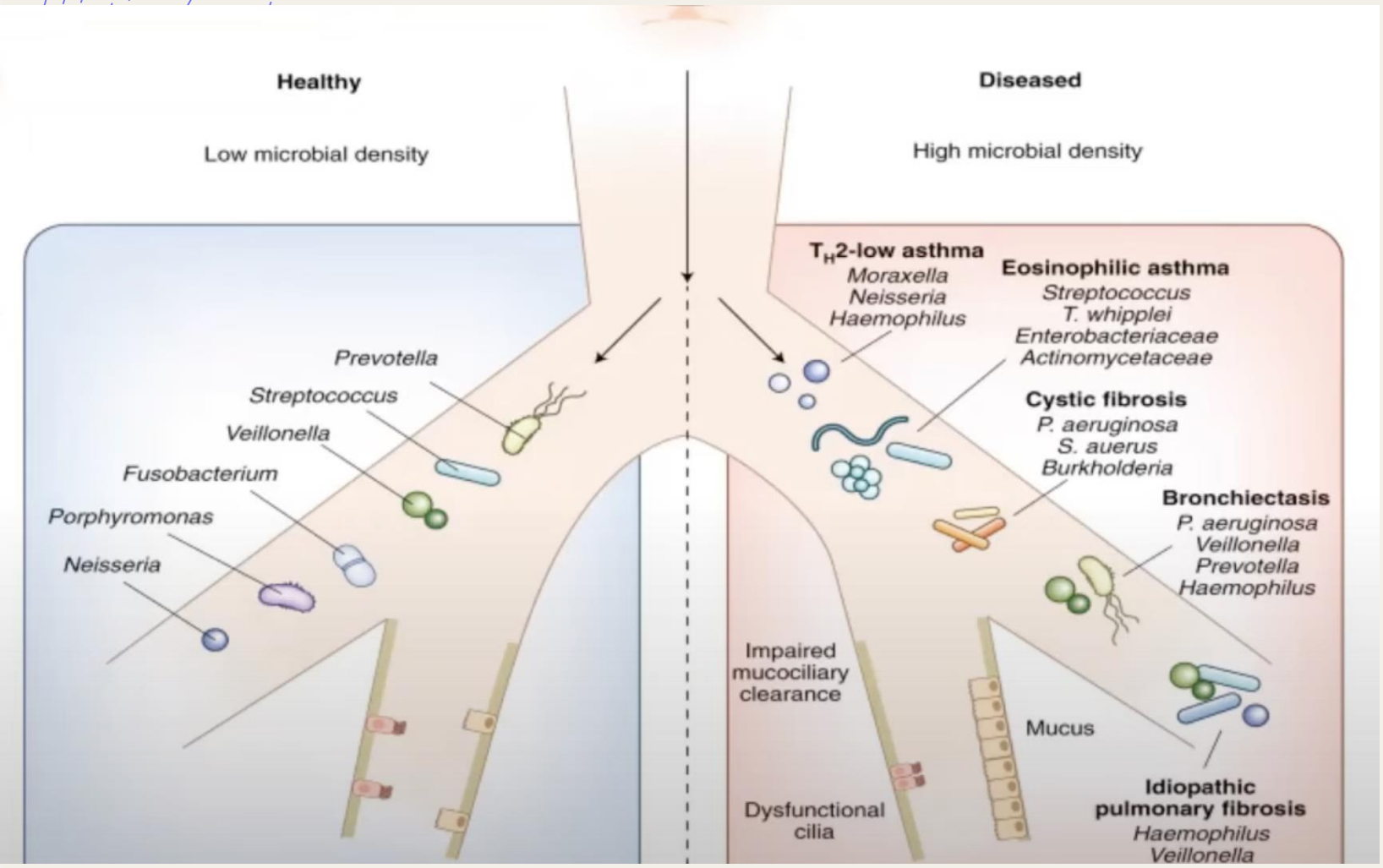
Calderon AA et al Eur Respir Rev 2023

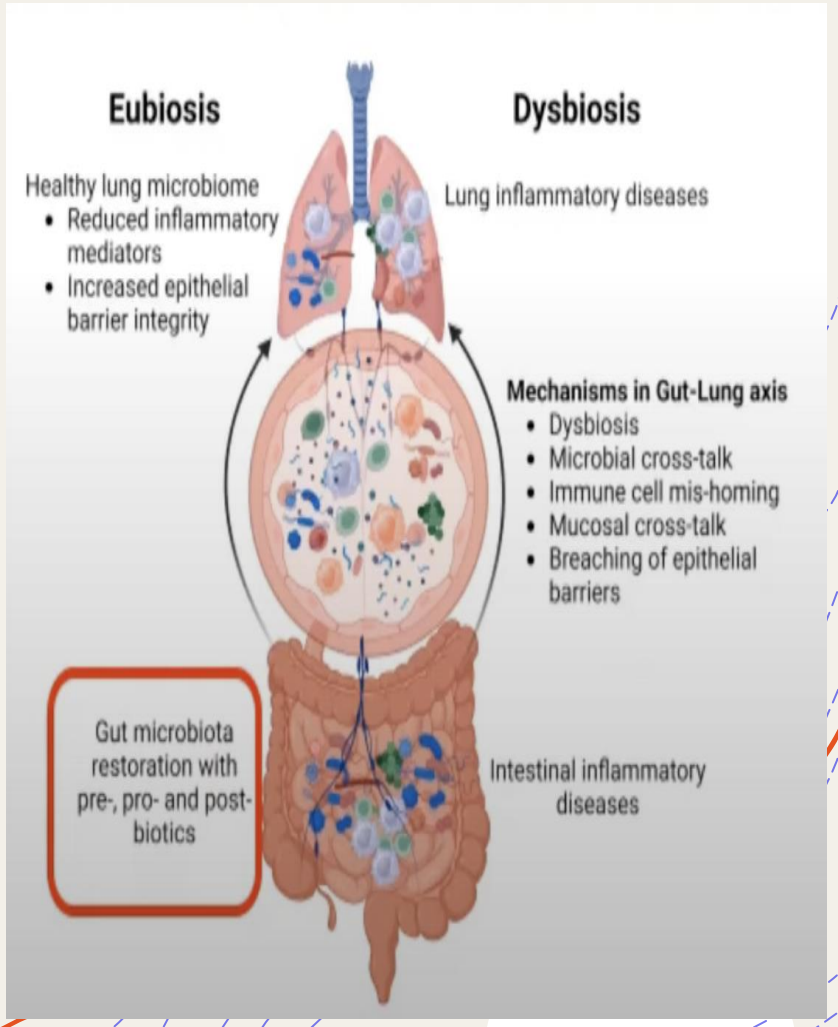


Arezina et al,Mechanic insights into therapeutic landscape of Chronic obstructive pulmonary disease.International journal of COPD.447-457.10.2147/COPD.S393540

Dysbiosis-Role of Probiotics?

New-2025 Report





Observational Study > J Allergy Clin Immunol. 2021 Jan;147(1):158-167.
doi: 10.1016/j.jaci.2020.02.040. Epub 2020 Apr 28.

The sputum microbiome, airway inflammation, and mortality in chronic obstructive pulmonary disease

Alison J Dicker [1], Jeffrey T J Huang [1], Mike Lonergan [1], Holly R Keir [1], Christopher J Fong [1], Brandon Tan [1], Andrew J Cassidy [1], Simon Finch [1], Hana Mullerova [2], Bruce E Miller [2],

Number of patients	Method	Result	Conclusion
253 clinically stable COPD patients	16S ribosomal RNA gene sequencing was performed on sputum from 253 clinically stable COPD patients (4-year median follow-up). Samples were classified as Proteobacteria or Firmicutes (phylum level) and Haemophilus or Streptococcus (genus level) dominant	Proteobacteria dominance and lower diversity was associated with more severe COPD according to the Global Initiative for Chronic Obstructive Lung Disease classification system (P = .0015), more frequent exacerbations (P = .0042), blood eosinophil level less than or equal to 100 cells/μL (P < .0001), and lower FEV_1 (P = .026). Proteobacteria dominance was associated with increased mortality compared with Firmicutes-dominated or balanced microbiome profiles (hazard ratio = 2.58; 95% CI = 1.43-4.66; P = .0017 and hazard ratio = 7.47; 95% CI = 1.02-54.86; P = .048, respectively).	Reduced microbiome diversity, associated with Proteobacteria (predominantly Haemophilus) dominance, is associated with neutrophil-associated protein profiles and an increased risk of mortality.

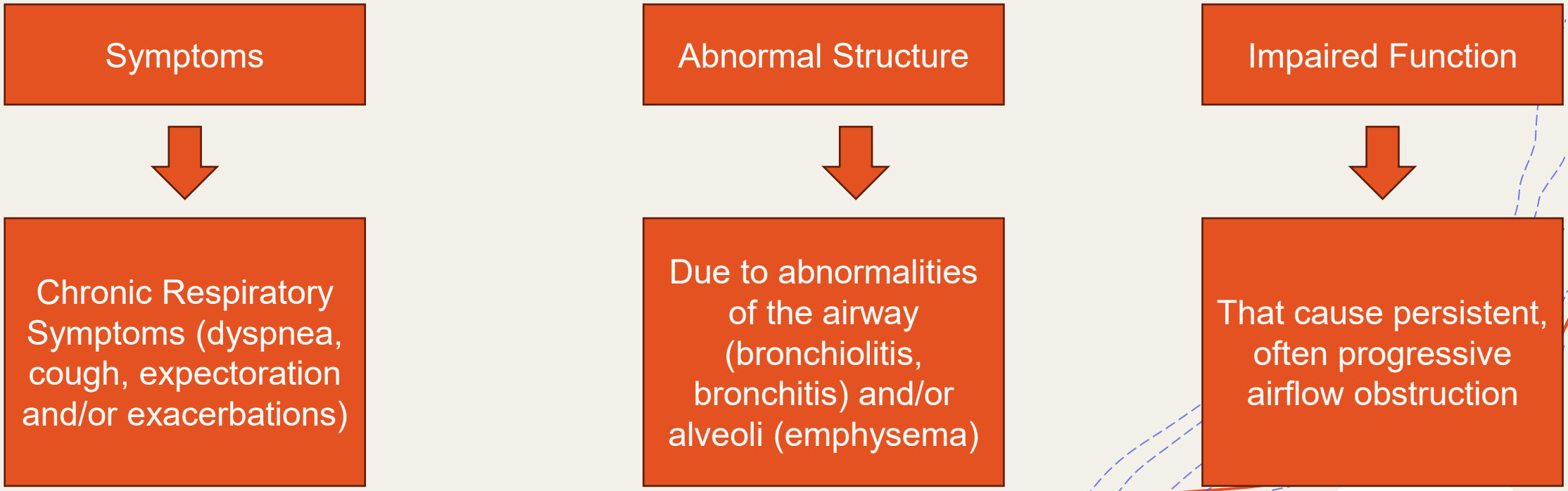
Taxonomy for COPD

Same as 2024

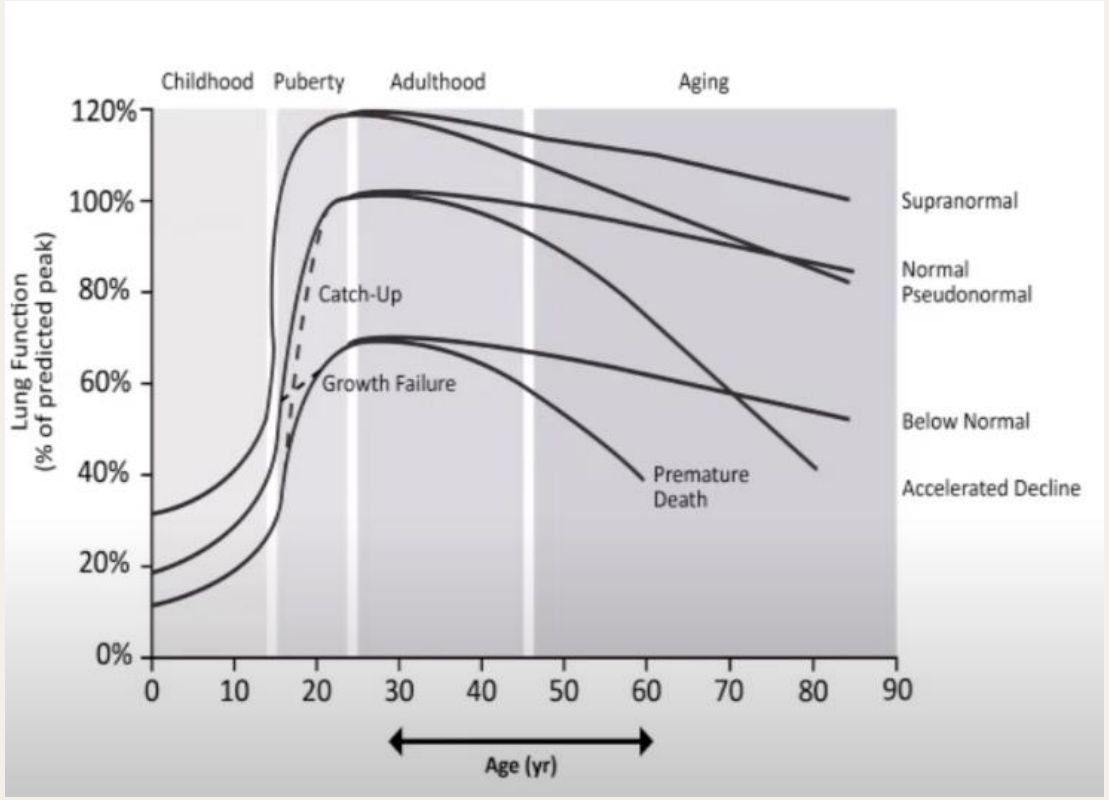
Classification	Description
Genetically determined COPD (COPD-G)	Alpha-1-antitrypsin deficiency (AATD)
COPD due to abnormal lung development (COPD-D)	early life events, premature birth, low birth weight
Cigarette smoking COPD (COPD-C)	Exposure to tobacco smoke, including in utero or passive smoking Vaping or e-cigarette Cannabis
Biomass and pollution exposure (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)	

