Highlights in COPD 2023

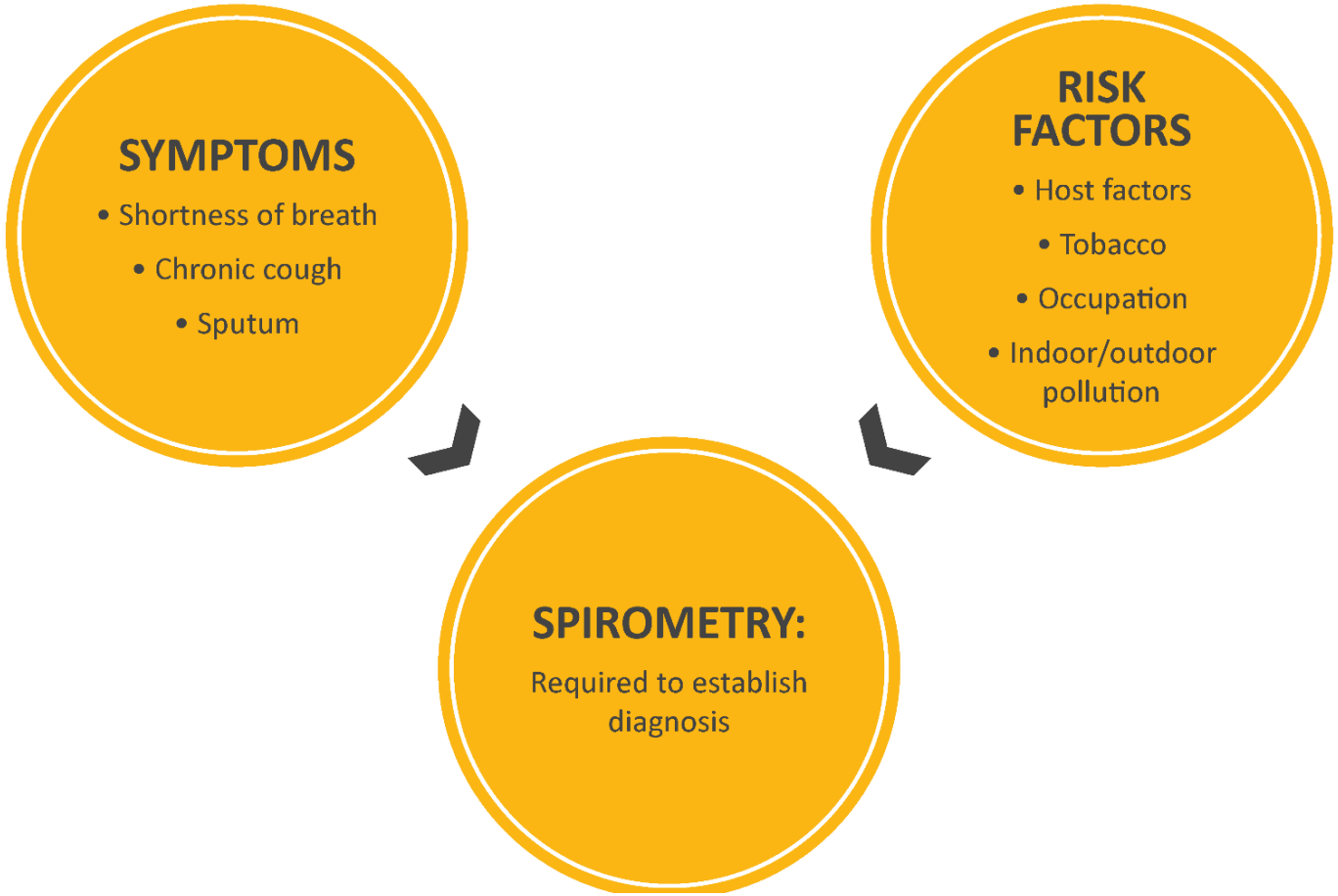
พ.ญ เปี่ยมลาภ แสงสายัณห์

นายแพทย์ทรงคุณวุฒิ สถาบันโรคทรวงอก

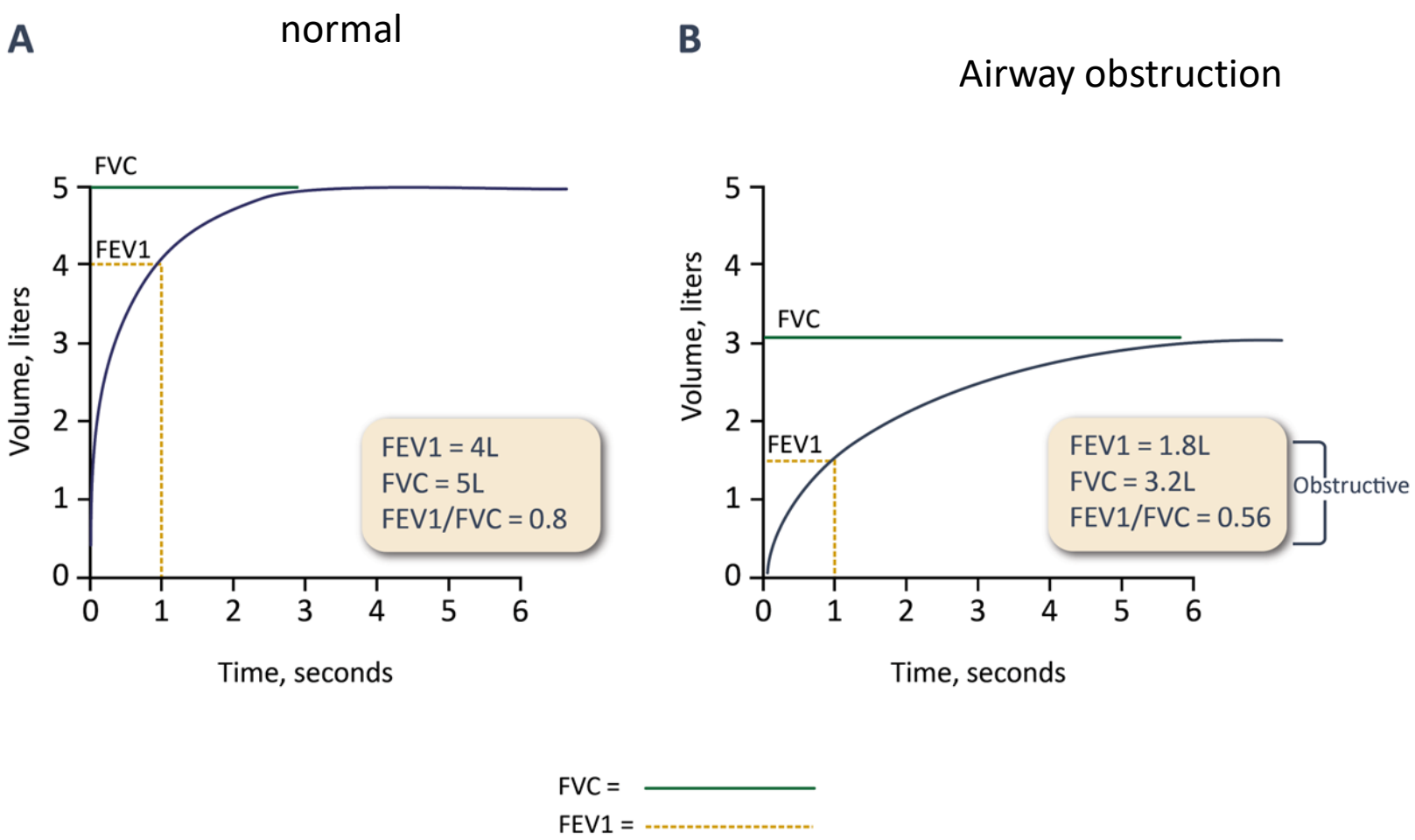
Clinical indicator for considering a Diagnosis of COPD

Dyspnea that is	Progressive over time Worse with exercise Persistent
Recurrent wheeze	
Chronic cough	May be intermittent and may be unproductive
Recurrent lower respiratory tract infections	
History of risk factors	Tobacco smoke (including popular local preparations) Smoke from home cooking and heating fuels Occupational dusts, vapors, fumes, gases and other chemicals Host factors (e.g., genetic factors, developmental abnormalities, low birthweight, prematurity, childhood respiratory infections etc.)