GOLD COPD Definition

COPD as a heterogenous lung condition characterized by :-



FEV1 Trajectories over life course

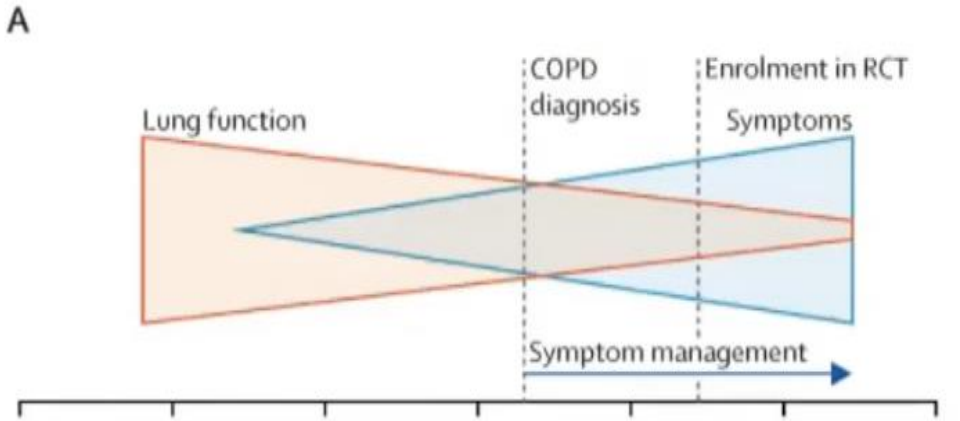


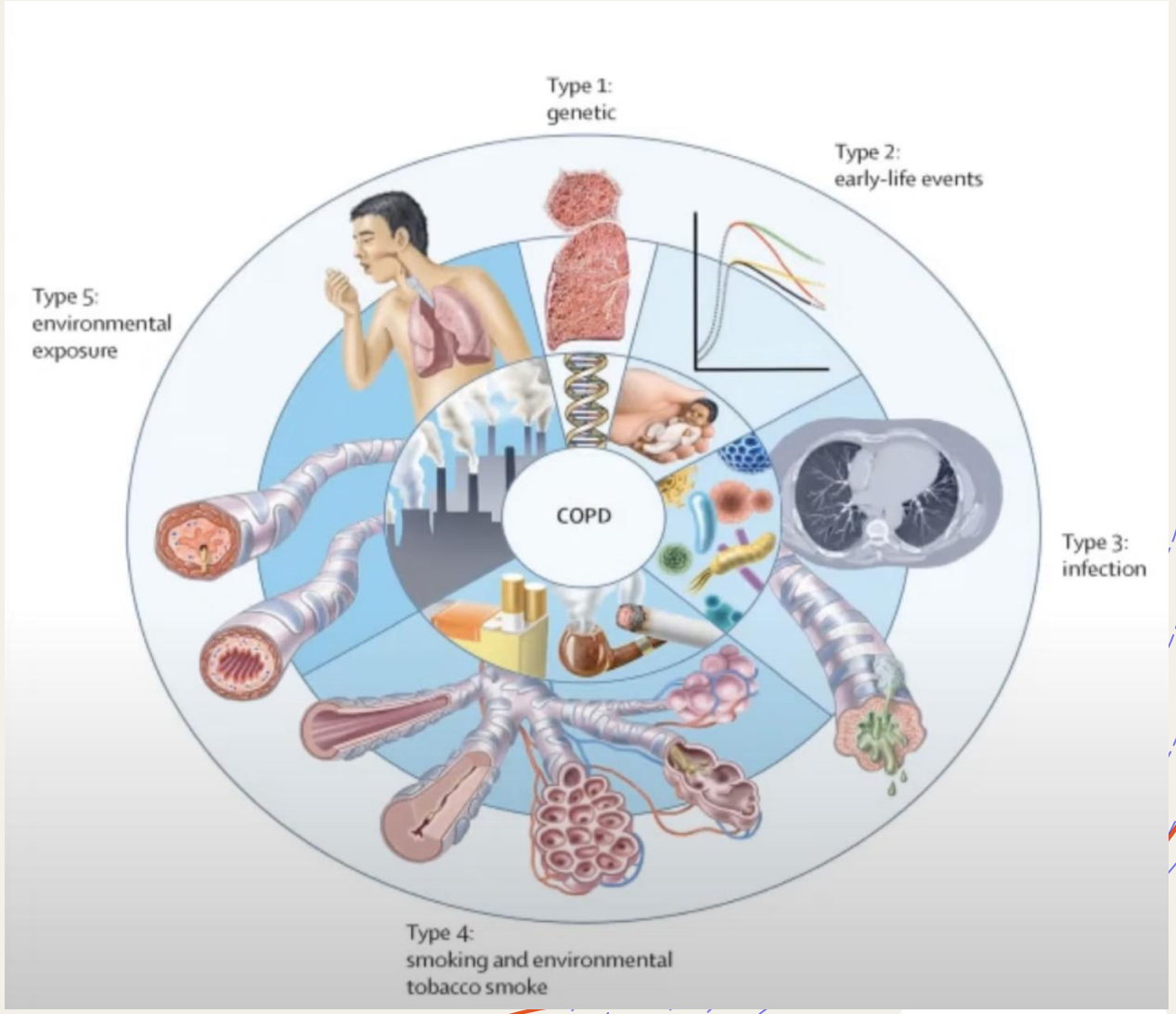
- **Early COPD**: only research
- **Mild COPD**: airflow obstruction severity
- **Young COPD:** < 50 years
- **PRISm:** Preserved ratio + FEV1 <80% ref

Agusti A,Hogg JC ,update on pathogenesis of COPD,N Eng J Med.2019

Early Diagnosis

Concept from GOLD 2023





Stolz et al Lancet 2022

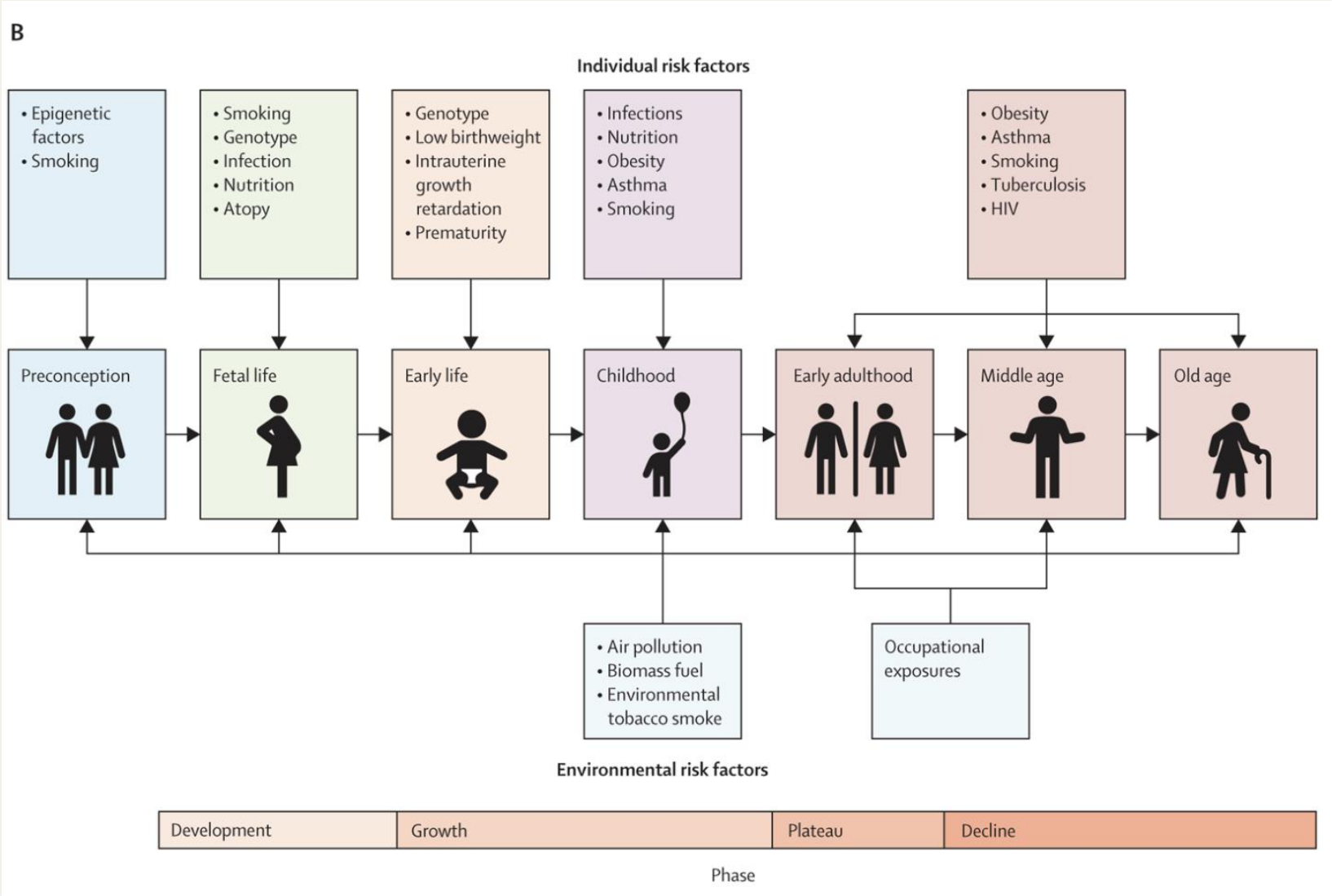
GETomics

+ Gene (G)-Serpina 1 Gene

+ Environment (E) interactions occurring over tobacco,Pollution

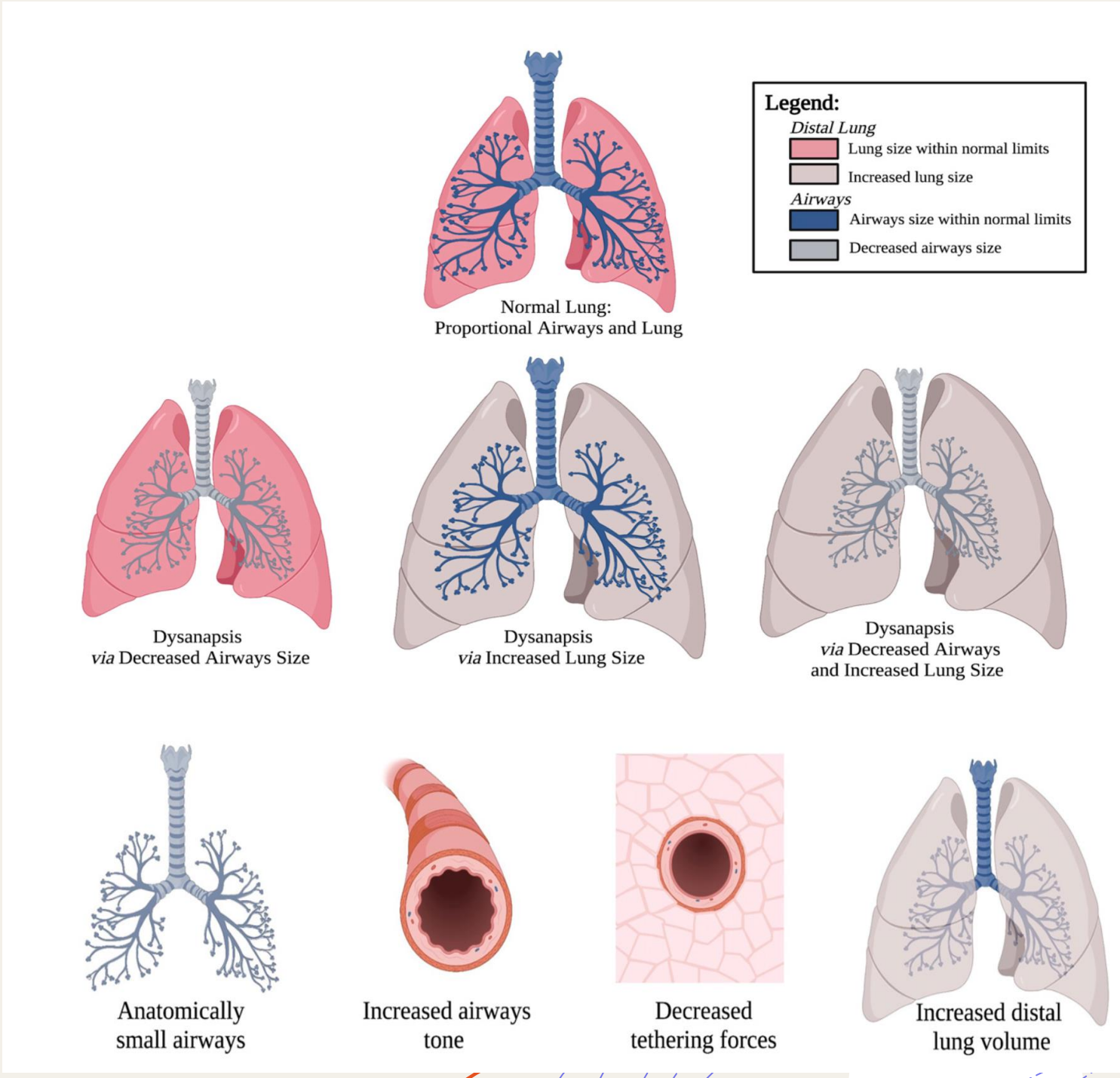
+ Lifetime (T) of individual

Damage lung/Alter normal development/Aging process



Dysnapsis

- Anthropometric mismatch of airway tree calibre relative to lung volume
- Common in general population
- Associated with FEV1/FVC from early childhood
- Associated with baseline airflow obstruction and risk of incident COPD independent of age,sex ,height ,race and ethnicity



Early COPD

- Starting early in life
- Difficult to diagnose early
- Use to discuss the biological first steps of disease in experimental setting

Young COPD

+Relates to chronological age of the patient

+20-50 years of age

+May be associated with structural and functional abnormalities

+Family history, early life events (Hospitalisation <5yrs age)

PRE COPD

+ Any age

+ Respiratory symptoms +/- structural lung lesions (eg emphysema)

+ Without airflow obstruction on forced spirometry

+ May/may not develop COPD over time (Persistent airflow obstruction)

+ FEV1/FVC >0.7 POST BRONCHODILATION

PRISm-Preserved Ratio >0.7

- Impaired spirometry
- Post BD FEV1 and/or FVC <80% (earlier classification)
- Identify those with normal ratio but abnormal spirometry
- High in active/former smokers ,both high and low BMI,female gender ,obesity ,multimorbidity
- Increased risk of Cardiovascular mortality
- 20-30% transitioned over time to obstructive spirometry
- May transition to normal or obstructive spirometry over time

Q.Which of the following is not a predictor of transition of PRISm to COPD?

A.Current Smoker

B.Male

C.Higher Age

D.Lower FEV1

PRISm-Preserved Ratio >0.7

Same as 2024

+Prevalence – 7.1 to 11% in population

+Predictors of Transition:

1. Lower baseline FEV1%,FEV1/FVC
2. Higher Age
3. Current Smoking
4. Females
5. Longer FET on second assessment

Asthma

- Adults with asthma-12 fold higher risk of COPD over time compared to non asthma (Tuscon cohort) after smoking adjustment

- European community respiratory health survey – 2nd to cigarette smoking as leading risk factor for COPD (15% risk,smoking-39%)

Diagnosis of COPD

Symptoms

- Shortness of breath
- Chronic Cough
- Sputum
- Recurrent Wheeze
- Recurrent LRTI

Risk Factors

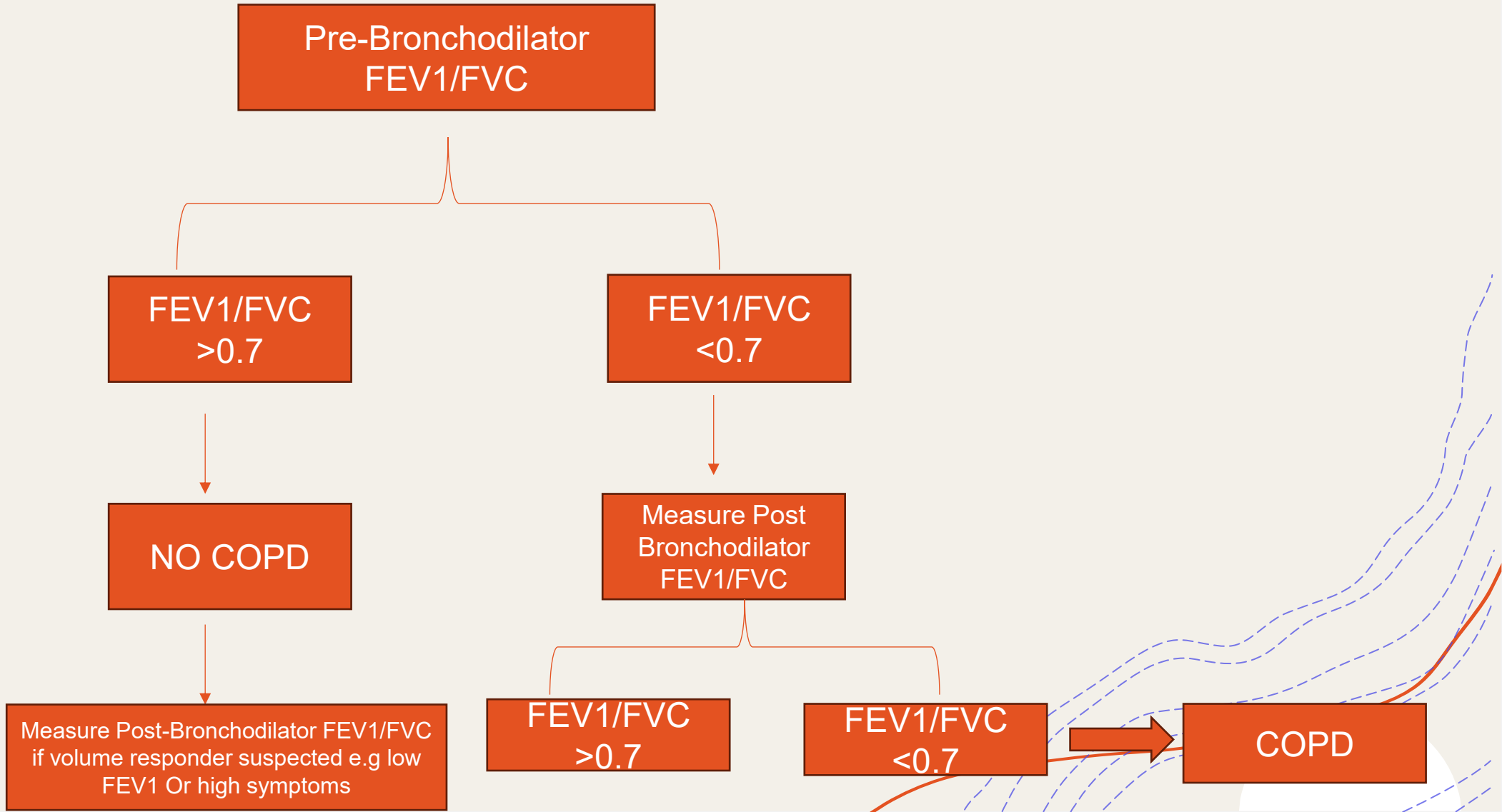
- Host Factors
- Tobacco
- Occupation
- Indoor/Outdoor Pollution

Spirometry

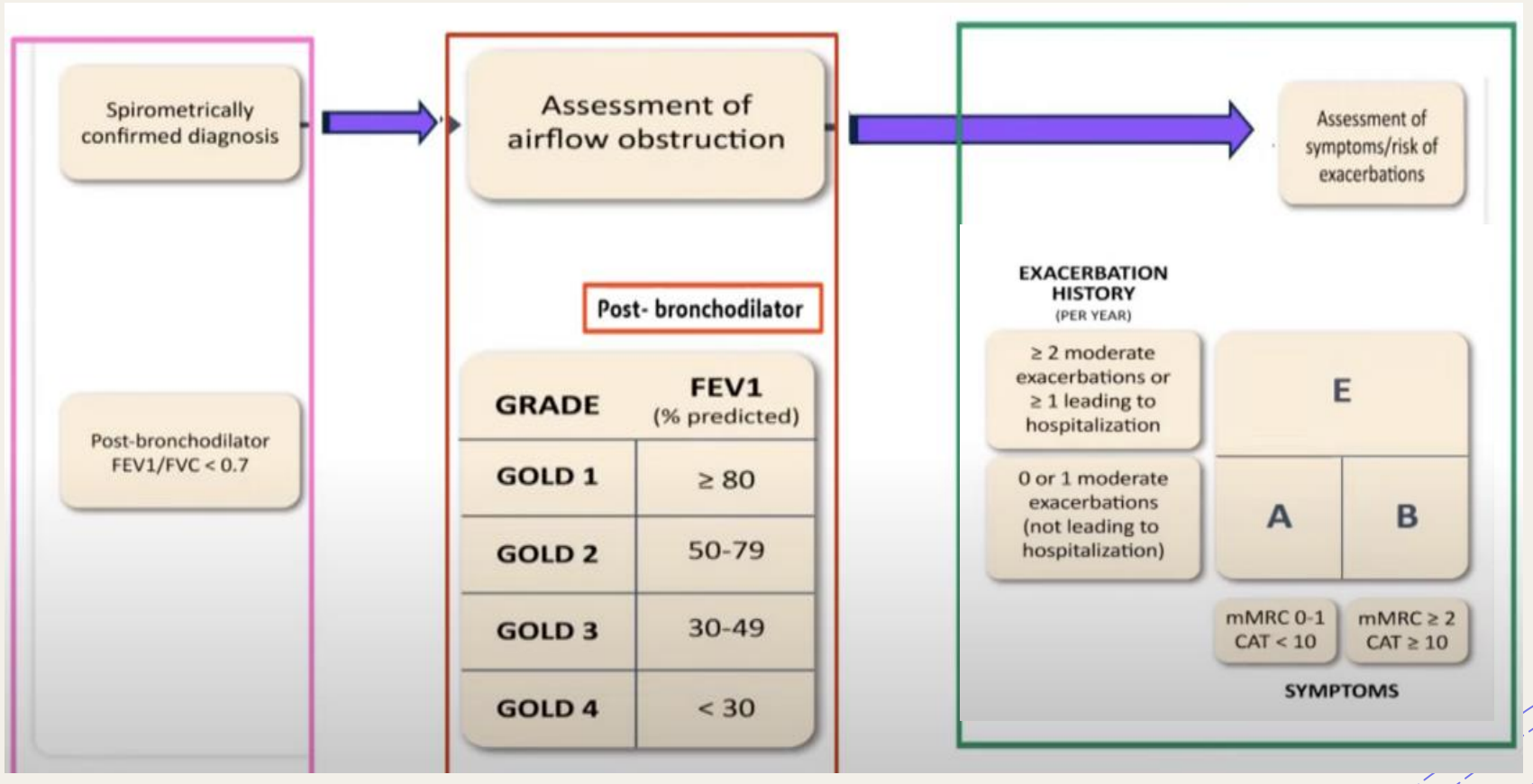
Post Bronchodilator
FEV1/FVC <0.7

Pre and Post Bronchodilator Spirometry

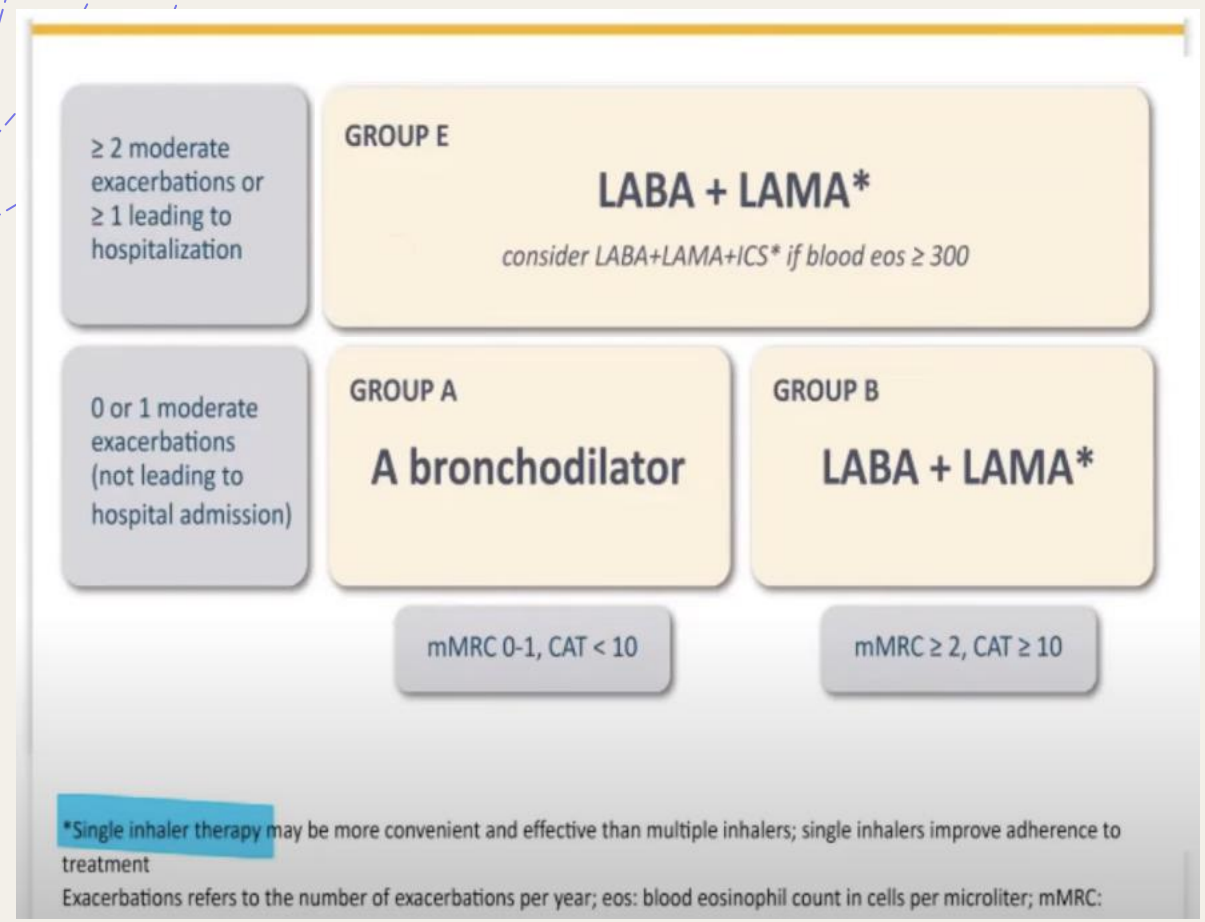
NEW 2025

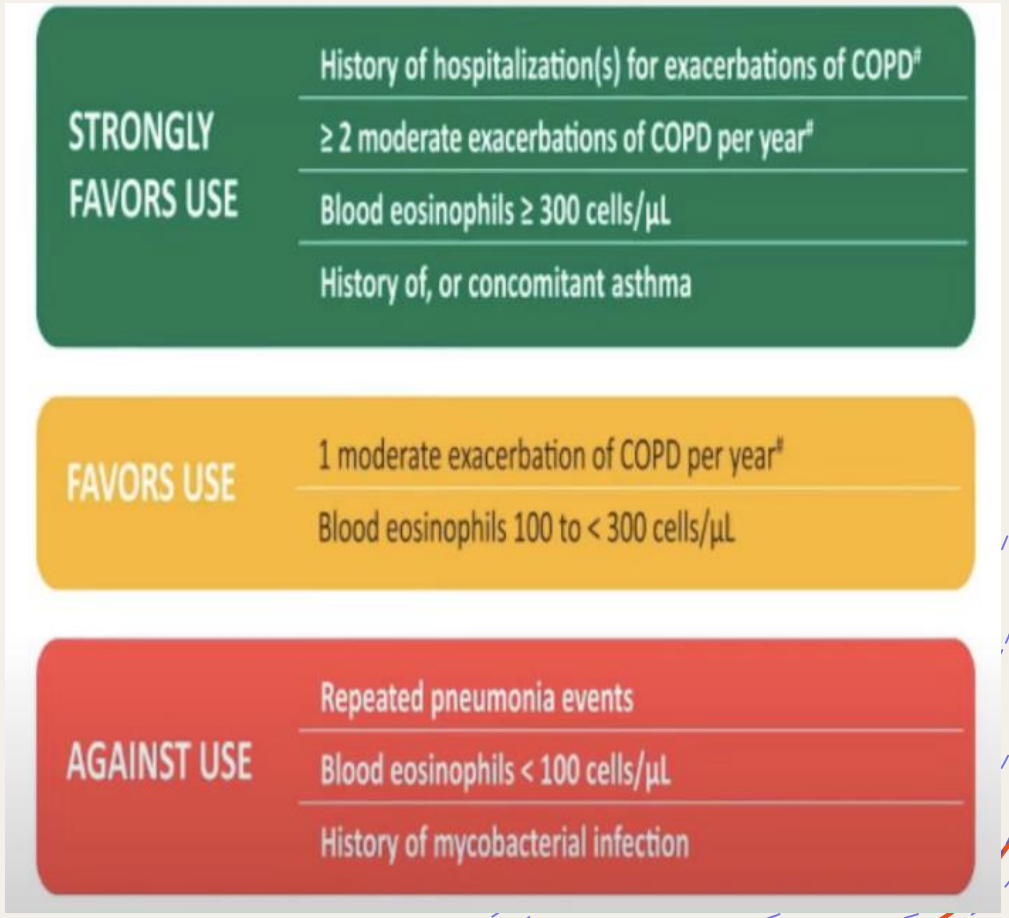


GOLD ABE ASSESMENT TOOL



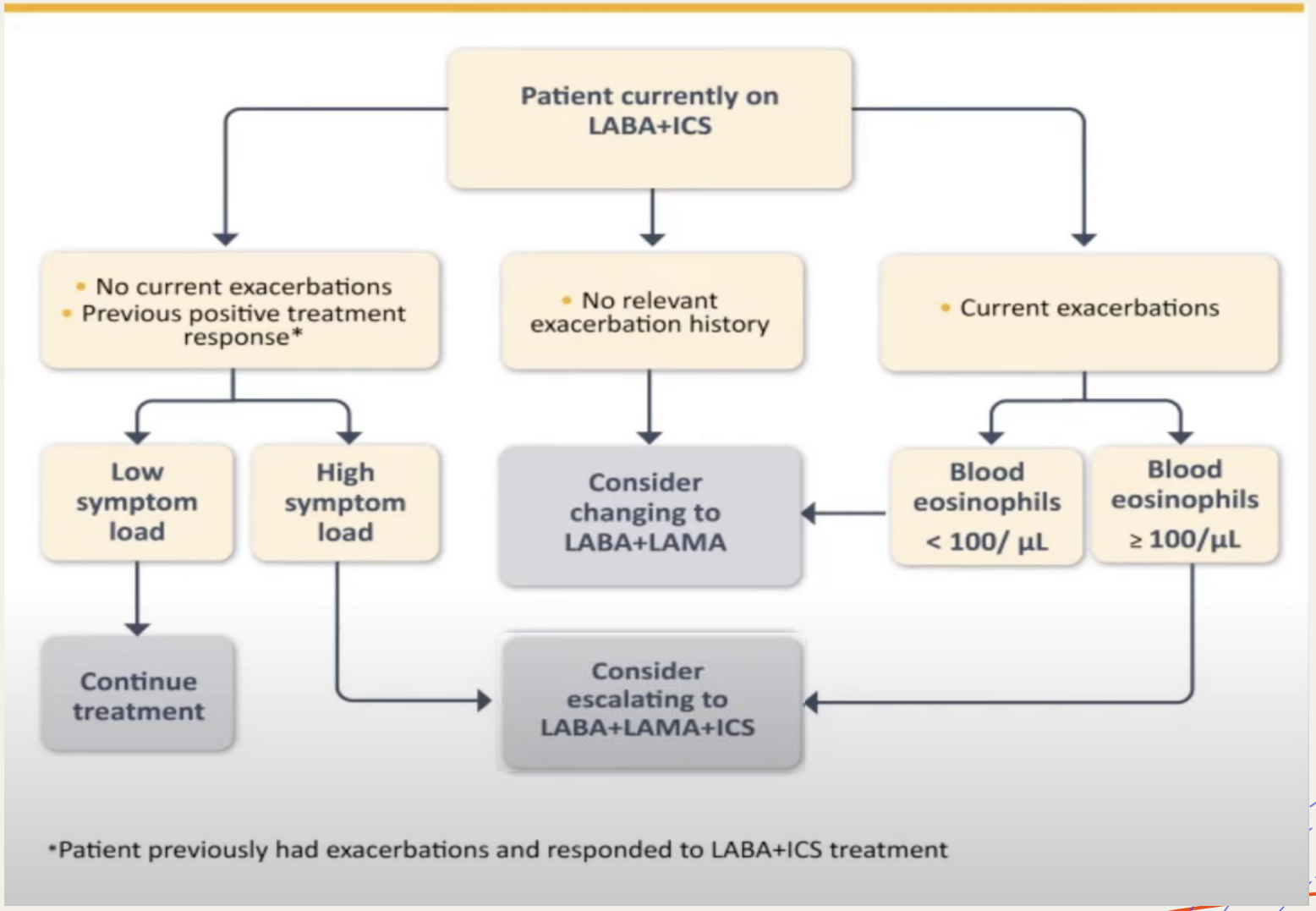
Initial Pharmacological Treatment-Stable COPD