Pathways to the Diagnosis of COPD



Spirometry


A
normal
FVC
FEV1
Volume, liters
Time, seconds
FEV1 = 4L
FVC = 5L
FEV1/FVC = 0.8
B
Airway obstruction
FVC
FEV1
Volume, liters
Time, seconds
FEV1 = 1.8L
FVC = 3.2L
FEV1/FVC = 0.56
Obstructive
FVC =
FEV1 =

ASSESSMENT TOOL

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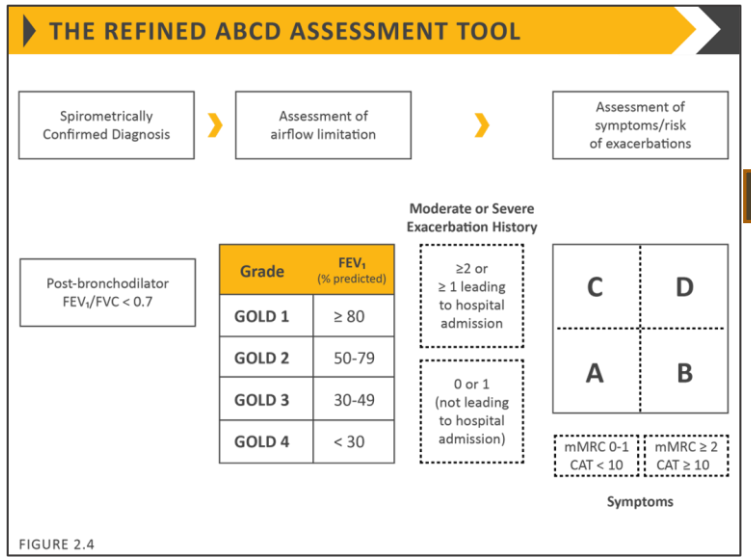
Old



New

Spirometrically confirmed diagnosis → Assessment of airflow obstruction → Assessment of symptoms/risk of exacerbations

Post-bronchodilator FEV1/FVC < 0.7

GRADE	FEV1 (% predicted)
GOLD 1	≥ 80
GOLD 2	50-79
GOLD 3	30-49
GOLD 4	< 30

EXACERBATION HISTORY (PER YEAR)

- ≥ 2 moderate exacerbations or ≥ 1 leading to hospitalization
- 0 or 1 moderate exacerbations (not leading to hospitalization)

E	
A	B

mMRC 0-1 CAT < 10 | mMRC ≥ 2 CAT ≥ 10

SYMPTOMS

Initial pharmacological treatment

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Old

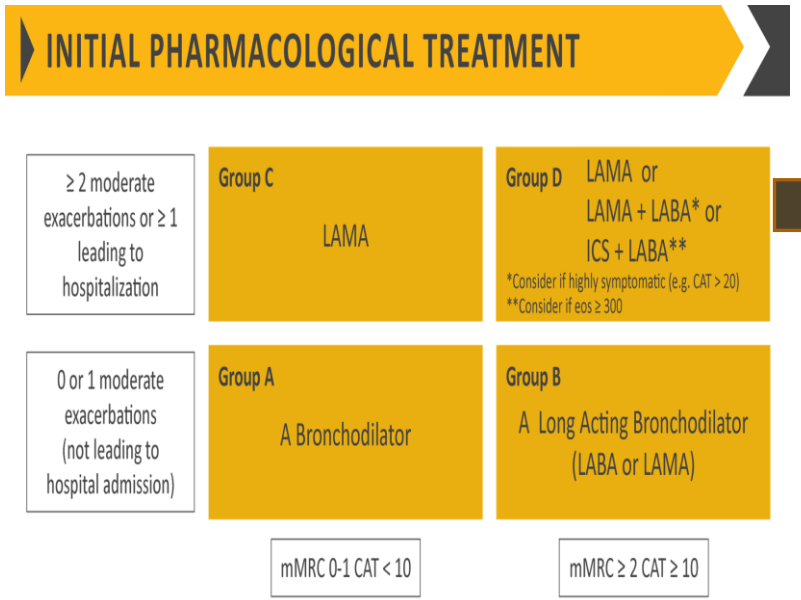

FIGURE 4.1

New

≥ 2 moderate exacerbations or ≥ 1 leading to hospitalization	GROUP E **LABA + LAMA*** *consider LABA+LAMA+ICS* if blood eos ≥ 300*	
0 or 1 moderate exacerbations (not leading to hospital admission)	GROUP A **A bronchodilator**	GROUP B **LABA + LAMA***
	mMRC 0-1, CAT < 10	mMRC ≥ 2, CAT ≥ 10

*single inhaler therapy may be more convenient and effective than multiple inhalers
Exacerbations refers to the number of exacerbations per year

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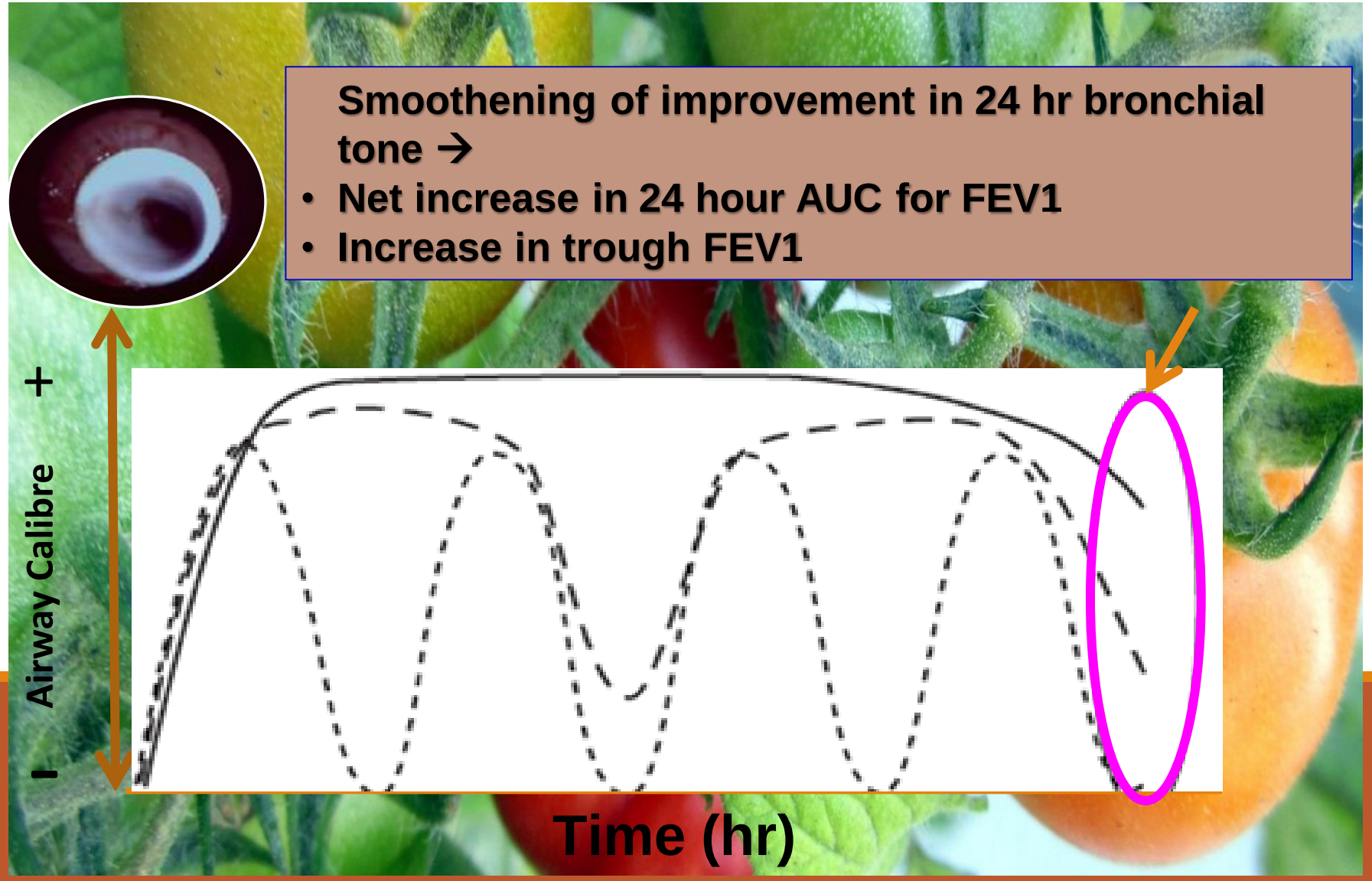
Pharmacological Stenting: Benefits of Long-acting Bronchodilators, More effective bronchodilation