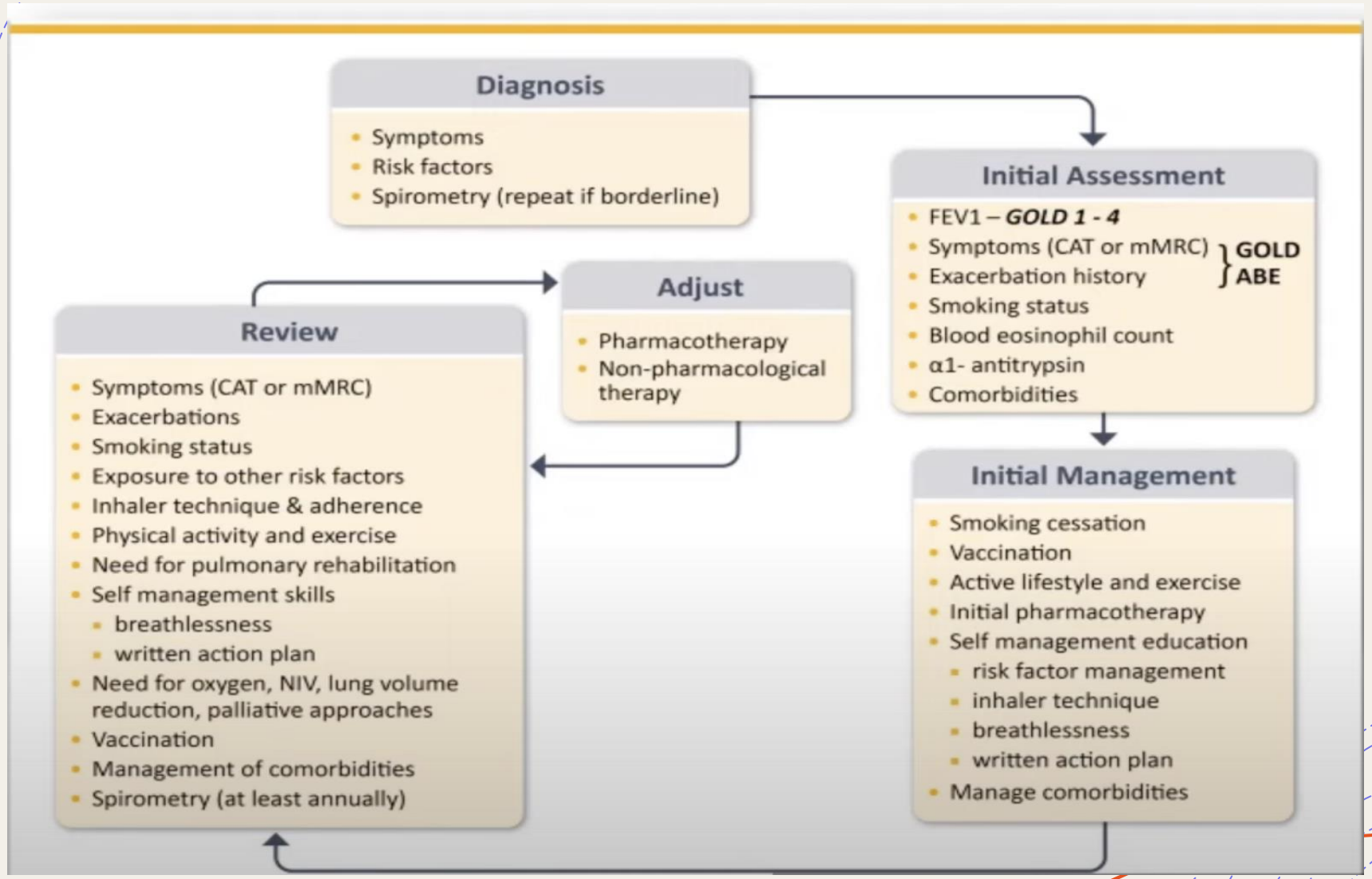


Patient currently on LABA ICS

NEW 2025



What next?


Diagnosis
Symptoms
Risk factors
Spirometry (repeat if borderline)
Initial Assessment
FEV1 – GOLD 1 - 4
Symptoms (CAT or mMRC)
Exacerbation history
GOLD ABE
Smoking status
Blood eosinophil count
α1- antitrypsin
Comorbidities
Initial Management
Smoking cessation
Vaccination
Active lifestyle and exercise
Initial pharmacotherapy
Self management education
risk factor management
inhaler technique
breathlessness
written action plan
Manage comorbidities
Review
Symptoms (CAT or mMRC)
Exacerbations
Smoking status
Exposure to other risk factors
Inhaler technique & adherence
Physical activity and exercise
Need for pulmonary rehabilitation
Self management skills
breathlessness
written action plan
Need for oxygen, NIV, lung volume reduction, palliative approaches
Vaccination
Management of comorbidities
Spirometry (at least annually)
Adjust
Pharmacotherapy
Non-pharmacological therapy

Identify and reduce risk factor exposure

- Smoking cessation interventions should be actively pursued in all people with COPD **(Evidence A)**
- Efficient ventilation, non-polluting cooking stoves and similar interventions should be recommended **(Evidence B)**
- Clinicians should advise patients to avoid continued exposures to potential irritants, if possible **(Evidence D)**

Vaccinations for Stable COPD

People with COPD should receive all recommended vaccinations in line with the relevant local guidelines:

- Yearly influenza vaccination **(Evidence B)**
- SARS-CoV-2 (COVID-19) vaccination based on WHO and CDC updated recommendations **(Evidence B)**
- Either one dose of 21-valent pneumococcal conjugate vaccine (PCV21) or one dose PCV20, as recommended by the CDC **(Evidence B)**. Pneumococcal vaccination has been shown to reduce the incidence of community-acquired pneumonia and exacerbations for people with COPD **(Evidence B)**
- Respiratory syncytial virus (RSV) vaccination for individuals aged ≥ 60 years and/or with chronic heart or lung disease, as recommended by the CDC **(Evidence A)**
- Tdap (dTaP/dTPa) vaccination to protect against pertussis (whooping cough) for people with COPD that were not vaccinated in adolescence, as recommended by the CDC **(Evidence B)**
- Zoster vaccine to protect against shingles for people with COPD aged > 50 years, as recommended by the CDC **(Evidence B)**

What helps reduce mortality?

Therapy	RCT	Treatment effect on mortality	Patient characteristics
LABA + LAMA + ICS	YES	Single inhaler triple therapy compared to dual LABD therapy relative risk reduction: IMPACT :HR 0.72 (95% CI: 0.53,0.99) ETHOS: HR 0.51 (95% CI: 0.33,0.80)	Symptomatic patients with a history of frequent and/or severe exacerbations
Smoking cessation	YES	HR for usual care group compared to intervention group (smoking cessation) HR 1.18 (95% CI:1.02,1.37)	Asymptomatic or mildly symptomatic
Pulmonary Rehabilitation	YES	Old Trials :RR 0.28 (95% CI: 0.10,0.84) New Trials: RR 0.68 (95% CI 0.28,1.67)	Hospitalized for exacerbations of COPD (during <4 weeks after discharge)
Long Term Oxygen Therapy	YES	NOTT >19 hours of continuous oxygen vs <13 hours-50% reduction MRC >15hours oxygen vs no oxygen :50% reduction	PaO2 <55 mm Hg or <60 mm Hg with cor pulmonale or secondary polycythemia
Noninvasive positive pressure ventilation	YES	12% in NPPV (High IPAP level) and 33% in control HR 0.24 ((95% CI 0.11,0.49)	Stable COPD with marked hypercapnia
Lung Volume reduction surgery	YES	0.07 deaths/person-year (LVRS) vs 0.15 deaths/person-year (UC) RR for death 0.47 (p=0.005)	Upper lobe emphysema and low exercise capacity

Follow up of non pharmacological treatment

1. If response to initial treatment is appropriate, maintain it and offer:

- Influenza vaccination every year and other recommended vaccinations according to guidelines
- Self-management education
- Assessment of behavioral risk factors such as smoking cessation (if applicable) and environmental exposures

Ensure

- Maintenance of exercise program and physical activity
- Adequate sleep and a healthy diet

2. If not, consider the predominant treatable trait to target

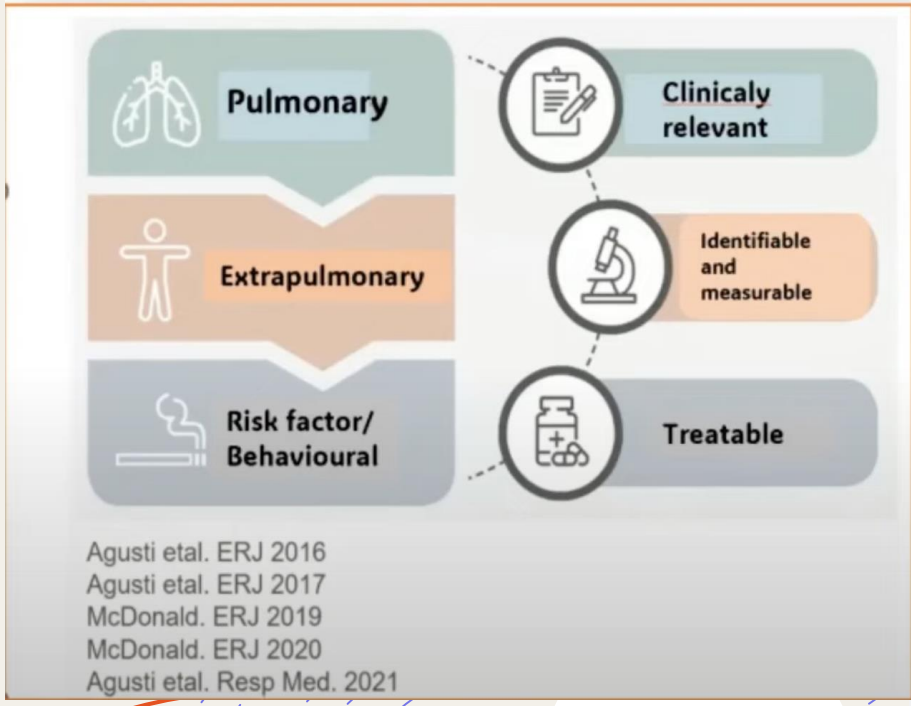
DYSPNEA

- Self-management education (written action plan) with integrated self-management regarding:
  - Breathlessness, energy conservation techniques, and stress management strategies
- Pulmonary rehabilitation (PR) program and/or maintenance exercise program post PR

EXACERBATIONS

- Self-management education (written action plan) that is personalized with respect to:
  - Avoidance of aggravating factors
  - How to monitor/manage worsening of symptoms
  - Contact information in the event of an exacerbation
- Pulmonary rehabilitation (PR) program and/or maintenance exercise program post PR

All patients with advanced COPD should be considered for end of life and palliative care support to optimize symptom control and allow patients and their families to make informed choices about future management.



Agusti etal. ERJ 2016
Agusti etal. ERJ 2017
McDonald. ERJ 2019
McDonald. ERJ 2020
Agusti etal. Resp Med. 2021

Q.Which of the following Biologicals have been recommended in GOLD 2025?

A.Meopolizumab

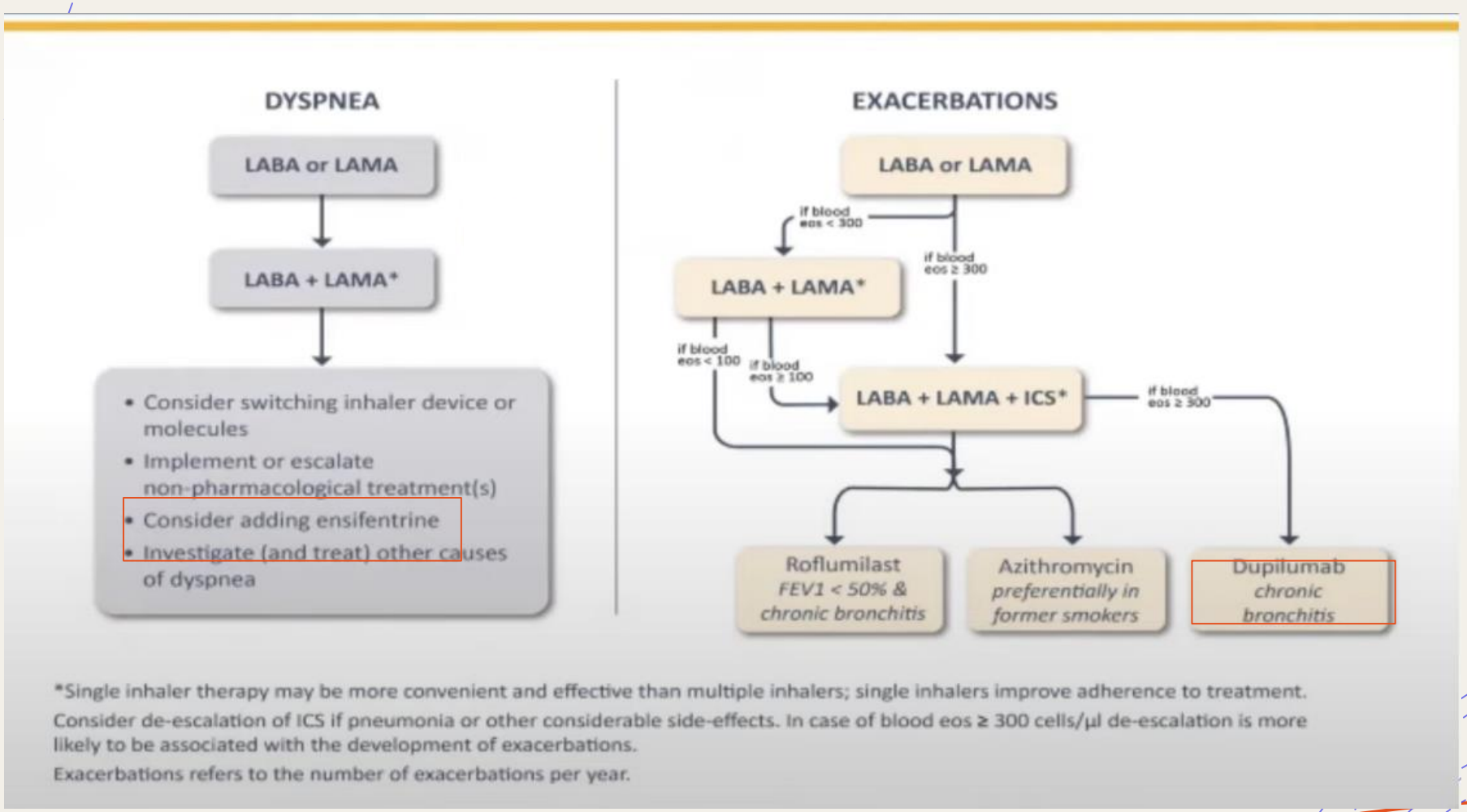
B.Benralizumab

C.Dupilumab

D.Omalizumab

Follow up of pharmacological treatment

NEW 2025



Q.Mechanism of action of ensifentrine?