Source: Beeh & Beier. Adv Ther (2010) 27(3):150-159

Tiotropium/olodaterol offers consistent benefits beyond tiotropium

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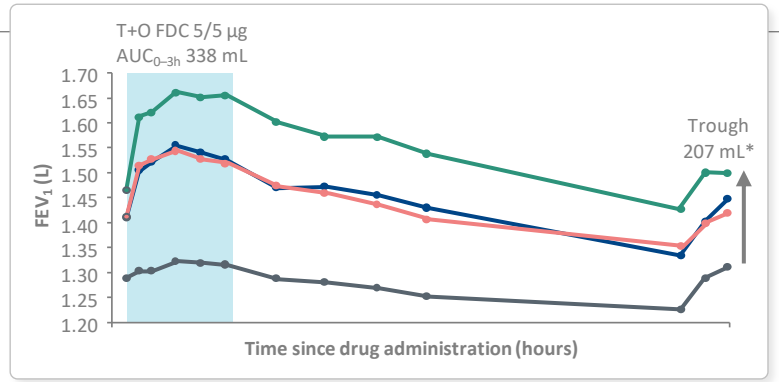
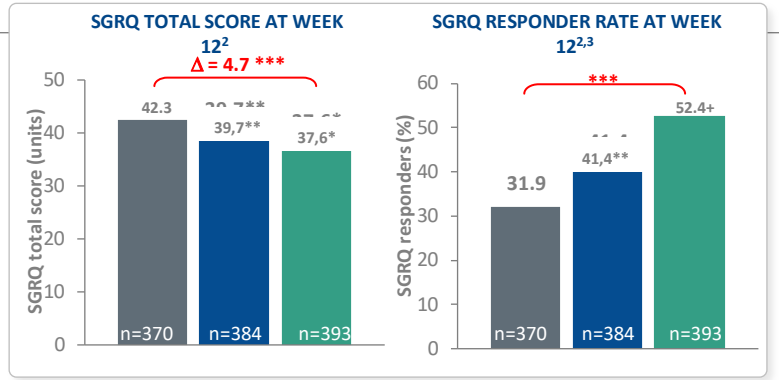
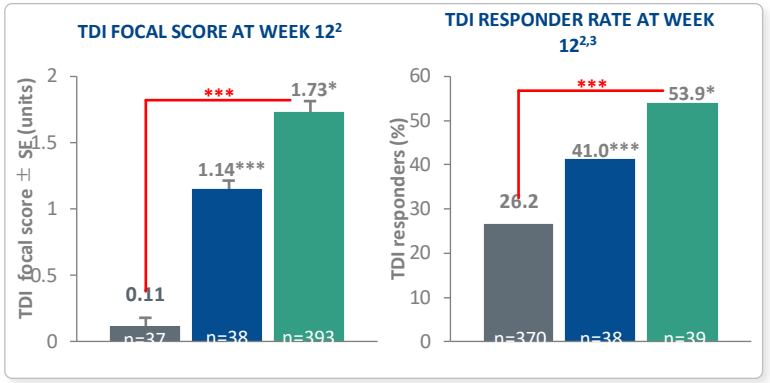
IN LUNG FUNCTION[1]



IN QUALITY OF LIFE[2,3]



IN DYSPNOEA[2,3]



Placebo | Tiotropium 5 µg | Olodaterol 5 µg | Tiotropium/Olodaterol 5/5 µg

Lung function: *=Difference between tiotropium/olodaterol 5/5µg and placebo. **Quality of life:** Combined dataset for OTEMTO® 1+2 (full-analysis set); common baseline mean SGRQ total score: 42.6. An SGRQ responder is defined as a reduction in SGRQ total score of ≥4.0 units from baseline; ***p<0.0001 tiotropium/olodaterol 5/5µg vs placebo; **p<0.001 tiotropium 5µg vs placebo; *p<0.01 tiotropium/olodaterol 5/5µg vs tiotropium 5µg; +p<0.05 tiotropium/olodaterol 5/5µg vs tiotropium 5µg (nominal p value).
Dyspnoea: Combined dataset for OTEMTO® 1+2 (full-analysis set). A TDI responder is defined as an improvement of ≥1.0 unit compared with baseline; Common baseline: 6.54. ***p<0.0001 (for both tiotropium/olodaterol 5/5µg vs placebo and tiotropium 5µg vs placebo); *p<0.01 tiotropium/olodaterol 5/5µg vs tiotropium 5µg (nominal p value). **1.** Beeh KM, et al. Pulm Pharmacol Ther 2015; 32: 53–59; **2.** Singh D, et al. Respir Med 2015; 109: 1312–1319 (supplementary material); **3.** Singh D, et al. Poster presented at the ERS International Congress 2015: PA2958; **4.** Buhl RM, et al. Eur Respir J 2015; 45: 969–979 (supplementary material).

Initial pharmacological treatment

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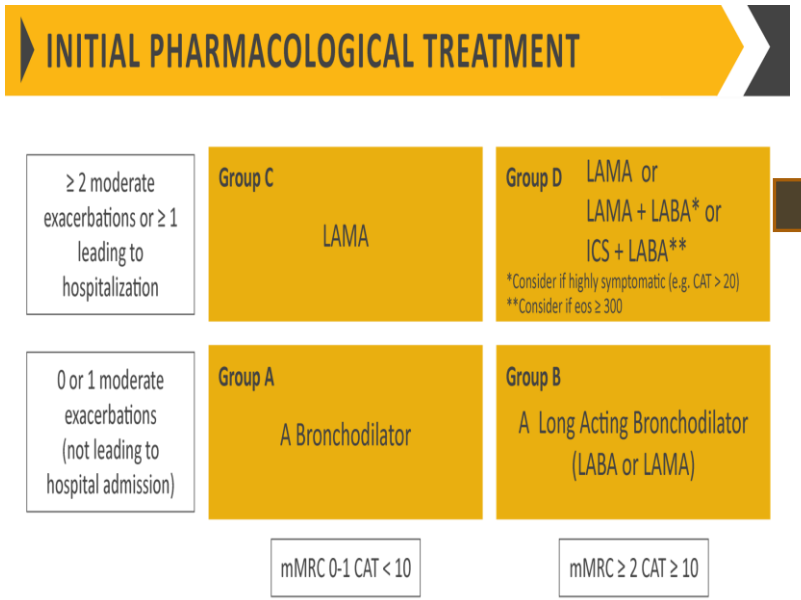
Old



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UPLIFT study:

Tiotropium(LAMA) vs placebo

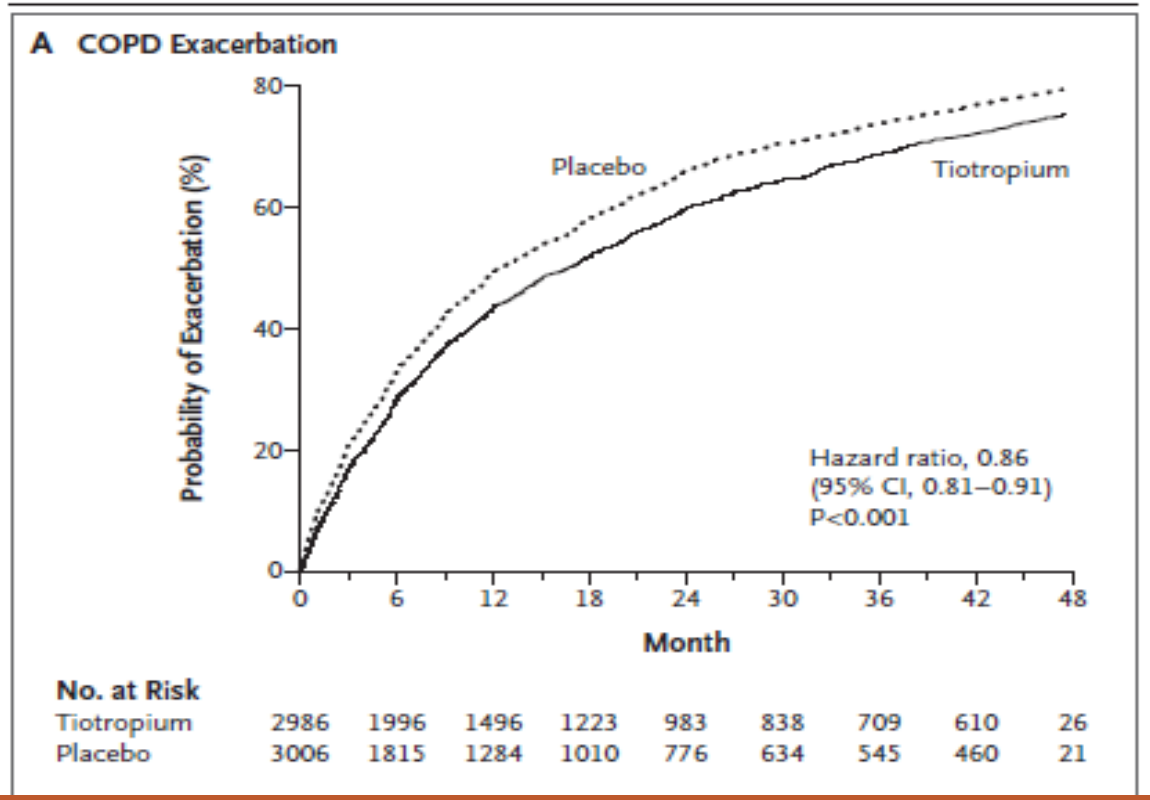
The NEW ENGLAND JOURNAL of MEDICINE

ESTABLISHED IN 1812 OCTOBER 9, 2008 VOL. 359 NO. 15

- 5,993 Patients, 4 yrs F/U
- Tiotropium was also associated with a significant delay in the time to the first exarcerbation (median of 16.7 months (95% CI, 14.9 to 17.9) in the tiotropium group and 12.5 months (95% CI, 11.5 to 13.8) in the placebo group.
- Tiotropium was also associated with a reduction in the mean number of exacerbations of 14% (P<0.001)

A 4-Year Trial of Tiotropium in Chronic Obstructive Pulmonary Disease

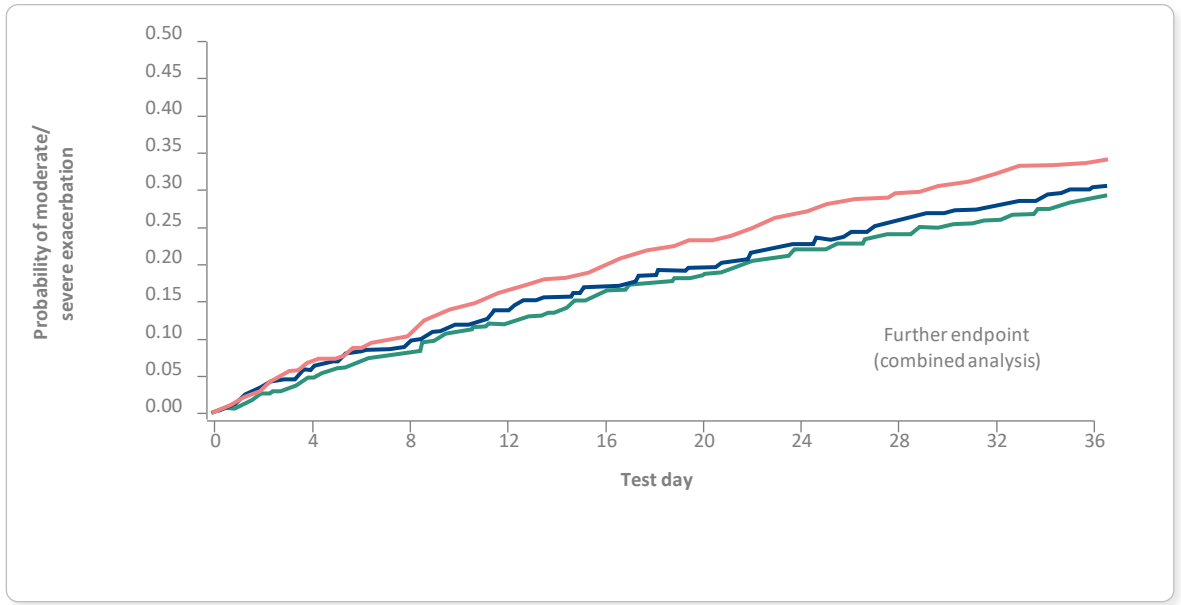
Donald P. Tashkin, M.D., Bartolome Celli, M.D., Stephen Senn, Ph.D., Deborah Burkhart, B.S.N., Steven Kesten, M.D., Shailendra Menjoge, Ph.D., and Marc Decramer, M.D., Ph.D., for the UPLIFT Study Investigators*



Tiotropium/olodaterol offers consistent benefits beyond tiotropium

Placebo Tiotropium 5 µg Olodaterol 5 µg Tiotropium/Olodaterol 5/5 µg

AND POTENTIALLY EXACERBATION[4]



Numbers at risk										
T+O 5/5 µg	1029	963	909	862	811	775	735	706	686	646
Tiotropium 5 µg	1033	952	880	832	786	752	716	679	647	613
Olodaterol 5 µg	1038	952	874	802	752	715	671	642	607	576

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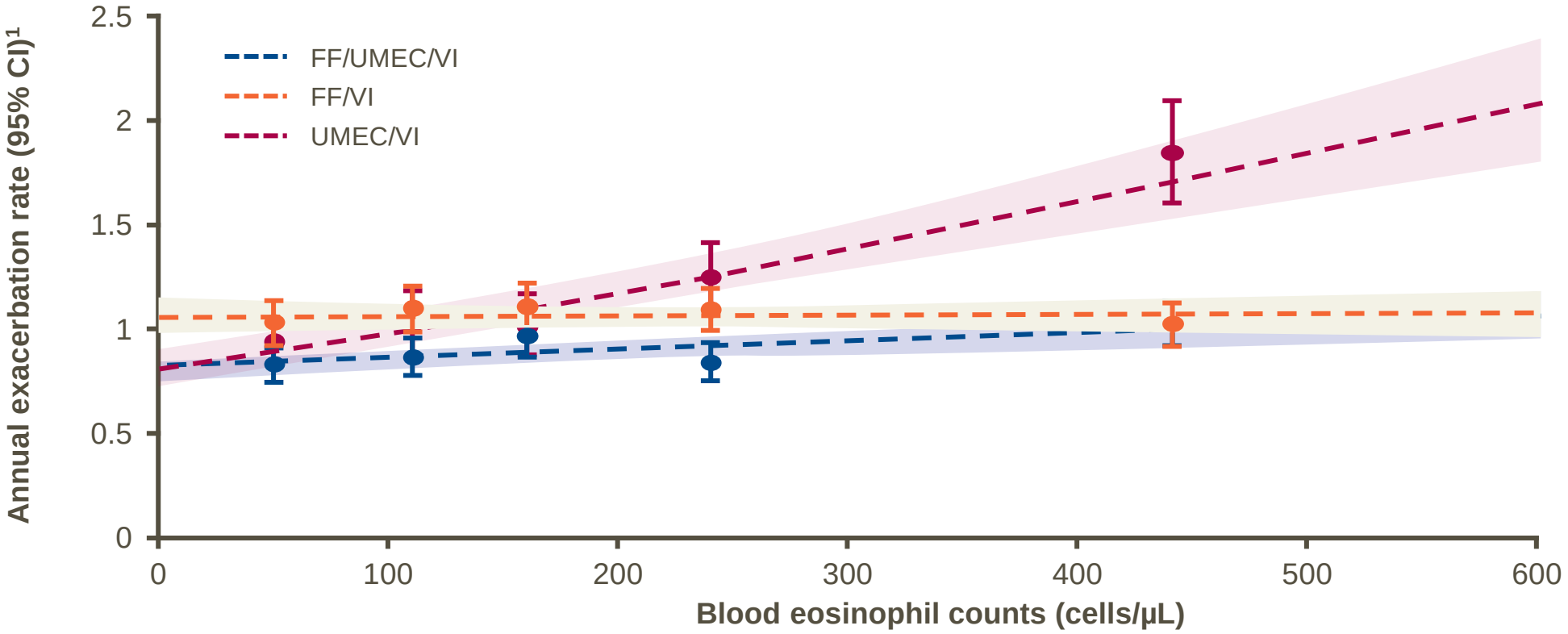
IMPACT: Blood eosinophil counts are a continuous variable associated with exacerbation frequency and ICS response across a spectrum