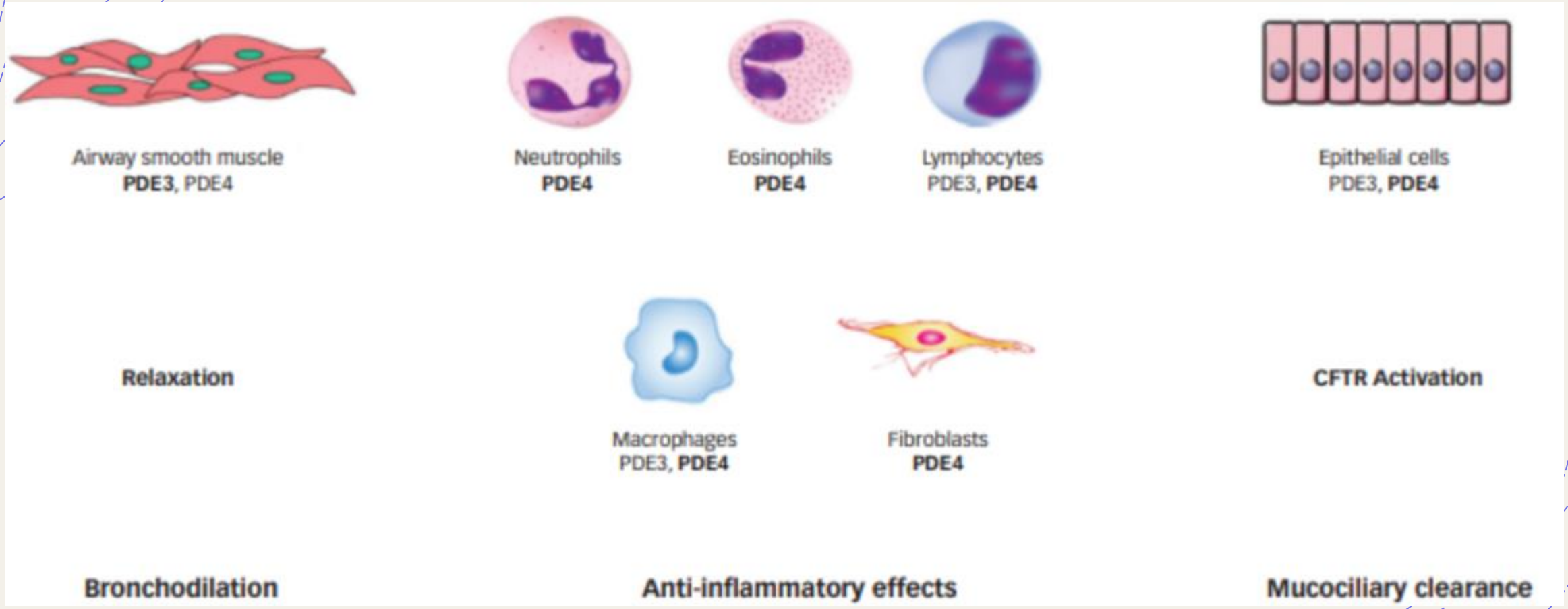
A.PDE 5 Inhibitor

B.PDE 4 Inhibitor

C.PDE 3 inhibitor

Ensifentrine – dual PDE3/4 inhibitor

Mechanisms of action



C Page & M Cazzola *Curr Opin Pharmacol* 2017;56:197

Ensifentrine, a novel phosphodiesterase 3 and 4 inhibitor for the treatment of COPD: ENHANCE-1 and ENHANCE-2

Study design

- COPD - FEV_1 30-70%, 40 to 80 years, mMRC≥2
- ENHANCE-1 (n=760), ENHANCE-2 (n=789)
- 69% LAMA, 55% LABA

- Primary - average FEV_1 AUC (0-12h) at week 12
- Secondaries - peak FEV1, E-RS, SGRQ, morning trough FEV1
- Safety

Anzueto A *et al AJRCCM* 2023; 208:406–16

Ensifentrine, a novel phosphodiesterase 3 and 4 inhibitor for the treatment of COPD: ENHANCE-1 and ENHANCE-2

Baseline characteristics

	ENHANCE-1		ENHANCE-2	
	Ensifentrine 3 mg BID	Placebo BID	Ensifentrine 3 mg BID	Placebo BID
Modified intention-to-treat population, *n*	477	283	498	291
Mean post-bronchodilator FEV_1, L (SD)	1.53 (0.46)	1.51 (0.47)	1.43 (0.44)	1.42 (0.45)
% predicted (SD)	52.9 (10.3)	51.7 (10.5)	50.8 (10.7)	50.4 (10.7)
Concomitant maintenance COPD therapy use, *n* (%)				
Not used	146 (30.6)	91 (32.2)	223 (44.8)	131 (45.0)
Maintenance therapy used	331 (69.4)	192 (67.8)	275 (55.2)	160 (55.0)
LAMA†	151 (31.7)	76 (26.9)	168 (33.7)	90 (30.9)
LAMA+ICS	4 (0.8)	5 (1.8)	1 (0.2)	0
LABA†	89 (18.7)	45 (15.9)	34 (6.8)	23 (7.9)
LABA+ICS	87 (18.2)	66 (23.3)	72 (14.5)	47 (16.2)
COPD history, *n* (%)				
Chronic bronchitis‡	385 (80.7)	215 (76.0)	322 (64.7)	190 (65.3)
Emphysema	195 (40.9)	146 (51.6)	303 (60.8)	179 (61.5)
COPD exacerbations, ≤15 mo of screening	120 (25.2)	75 (26.5)	102 (20.5)	62 (21.3)

Anzueto A. *et al AJRCCM* 2023; 208:406–16

Ensifentrine, a novel phosphodiesterase 3 and 4 inhibitor for the treatment of COPD: ENHANCE-1 and ENHANCE-2

Primary and secondary outcomes

Treatment Group	ENHANCE-1		ENHANCE-2	
	Ensifentrine 3 mg BID ($n = 477$)	Placebo BID ($n = 283$)	Ensifentrine 3 mg BID ($n = 498$)	Placebo BID ($n = 291$)
Primary endpoint				
Ensifentrine vs. placebo, ml (95% CI)	87 (55, 119)	—	94 (65, 124)	—
P value	<0.001	—	<0.001	—
Key secondary endpoints				
Week 24 E-RS total score				
Ensifentrine vs. placebo (95% CI)	−1.0 (−1.7, −0.2)	—	−0.6 (−1.4, 0.2)	—
P value	0.011	—	0.134	—
Week 24 SGRQ total score				
Ensifentrine vs. placebo (95% CI)	−2.3 (−4.3, −0.3)	—	−0.5 (−2.7, 1.7)	—
P value	0.025	—	0.669	—

Anzueto A. *et al AJRCCM* 2023; 208:406–16

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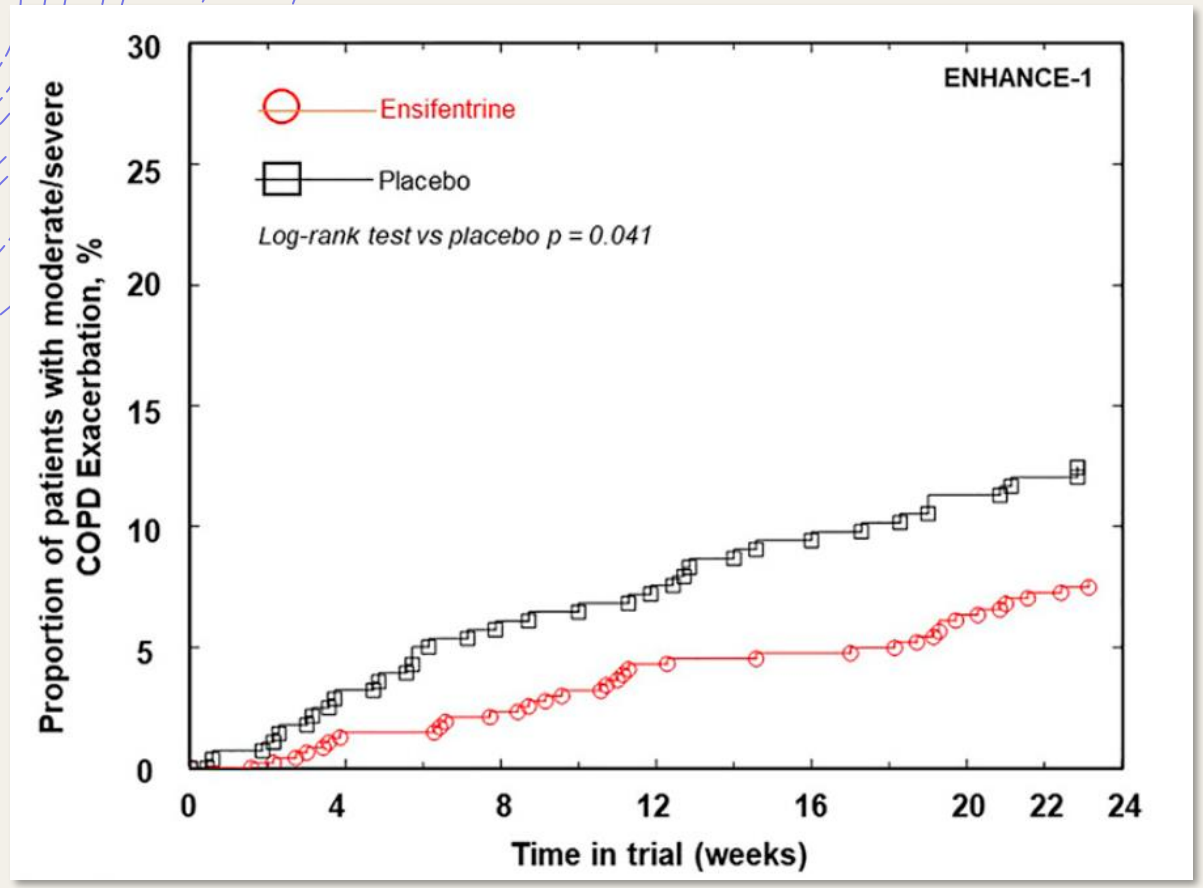
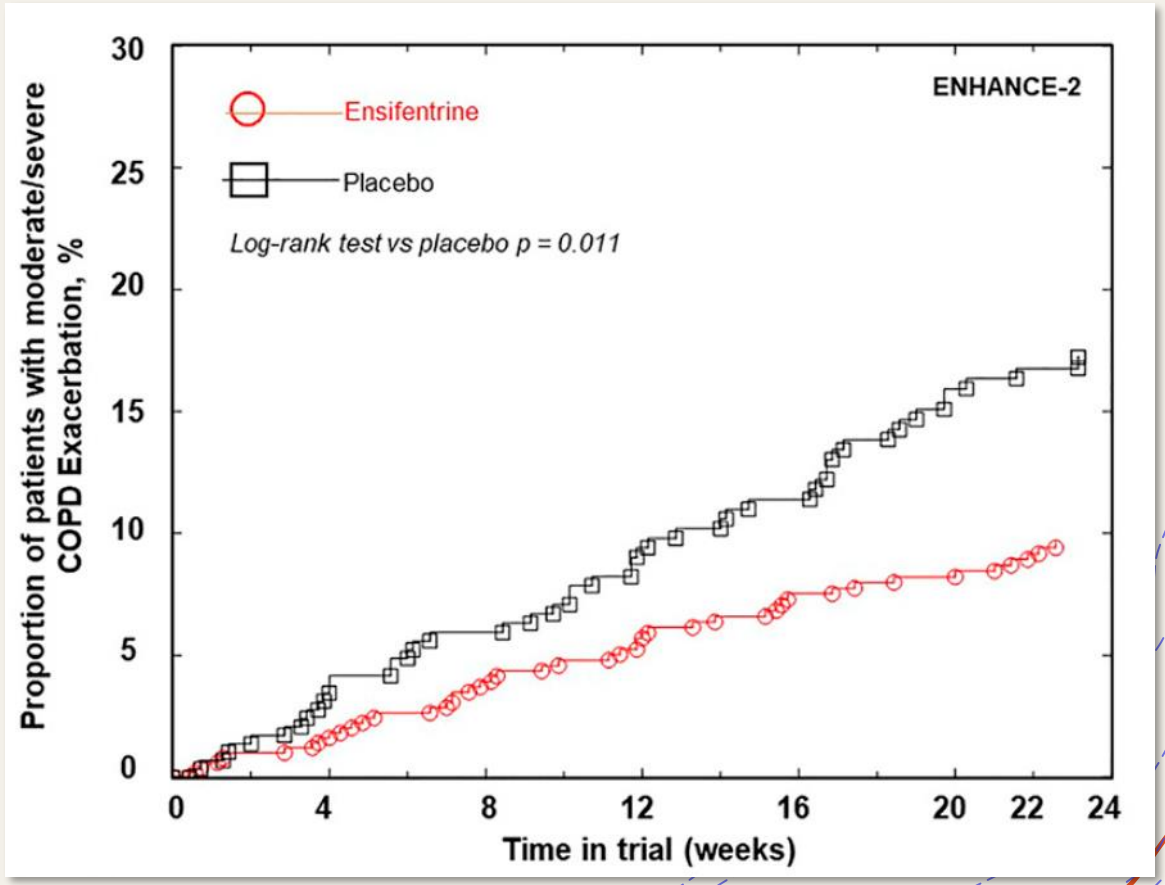
Anzueto A. *et al AJRCCM* 2023; 208:406–16

Ensifentrine, a novel phosphodiesterase 3 and 4 inhibitor for the treatment of COPD: ENHANCE-1 and ENHANCE-2

Time to first exacerbations @ 24 weeks





Anzueto A. *et al AJRCCM* 2023; 208:406–16

BOREAS

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Dupilumab for COPD with Type 2 Inflammation Indicated by Eosinophil Counts

S.P. Bhatt, K.F. Rabe, N.A. Hanania, C.F. Vogelmeier, J. Cole, M. Bafadhel, S.A. Christenson, A. Papi, D. Singh, E. Laws, L.P. Mannent, N. Patel, H.W. Staudinger, G.D. Yancopoulos, E.R. Mortensen, B. Akinlade, J. Maloney, X. Lu, D. Bauer, A. Bansal, L.B. Robinson, and R.M. Abdulai, for the BOREAS Investigators*

This article was published on May 21, 2023, at NEJM.org.