These results are consistent with *post hoc* analyses of studies including FORWARD and INSPIRE, and with the outcome of a pre-specified analysis of the TRINITY clinical trial[2–5]

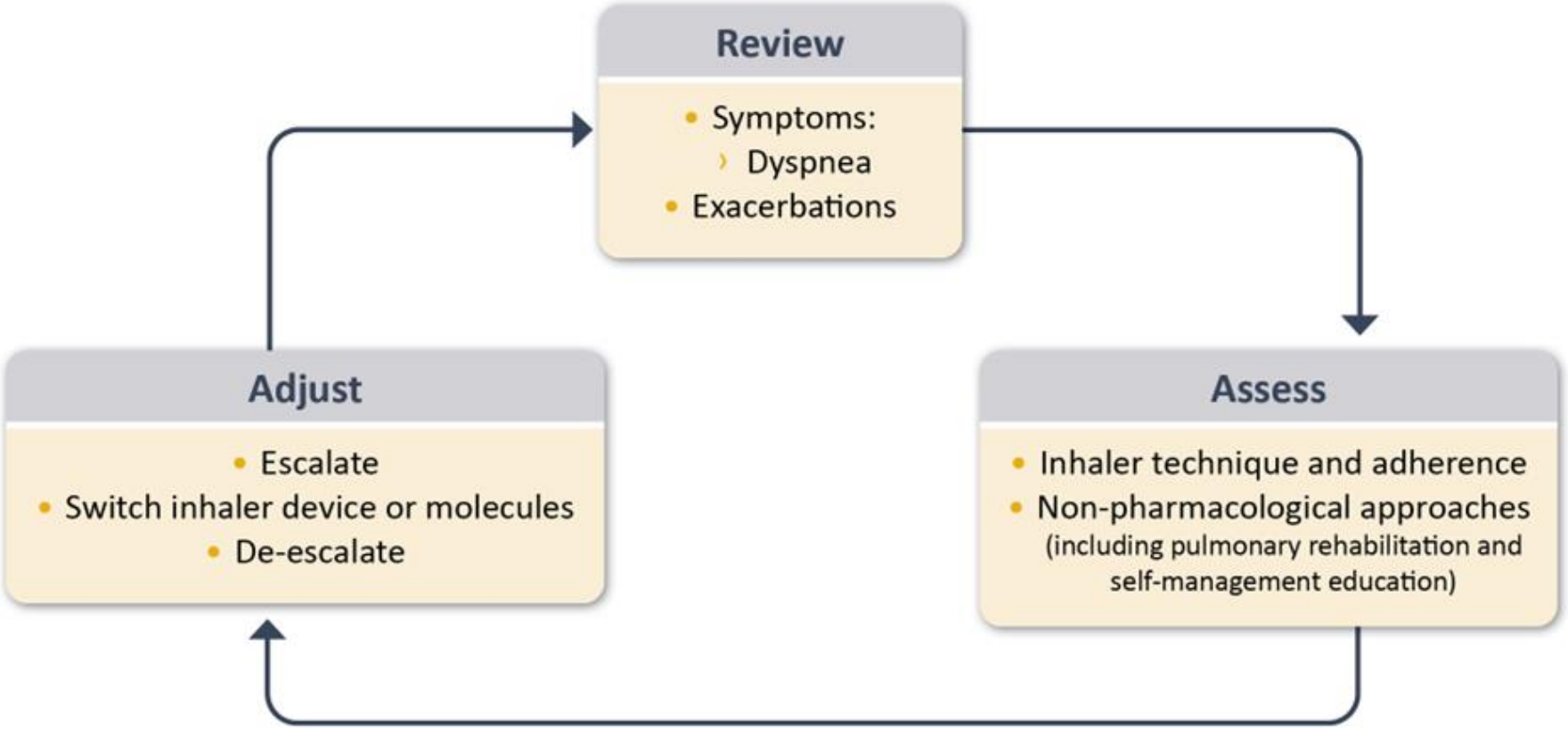
BEC, blood eosinophil count, FF, fluticasone furoate; UMEC, umeclidinium; VI, vilanterol.

1. Pascoe S, et al. Lancet Respir Med. 2019;7:745–756 (including Supplementary Appendix; 2. Pascoe S, et al. *Lancet Respir Med*. 2015;3:435–442; 3. Siddiqui SH. *Am J Respir Crit Care Med*. 2015;192:523-525; 4. Pavord ID, et al. *Thorax*. 2016;71:118–125 (including Supplementary Appendix); 5. Vestbo J, et al. *Lancet*. 2017;389:1919–1929 (including Supplementary Appendix).

Bronchodilators in stable COPD

- Inhaled bronchodilators in COPD are central to symptom management and commonly given on a regular basis to prevent or reduce symptoms **(Evidence A)**
- Regular and as-needed use of SABA or SAMA improves FEV1 and symptoms **(Evidence A)**
- Combinations of SABA and SAMA are superior compared to either medication alone in improving FEV1 and symptoms **(Evidence A)**
- LABAs and LAMAs significantly improve lung function, dyspnea, health status, and reduce exacerbation rates **(Evidence A)**
- LAMAs have a greater effect on exacerbation reduction compared with LABAs **(Evidence A)** and decrease hospitalizations **(Evidence B)**
- Combination treatment with a LABA and a LAMA increases FEV1 and reduces symptoms compared to monotherapy **(Evidence A)**
- Combination treatment with a LABA+LAMA reduces exacerbations compared to monotherapy **(Evidence B)**
- Tiotropium improves the effectiveness of pulmonary rehabilitation in increasing exercise performance **(Evidence B)**
- Theophylline exerts a small bronchodilator effect in stable COPD **(Evidence A)** and that is associated with modest symptomatic benefits **(Evidence B)**
- Single inhaler therapy may be more convenient and effective than multiple inhalers