DOI: 10.1056/NEJMoa2303951

NOTUS

ORIGINAL ARTICLE

Dupilumab for COPD with Blood Eosinophil Evidence of Type 2 Inflammation

S.P. Bhatt, K.F. Rabe, N.A. Hanania, C.F. Vogelmeier, M. Bafadhel, S.A. Christenson, A. Papi, D. Singh, E. Laws, N. Patel, G.D. Yancopoulos, B. Akinlade, J. Maloney, X. Lu, D. Bauer, A. Bansal, R.M. Abdulai, and L.B. Robinson, for the NOTUS Study Investigators*

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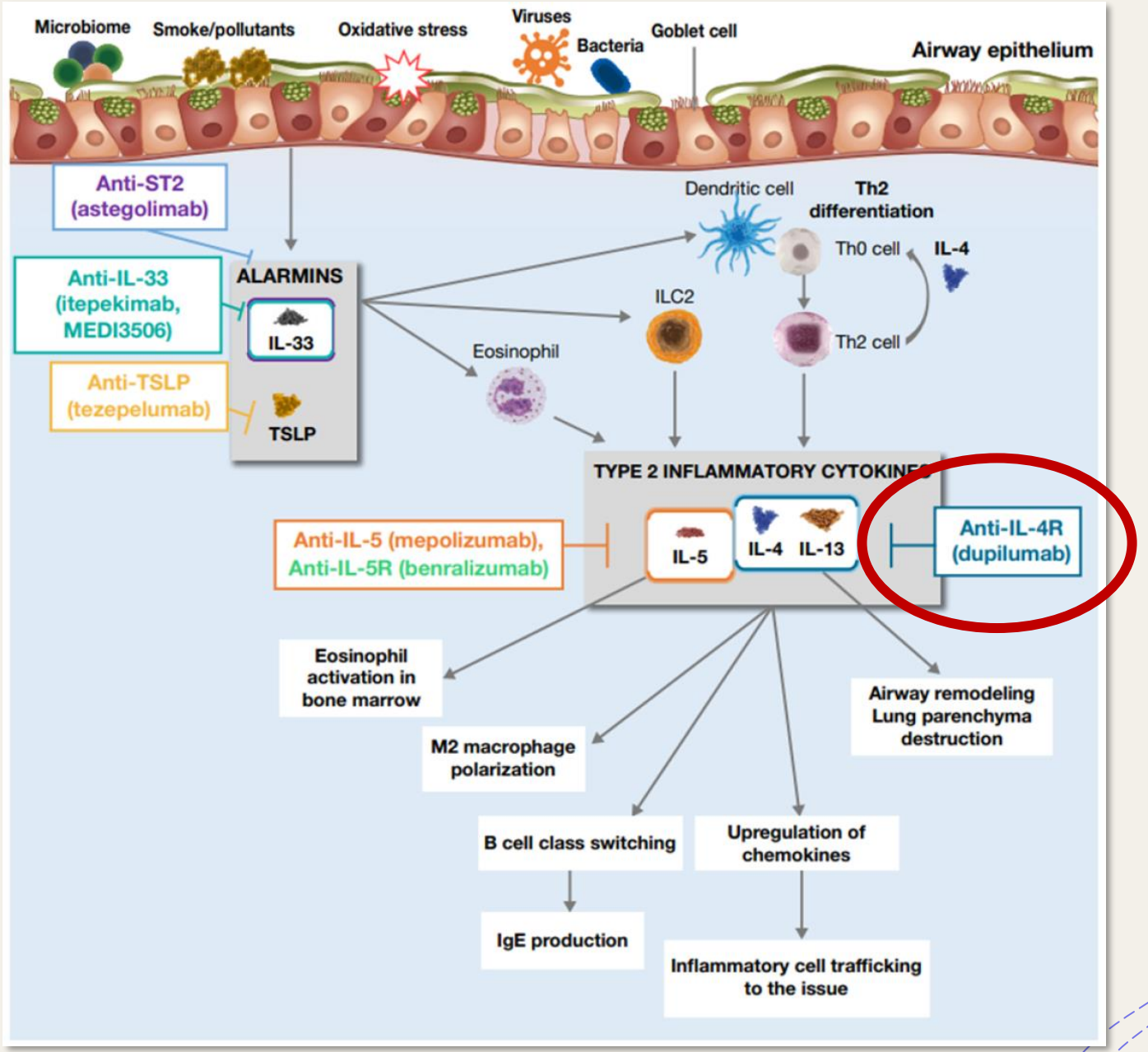


KF Rabe *et al AJRCCM* 2024

Inclusion and Exclusion Criteria

Key Inclusion Criteria[1,2]

- Physician-diagnosed COPD for ≥12 months prior to randomisation
- Current or former smoker with a smoking history of ≥10 pack-years
- Signs or symptoms of chronic bronchitis (chronic productive cough) for ≥3 months
- ≥1 exacerbation while the patient was on SOC
- mMRC dyspnoea scale grade ≥2
- Blood EOS ≥300 cells/μL
- ≥2 moderate or ≥1 severe exacerbations within the year prior to screening
- Background optimised therapy (ICS+LAMA+LABA) for 3 months prior to randomisation with a stable dose of medication for ≥1 month prior to Visit 1; double therapy (LAMA+LABA) allowed if ICS was not appropriate

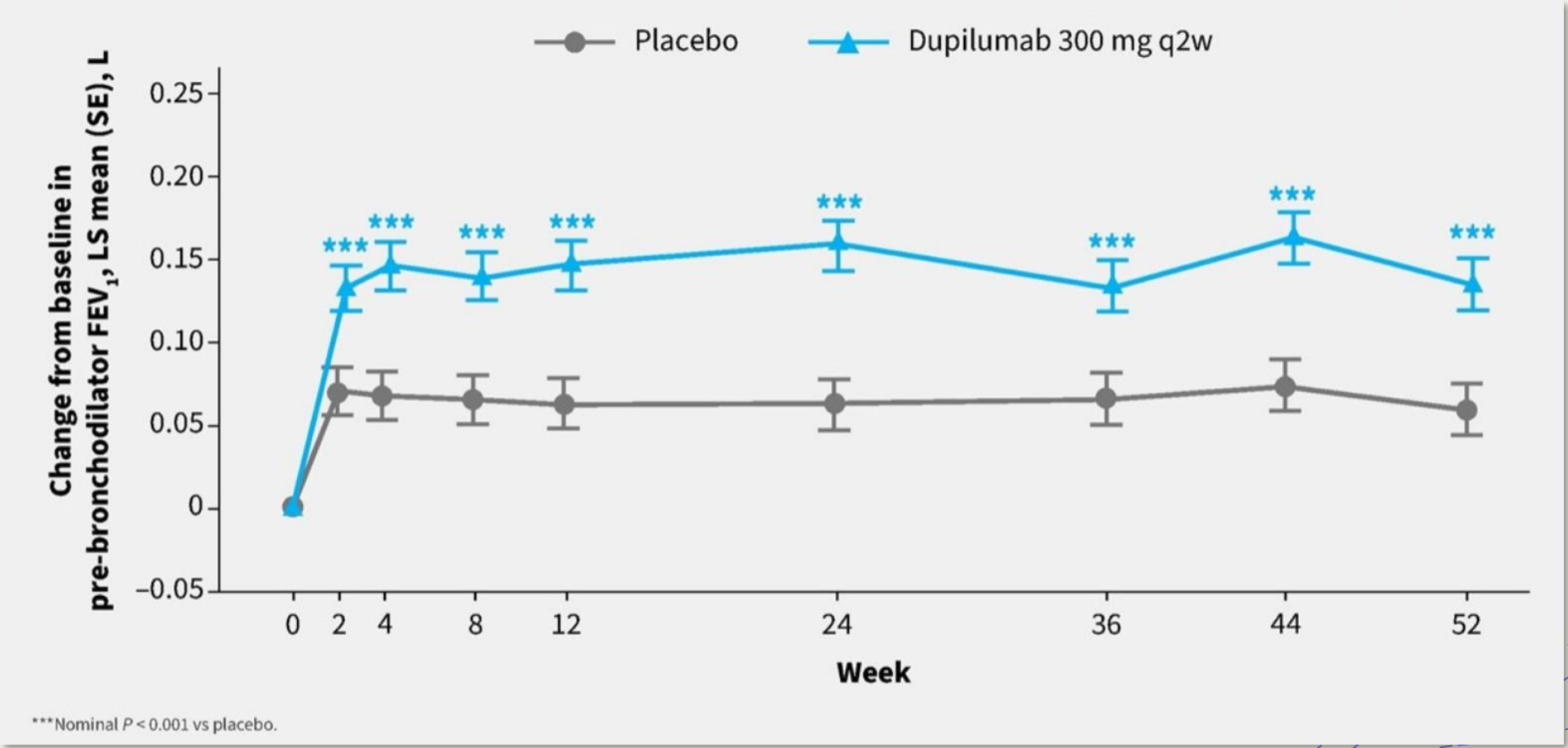
Key Exclusion Criteria[1,2]

- Physician-diagnosed COPD for <12 months prior to randomisation
- Diagnosis or history of asthma according to the 2018 GINA guidelines

1. Bhatt SP, et al. *N Engl J Med*. 2023;389(3):205-214. 2. Bhatt SP, et al. *N Engl J Med*. Published online 20 May 2024. doi:10.1056/NEJMoa2401304

Dupilumab efficacy and safety in patients with moderate-to-severe COPD with type 2 inflammation: pooled analysis of BOREAS and NOTUS

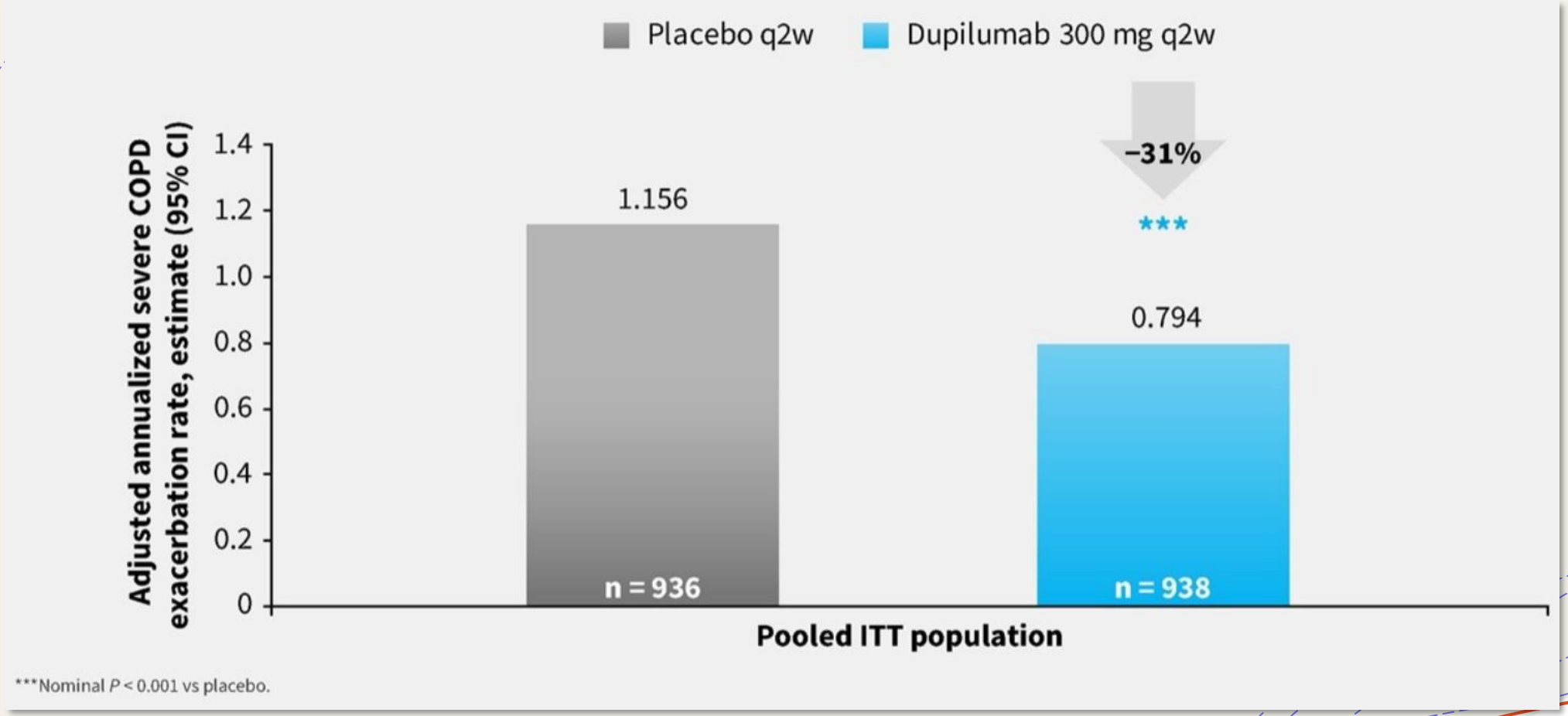
Pre BD FEV_1



S Bhatt et al. ERS 2024 Poster-ID 4787

Dupilumab efficacy and safety in patients with moderate-to-severe COPD with type 2 inflammation: pooled analysis of BOREAS and NOTUS

Exacerbation rate



S Bhatt et al. ERS 2024 Poster-ID 4787

Definition of exacerbation

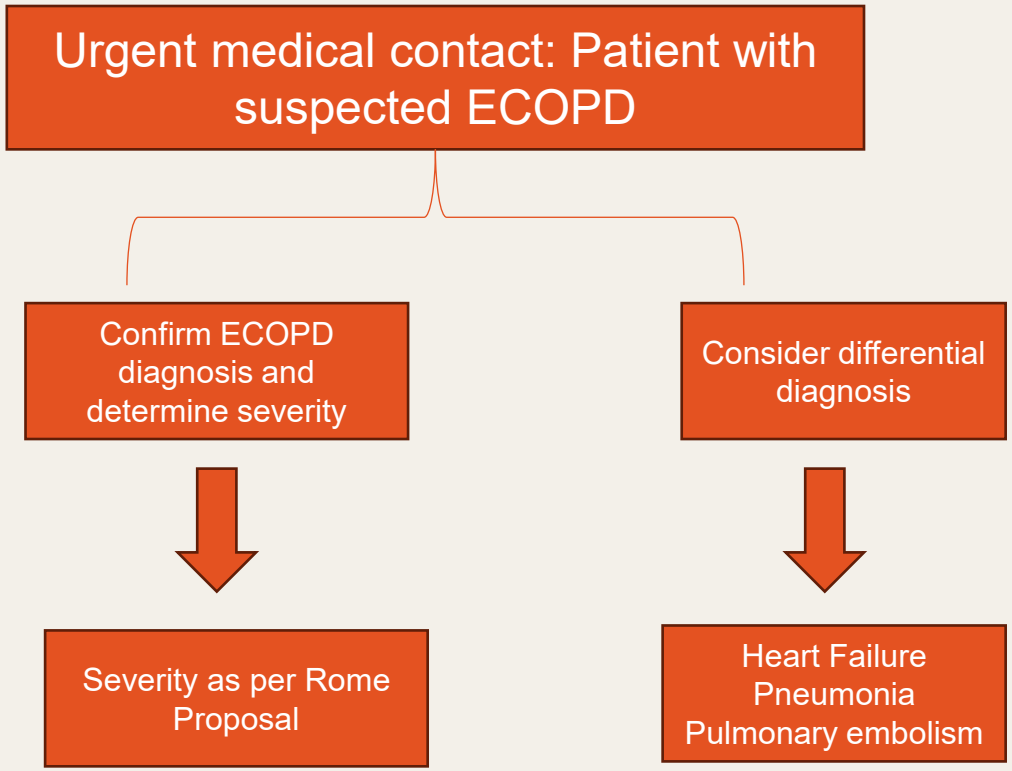
GOLD 2022

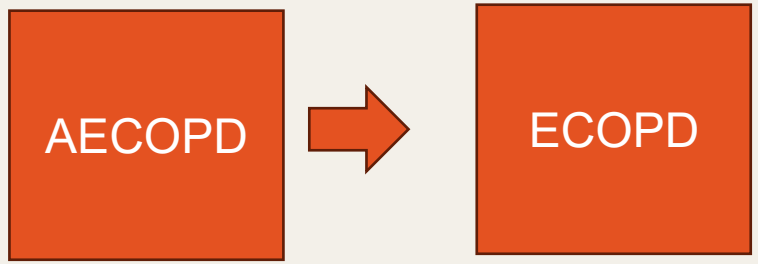
An exacerbation of COPD is defined as an acute worsening of respiratory symptoms that results in additional therapy

GOLD 2023/2024/2025

- Increased dyspnea and or cough and sputum
- <14 days
- May be accompanied by increased tachypnoea and or tachycardia
- Often associated with increased systemic and local inflammation caused by infection,pollution or other insults to the airways

Exacerbations of COPD





Severity	Criteria for judging severity
Mild	• Dyspnea VAS <5 • RR <24 breaths/min • HR <95 • Resting SPO2 >92% breathing ambient air AND Change <3% (where known) • CRP <10mg/L (if obtained)
Moderate (meets at least three of five)	• Dyspnea VAS >5 • RR >24 breaths/min • HR >95 • Resting SPO2 <92% breathing ambient air AND Change >3% (where known) • CRP >10mg/L (if obtained) • If obtained ABG may sow hypoxemia PaO2 <60 mm of hg and/or hypercapnia PaCO2 >45 mm of hg but no acidosis (pH >7.315)
Severe	ABG shows hypercapnia and acidosis (PaCO2 >45mm of hg and pH <7.315)

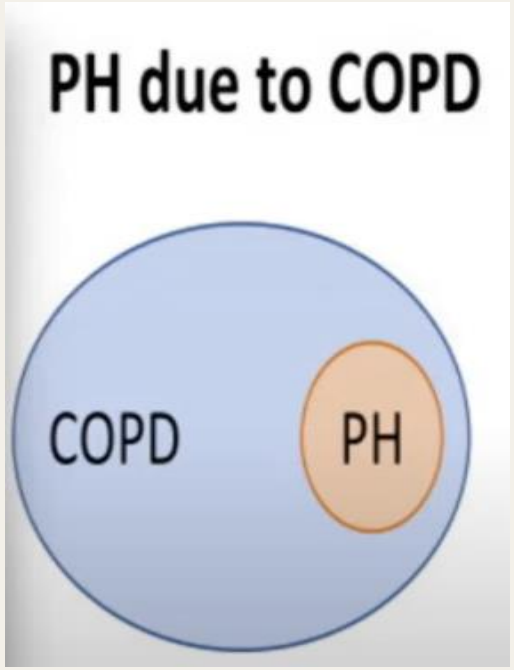
Interventions that reduce exacerbation frequency

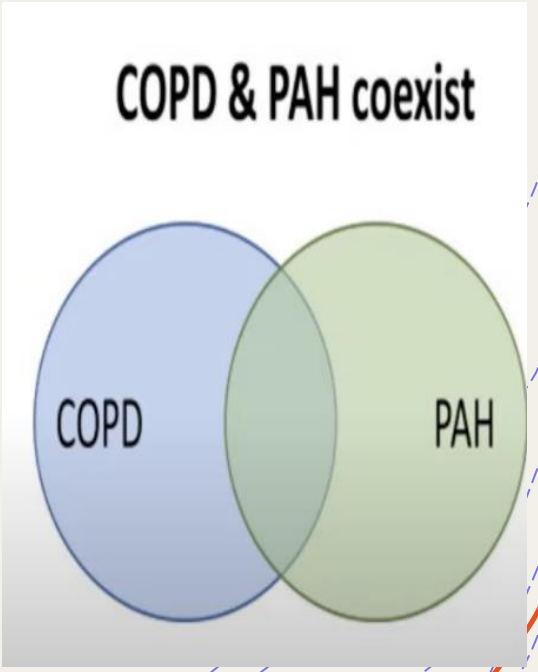
Intervention Class	Intervention
Bronchodilators	LABAs LAMAs LABA + LAMA
Corticosteroid-containing regimens	LABA + ICS LABA + LAMA + ICS
Anti-inflammatory (non-steroid)	Roflumilast Dupilumab
Anti-infectives	Vaccines Long Term Macrolides
Mucoregulators	N-acetylcysteine Carbocysteine Erdosteine
Various others	Smoking Cessation Rehabilitation Lung Volume Reduction Vitamin D Shielding measures (e.g., mask wearing, minimizing social contact, frequent hand washing)

Treatable Traits in Pulmonary Hypertension-COPD

NEW 2025

COPD and PAH (Group 1 PH)	• Treat as PAH with comorbidity according to 2022 ESC/ERS PH guidelines
COPD and CTEPH (Group 4 PH)	• Treat as CTEPH according to 2022 ESC/ERS PH guidelines
COPD and severe PH associated with lung diseases and/or hypoxia (Group 3 PH)	• Individualized treatment approach in PH center with experience in respiratory diseases





Cardiovascular Risk in COPD

Patients with COPD often suffer cardiovascular diseases and vice versa

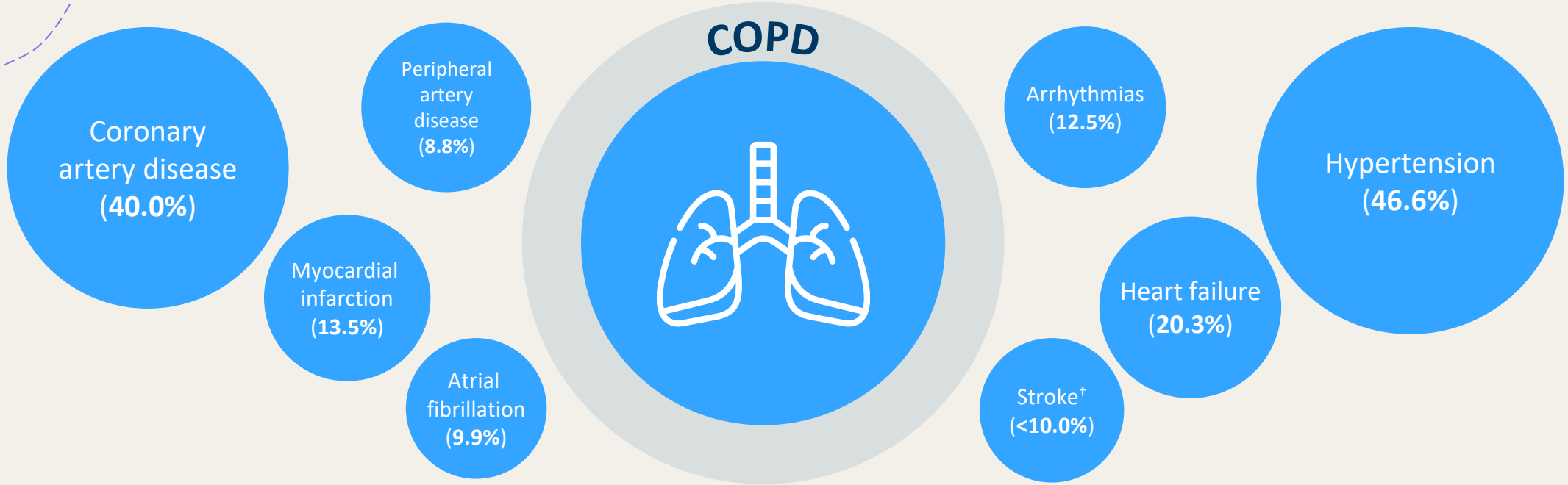
Clinically stable COPD

High prevalence of cardiovascular diseases, including arterial hypertension,coronary artery disease ,heart failure and arrhythmias

Acute exacerbation of COPD

Cardiovascular risk increases during and after exacerbation

High prevalence of CVD in stable patients with COPD

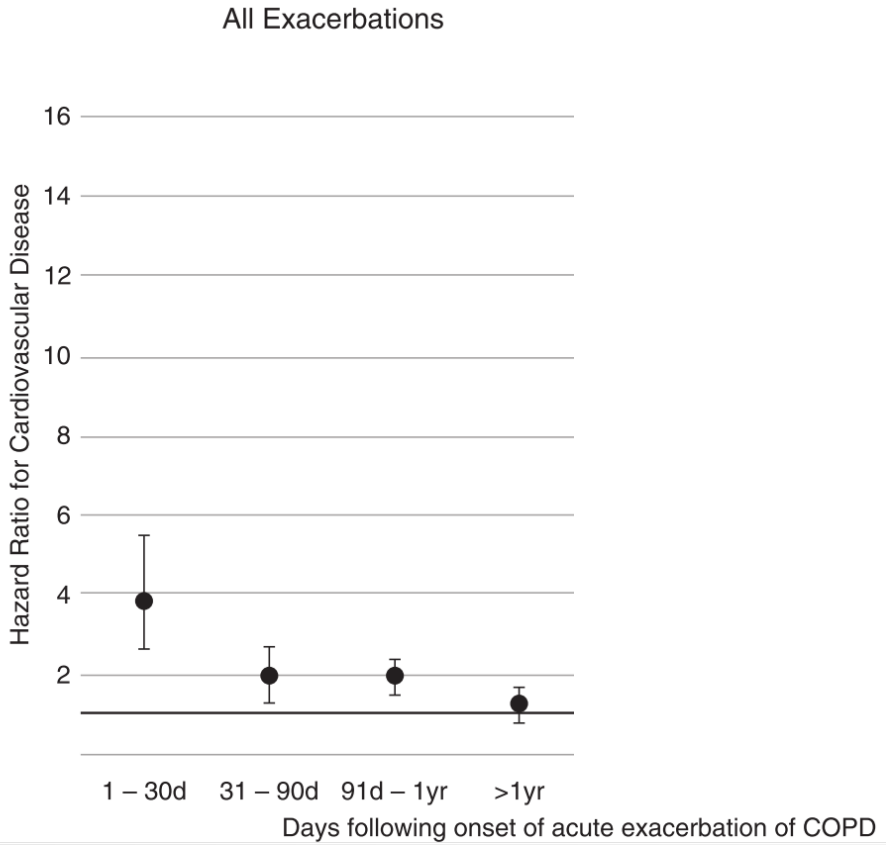


Rogliani P, et al. Expert Rev Respir Med 2021;15:59–70

Exacerbations of Chronic Obstructive Pulmonary Disease and Cardiac Events

A *Post Hoc* Cohort Analysis from the SUMMIT Randomized Clinical Trial

Ken M. Kunisaki[1,2], Mark T. Dransfield[3,4], Julie A. Anderson[5], Robert D. Brook[6], Peter M. A. Calverley[7], Bartolome R. Celli[8], Courtney Crim[9], Benjamin F. Hartley[10], Fernando J. Martinez[11], David E. Newby[12], Alexa A. Pragman[1,2], Jørgen Vestbo[13], Julie C. Yates[9], and Dennis E. Niewoehner[1,2]; on behalf of the SUMMIT Investigators



Am J Respir Crit Care Med Vol 198, Iss 1, pp 51–57, Jul 1, 2018

Q. What is the probable mechanism of Cardio Vascular Disease in COPD?

A. Inflammation

B. Hypoxia

C. Hyperinflation

Potential Mechanism

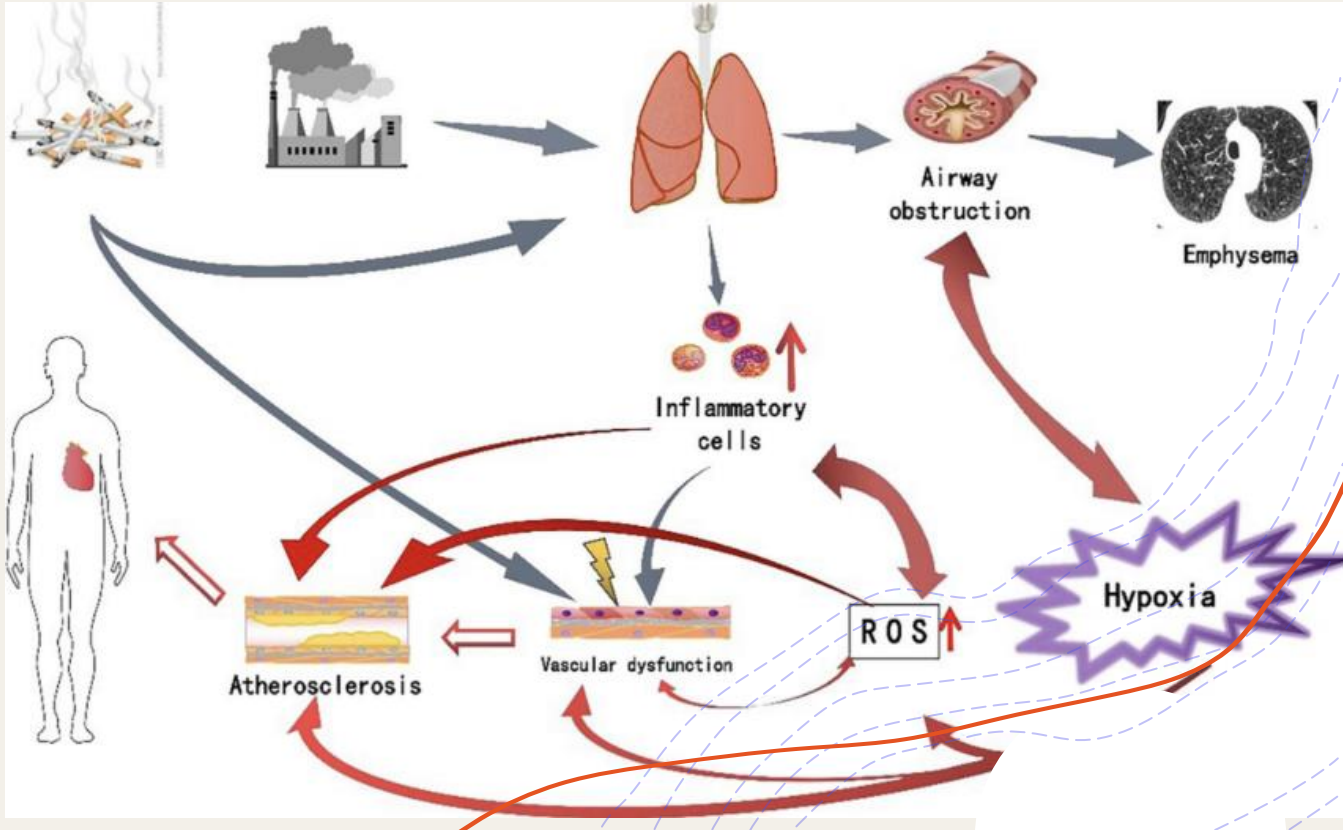
- Inflammation – COPD and CVD are both inflammatory conditions. COPD is associated with increased systemic inflammation, and airway inflammation is amplified during acute exacerbations