Management Cycle



Follow- up Pharmacological Treatment

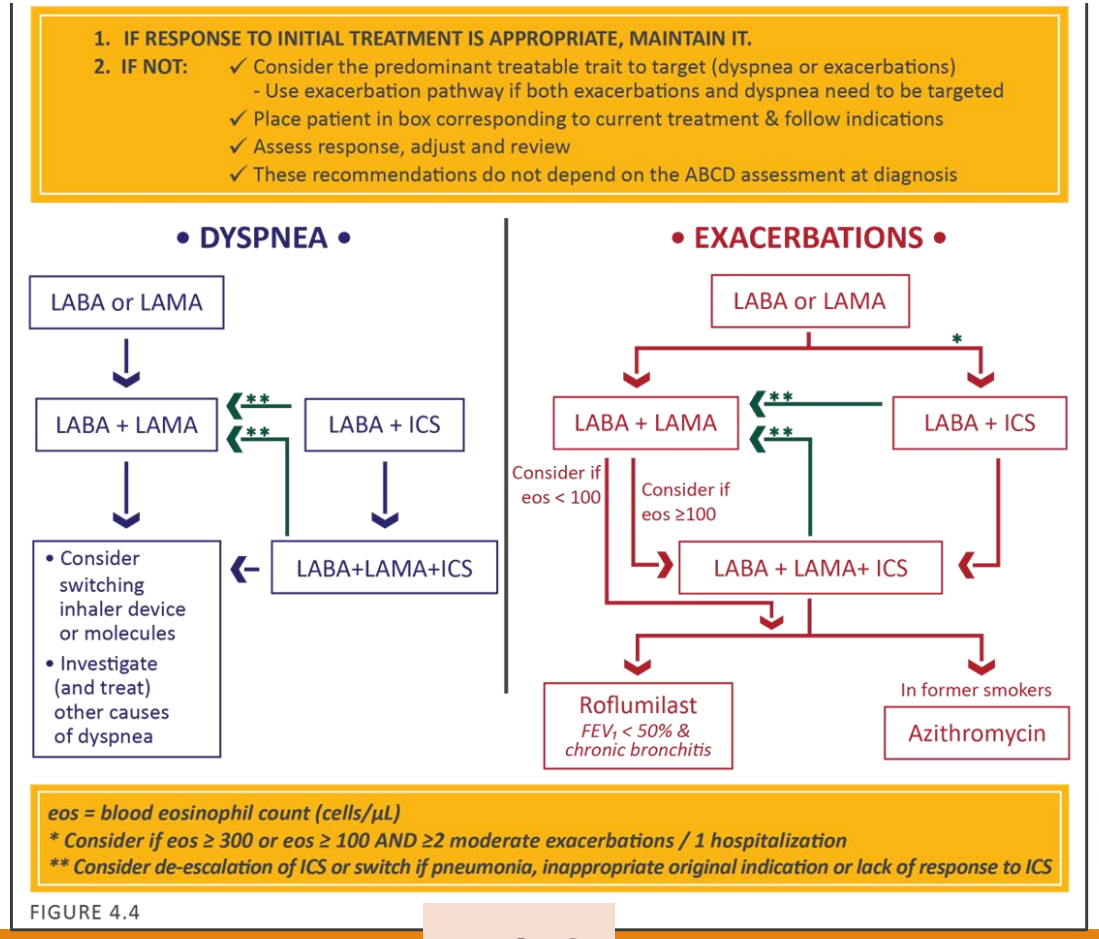
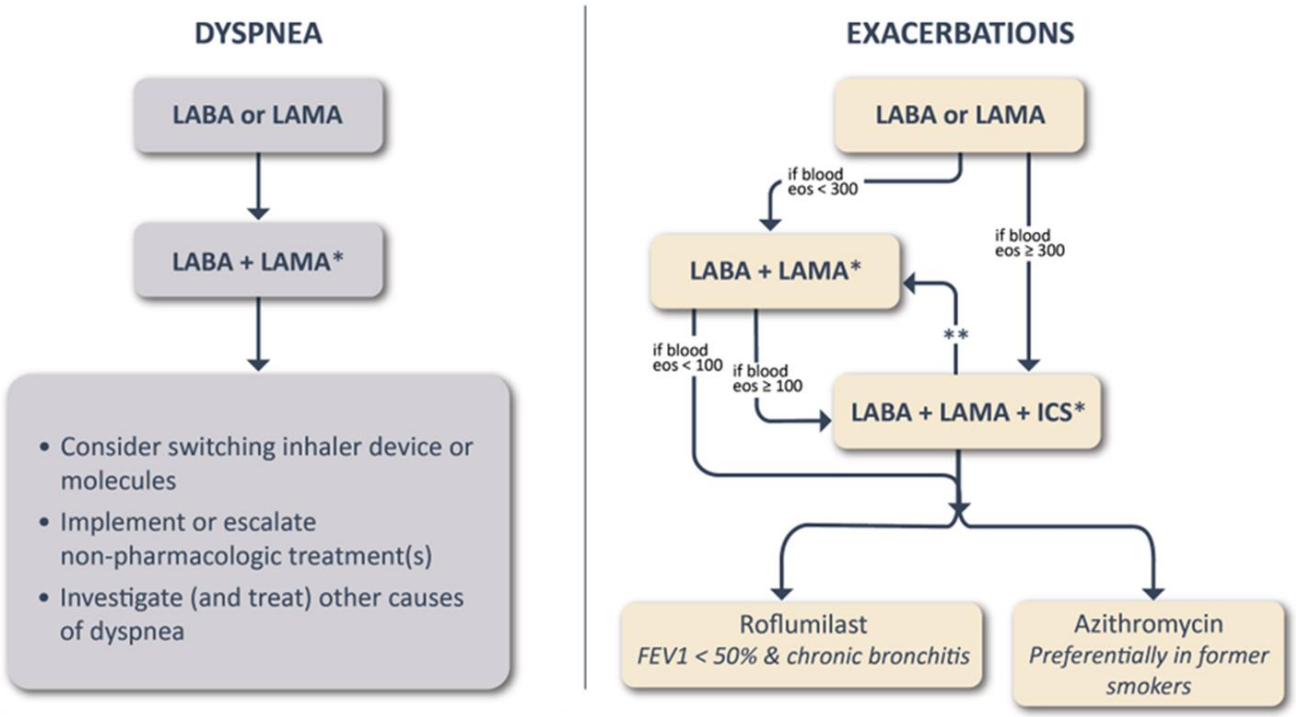


FIGURE 4.4

Old



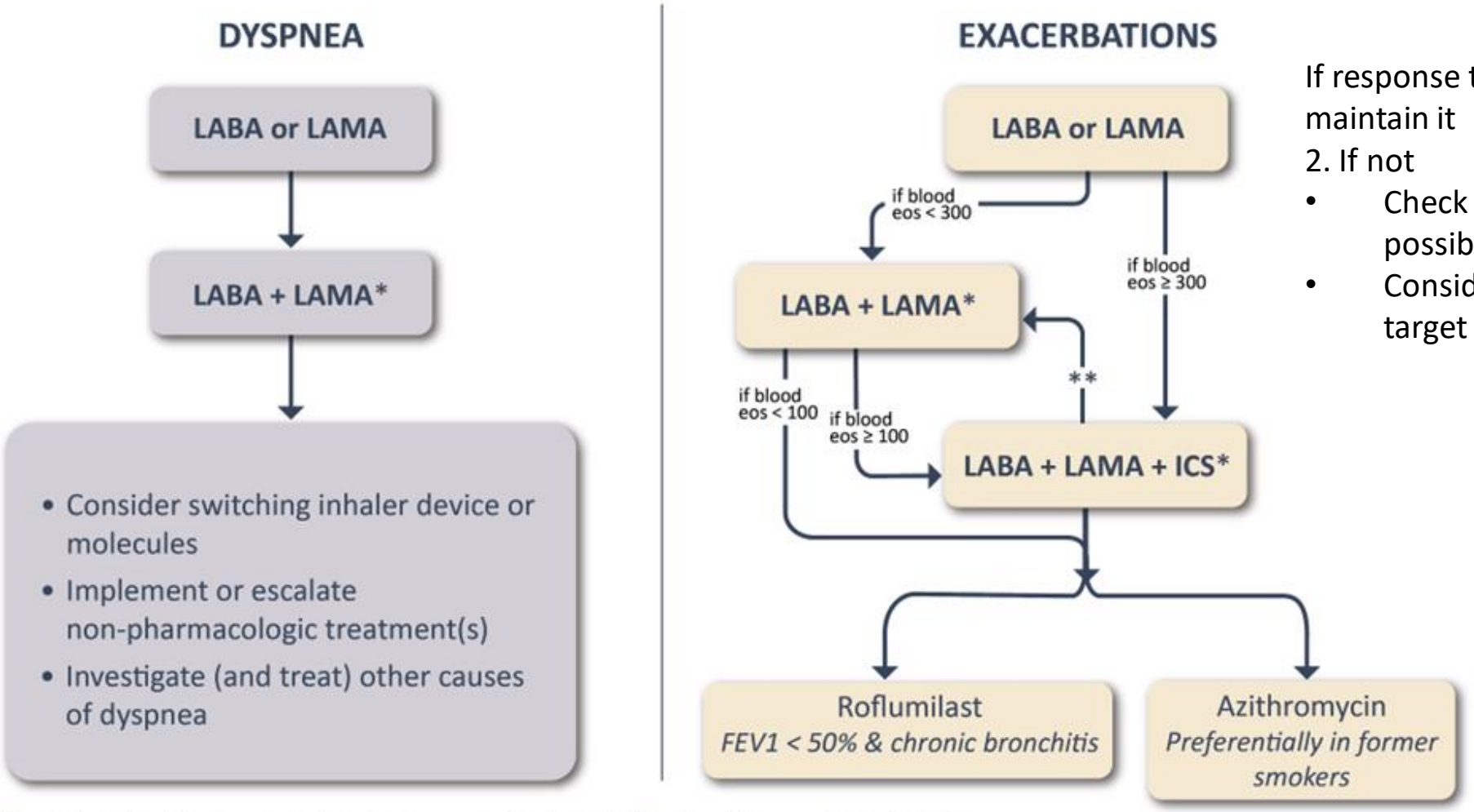
*Single inhaler therapy may be more convenient and effective than multiple inhalers