- Hyperinflation – hyperinflation is a hallmark of COPD and a mechanical event, which can impair venous return to the heart and cardiac systolic function

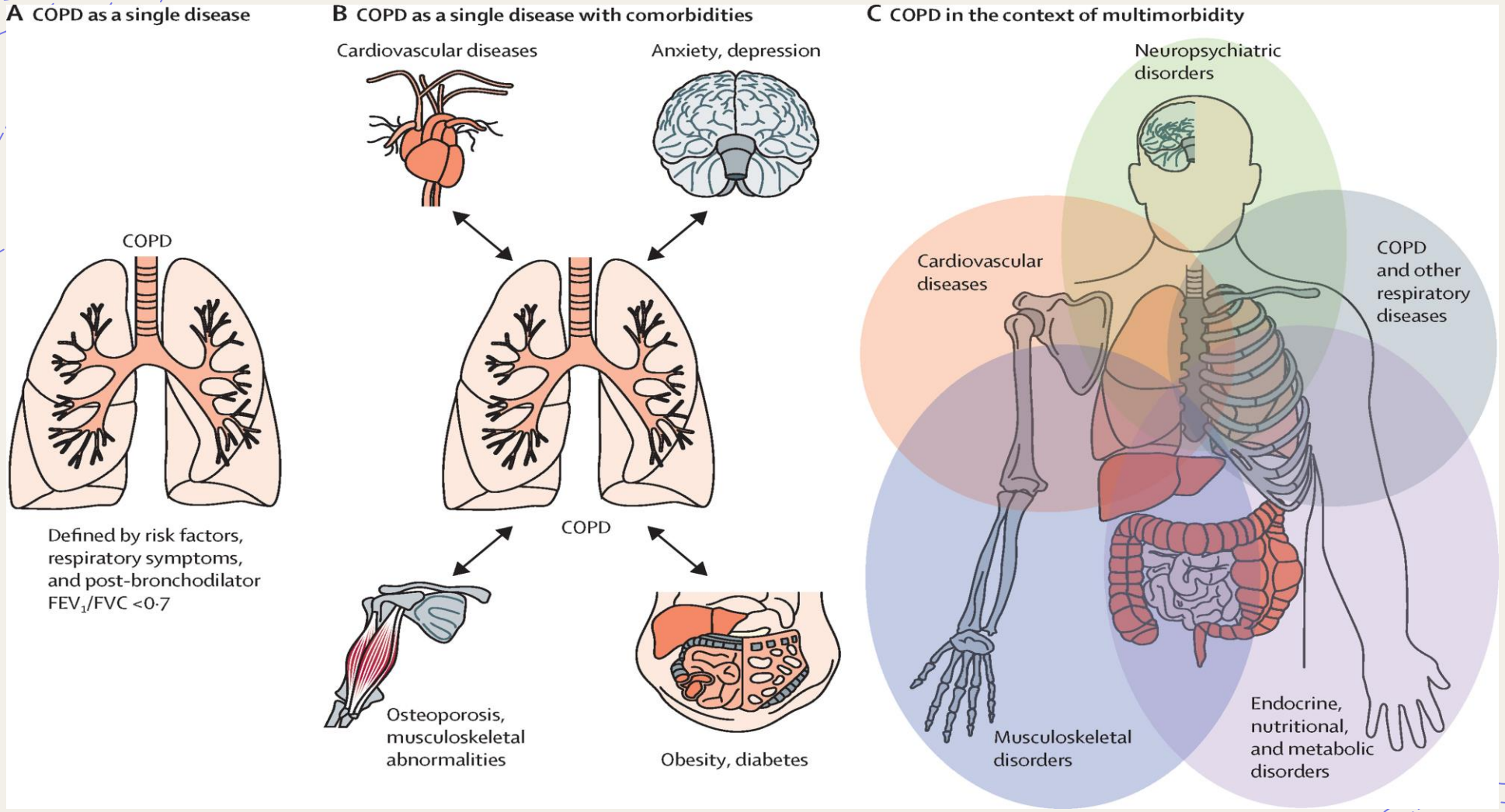
- Hypoxia – in more severe COPD disease, hypoxic vasoconstriction can lead to pulmonary hypertension

- These mechanisms can be amplified during an exacerbation, which is why exacerbations can be important drivers of cardiopulmonary risk in COPD

- The heart and lungs are fundamentally linked, and patients with COPD at increased cardiopulmonary risk should be proactively identified and their management optimised



Syndemic Approach to COPD-A Novel Concept



Syndemic refers to co-occurrence of diseases with shared mechanisms and risk factors a novel concept that helps to explain the clustering of certain morbidities in patients diagnosed with COPD

Q.Which of the following is a false indication for lung cancer screening?

A.Smoking pack years >20 years

B.Quit smoking 10 years ago

C.Age 50-80 years

D.None of the above

Role of CT Scan in COPD

NEW
2025

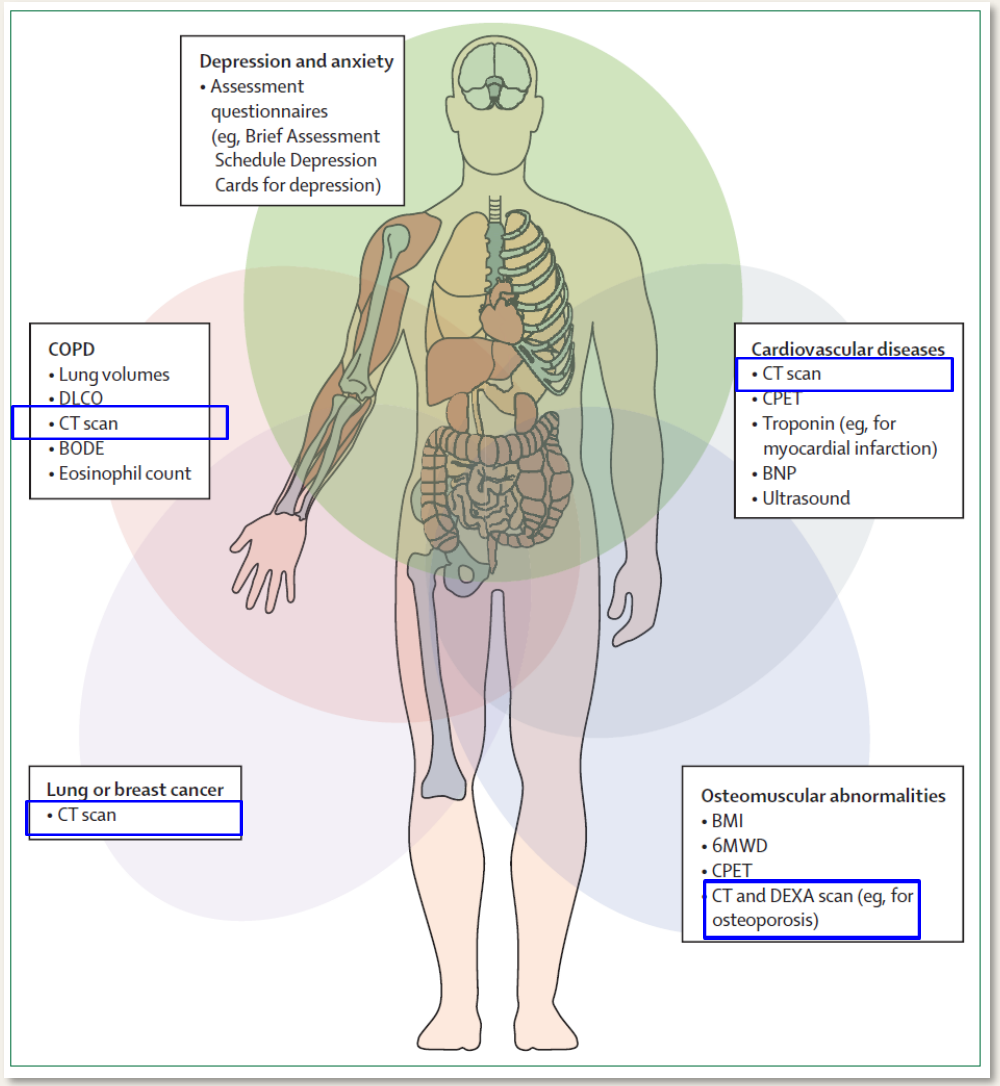
Emphysema
Distribution and severity can be assessed
Can help in decision making for lung volume reduction syregry or endobronchial valve placement

Lung nodules
American cancer society suggests individuals aged 50-80 years with 20 pack year smoking history, regardless of years since quitting should be considered for lung cancer screening

Airways
Bronchiectasis visible in roughly 30% patients
Mucus plugs associated with mortality

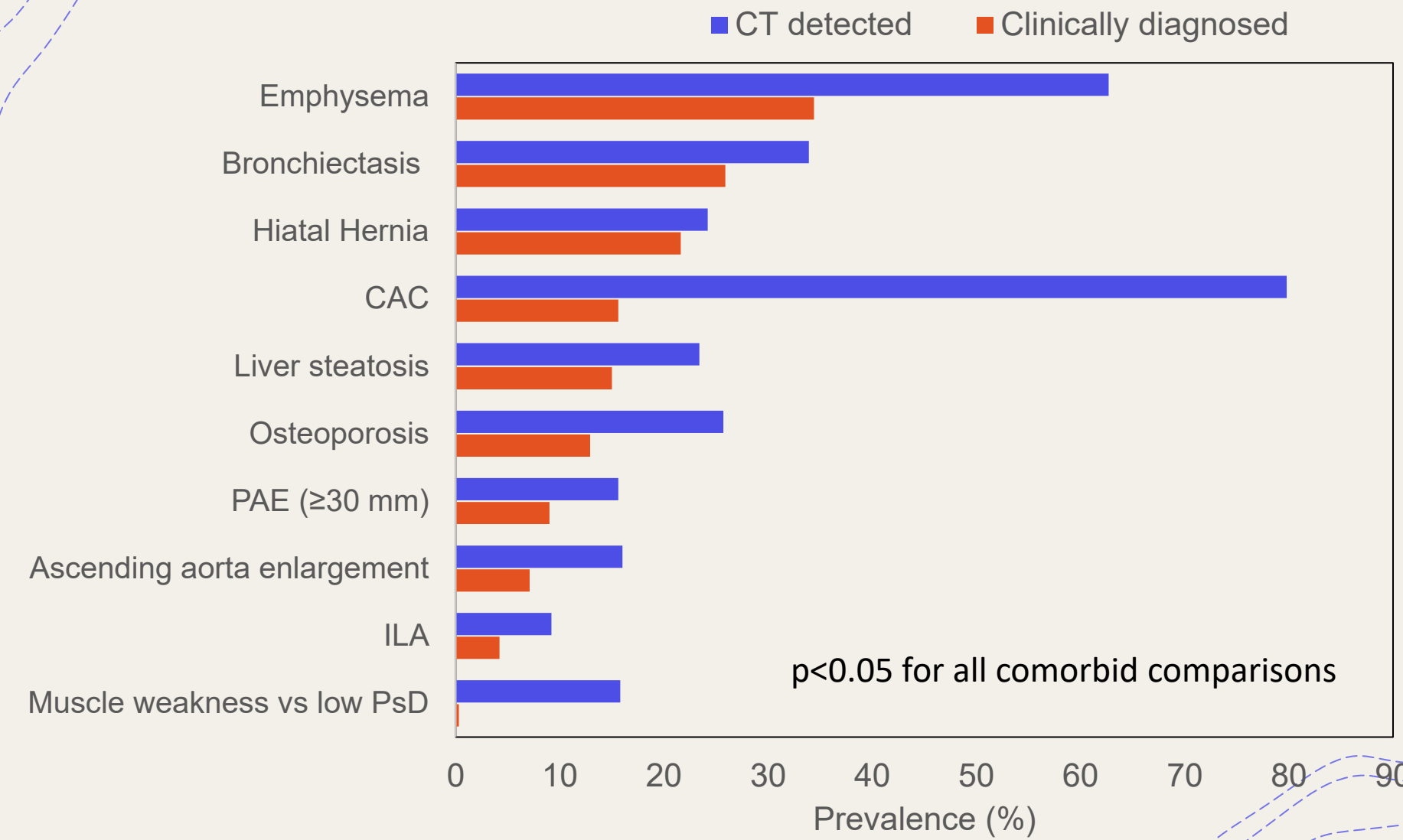
COPD related morbidities
CT scan provides information about coronary artery calcification ,bone density ,muscle mass

Identifying multimorbidity in patients with COPD



LM Fabbri *et al Lancet Respir Med* 2023

COPD – comorbidities detected by CT vs clinical diagnoses



N=379 clinically stable COPD patients BODE cohort

Ezponda et al, *Respirology* 2022;27:286-293

Climate change & COPD

NEW
2025

- Higher outdoor temperature were shown to be linked with an increased risk of hospitalization

- Lower outdoor temperatures were linked with a risk increase for exacerbations

Randomized Controlled Trial > PLoS One. 2013;8(3):e57066.
doi: 10.1371/journal.pone.0057066. Epub 2013 Mar 15.

The effect of cold temperature on increased exacerbation of chronic obstructive pulmonary disease: a nationwide study

Ching-Min Tseng [1], Yung-Tai Chen, Shuo-Ming Ou, Yi-Han Hsiao, Szu-Yuan Li, Shuu-Jiun Wang,

Type of study	Number of Patients	Result	Conclusion
Randomized controlled trial	16,254	It was found that a 1°C decrease in air temperature was associated with a 0.8% increase in the exacerbation rate on event-days (95% confidence interval (CI), 1.015-1.138, p = 0.015). With a 5°C decrease in mean temperature, the cold temperature (28-day average temperature) had a long-term effect on the exacerbation of COPD (odds ratio (OR), 1.106, 95% CI 1.063-1.152, p<0.001). In addition, elderly patients and those who did not receive inhaled medication tended to suffer an exacerbation when the mean temperature dropped 5°C.	Elderly patients and those without inhaled medicine before the exacerbation event were affected significantly by lower mean temperatures. A more comprehensive program to prevent cold stress in COPD patients may lead to a reduction in the exacerbations rate of COPD.

Am J Respir Crit Care Med. 2013 May 15;187(10):1098–1103. doi: 10.1164/rccm.201211-1969OC

Heat-related Emergency Hospitalizations for Respiratory Diseases in the Medicare Population

G Brooke Anderson [1], Francesca Dominici [2], Yun Wang [2], Meredith C McCormack [3,4], Michelle L Bell [5], Roger D Peng [1,✉]

Type of study	Patients	Result	Conclusion
Observational Study	12.5 million Medicare beneficiaries in 213 United States counties	obtained daily county-level rates of Medicare emergency respiratory hospitalizations in 213 U.S. counties from 1999 through 2008. Overall, each 10°F increase in daily temperature was associated with a 4.3% increase in same-day emergency hospitalizations for respiratory diseases (95% posterior interval, 3.8, 4.8%).	Found strong evidence of an association between outdoor heat and respiratory hospitalizations in the largest population

Thank You