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

Exacerbations refers to the number of exacerbations per year

New

Follow- up Pharmacological Treatment



If response to initial treatment is appropriate, maintain it

2. If not

- Check adherence, inhaler technique and possible interfering comorbidities
- Consider the predominant treatable trail to target (dyspnea or exacerbations)

*Single inhaler therapy may be more convenient and effective than multiple inhalers

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Exacerbations refers to the number of exacerbations per year

Anti-inflammatory Therapy in stable COPD

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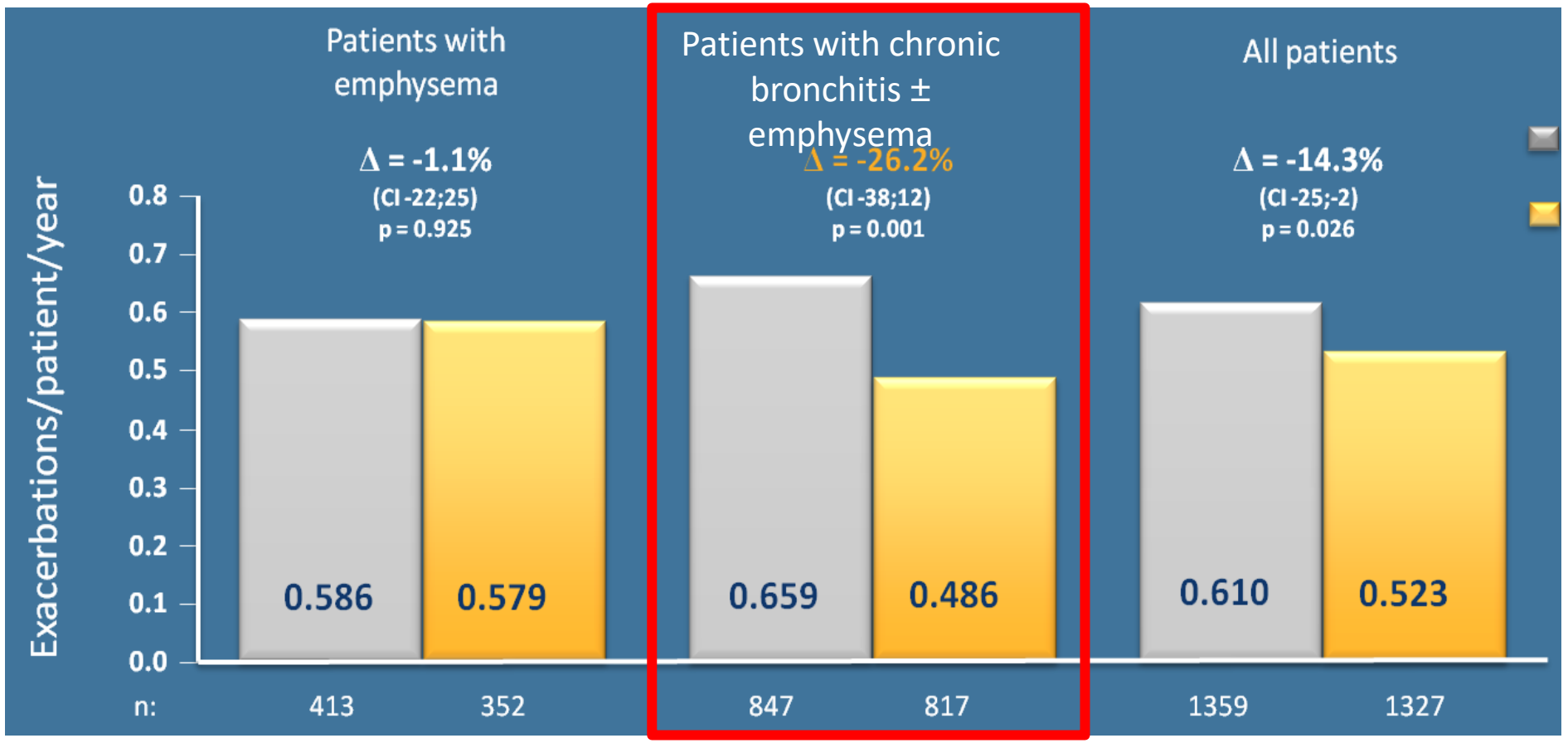
Inhaled Corticosteroids	• An ICS combined with a LABA is more effective than the individual components in improving lung function and health status and reducing exacerbations in patients with exacerbations and moderate to very severe COPD **(Evidence A)** • Regular treatment with ICS increases the risk of pneumonia especially in those with severe disease **(Evidence A)** • Lower blood and sputum eosinophils are associated with greater presence of proteobacteria, notably *Haemophilus*, increased bacterial infections & pneumonia • Independent of ICS use, there is evidence that a blood eosinophil count < 2% increases the risk of pneumonia **(Evidence C)** • Triple inhaled therapy of LABA+LAMA+ICS improves lung function, symptoms and health status, and reduces exacerbations, compared to LABA+ICS, LABA+LAMA or LAMA monotherapy **(Evidence A)**. Recent data suggest a beneficial effect of triple inhaled therapy versus fixed-dose LABA+LAMA combinations on mortality in symptomatic COPD patients with a history of frequent and/or severe exacerbations • Single inhaler therapy may be more convenient and effective than multiple inhalers
Oral Glucocorticoids	• Long-term use of oral glucocorticoids has numerous side effects **(Evidence A)** with no evidence of benefits **(Evidence C)**

Anti-inflammatory Therapy in stable COPD

PDE4 Inhibitors	• In patients with chronic bronchitis, severe to very severe COPD and a history of exacerbations: ▪ A PDE4 inhibitor improves lung function and reduces moderate and severe exacerbations **(Evidence A)** ▪ A PDE4 inhibitor improves lung function and decreases exacerbations in patients who are on fixed-dose LABA+ICS combinations **(Evidence A)**
Antibiotics	• Long-term azithromycin and erythromycin therapy reduces exacerbations over one year **(Evidence A)** • Treatment with azithromycin is associated with an increased incidence of bacterial resistance **(Evidence A)** and hearing test impairments **(Evidence B)**
Mucoregulators and Antioxidant Agents	• Regular treatment with mucolytics such as erdosteine, carbocysteine and NAC reduces the risk of exacerbations in select populations **(Evidence B)**
Other Anti-Inflammatory Agents	• Simvastatin does not prevent exacerbations in COPD patients at increased risk of exacerbations and without indications for statin therapy **(Evidence A)**. However, observational studies suggest that statins may have positive effects on some outcomes in patients with COPD who receive them for cardiovascular and metabolic indications **(Evidence C)** • Leukotriene modifiers have not been tested adequately in COPD patients

Effect of roflumilast on exacerbations greatest in patients with chronic cough and sputum



Rennard, et al. Respir Res 2011

Factors to consider when Initiating ICS Treatment

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STRONGLY FAVORS USE	**History of hospitalization(s) for exacerbations of COPD#**
	≥ 2 moderate exacerbations of COPD per year#
	Blood eosinophils ≥ 300 cells/µL
	History of, or concomitant asthma
FAVORS USE	1 moderate exacerbation of COPD per year#
	Blood eosinophils 100 to < 300 cells/µL
AGAINST USE	**Repeated pneumonia events**
	Blood eosinophils < 100 cells/µL
	History of mycobacterial infection

Non- Pharmacologic Management

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Patient Group	Essential	Recommended	Depending on Local Guidelines
A	Smoking Cessation (can include pharmacological treatment)	Physical Activity	Flu Vaccination Pneumococcal Vaccination Pertussis Vaccination COVID-19 Vaccinations Shingles Vaccination
B and E	Smoking Cessation (can include pharmacological treatment) Pulmonary Rehabilitation	Physical Activity	Flu Vaccination Pneumococcal Vaccination Pertussis Vaccination COVID-19 Vaccinations Shingles Vaccination

Follow- up of Non-Pharmacological treatment

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

- Flu 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

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.

Evidence supporting a reduction in mortality with Pharmacotherapy and Non- pharmacotherapy in COPD patients

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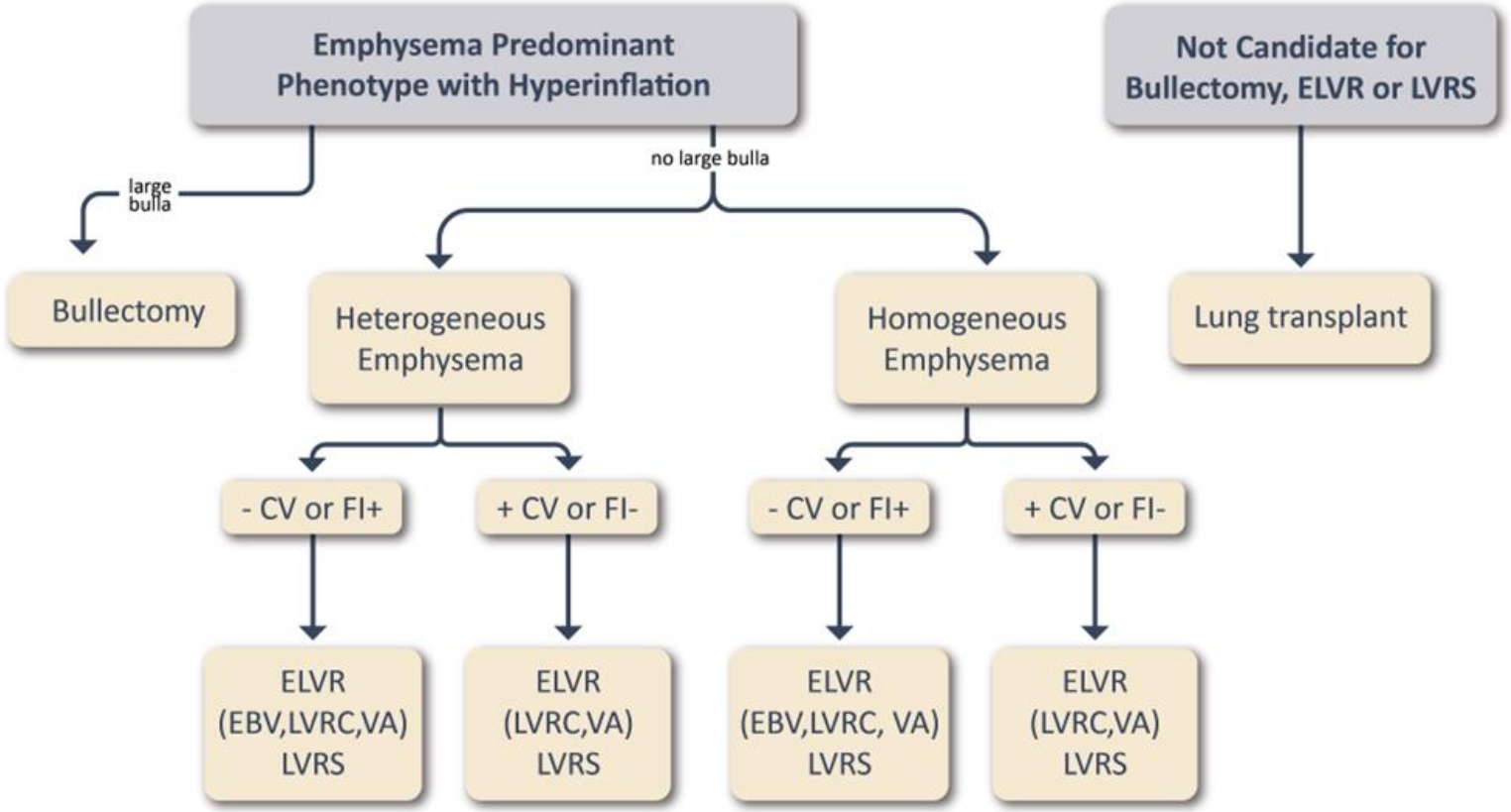
Therapy	RCT*	Treatment effect on mortality	Patient characteristics
Pharmacotherapy			
LABA+LAMA+ICS[1]	Yes	Single inhaler triple therapy compared to dual LABD therapy relative risk reduction: IMPACT: HR 0.72 (95% CI: 0.53, 0.99)[1a] ETHOS: HR 0.51 (95% CI: 0.33, 0.80)[1b]	Symptomatic people with a history of frequent and/or severe exacerbations
Non-pharmacological Therapy			
Smoking cessation[2]	Yes	HR for usual care group compared to intervention group (smoking cessation) HR 1.18 (95% CI: 1.02, 1.37)[2]	Asymptomatic or mildly symptomatic
Pulmonary rehabilitation[3#]	Yes	Old trials: RR 0.28 (95% CI 0.10, 0.84)[3a] New trials: RR 0.68 (95% CI 0.28, 1.67)[3b]	Hospitalized for exacerbations of COPD (during or ≤ 4 weeks after discharge)
Long-term oxygen therapy[4]	Yes	NOTT: ≥ 19 hours of continuous oxygen vs ≤ 13 hours: 50% reduction[4a] MRC: ≥ 15 hours vs no oxygen: 50% reduction[4b]	PaO_2 ≤ 55 mmHg or < 60 mmHg with *cor pulmonale* or secondary polycythemia
Noninvasive positive pressure ventilation[5]	Yes	12% in NPPV (high IPAP level) and 33% in control HR 0.24 (95% CI 0.11, 0.49)[5]	Stable COPD with marked hypercapnia
Lung volume reduction surgery[6]	Yes	0.07 deaths/person-year (LVRS) vs 0.15 deaths/person-year (UC) RR for death 0.47 (p = 0.005)[6]	Upper lobe emphysema and low exercise capacity

Surgical and Interventional Therapies in advanced Emphysema



Note: not all therapies are clinically available in all countries. Long term ELVR outcomes or direct comparisons to LVRS are unknown.

Definition of abbreviations: CV, collateral ventilation measure by Chartis; FI + fissure integrity > 90% by HRCT; FI-, fissure integrity < 90% by HRCT; ELVR, Endoscopic Lung Volume Reduction, EBV, Endobronchial Valve; VA, Vapor Ablation; LVRC, Lung Volume Reduction Coil; LVRS, Lung Volume Reduction Surgery. Modified from Vogelmeier, AJRCCM, 2017

Vaccination for stable COPD

- Influenza vaccination is recommended in people with COPD **(Evidence B)**
- The WHO and CDC recommends SARS-CoV-2 (COVID-19) vaccination for people with COPD **(Evidence B)**
- The CDC recommends one dose of 20-valent pneumococcal conjugate vaccine (PCV20); or one dose of 15-valent pneumococcal conjugate vaccine (PCV15) followed by 23-valent pneumococcal polysaccharide vaccine (PPSV23) in people with COPD **(Evidence B)**
- Pneumococcal vaccination has been shown to reduce the incidence of community-acquired pneumonia and exacerbations in people with COPD **(Evidence B)**
- The CDC recommends Tdap (dTaP/dTPa) vaccination to protect against pertussis (whooping cough) for people with COPD that were not vaccinated in adolescence **(Evidence B)**, and Zoster vaccine to protect against shingles for people with COPD over 50 years **(Evidence B)**

Definition of exacerbation

dyspnea and/or cough and sputum that worsen over < 14 days. Exacerbations of COPD are often associated with increased local and systemic inflammation caused by airway infection, pollution, or other insults to the lungs

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Exacerbation

COPD Patient with Suspected Exacerbation

Confirm ECOPD Diagnosis and Episode Severity

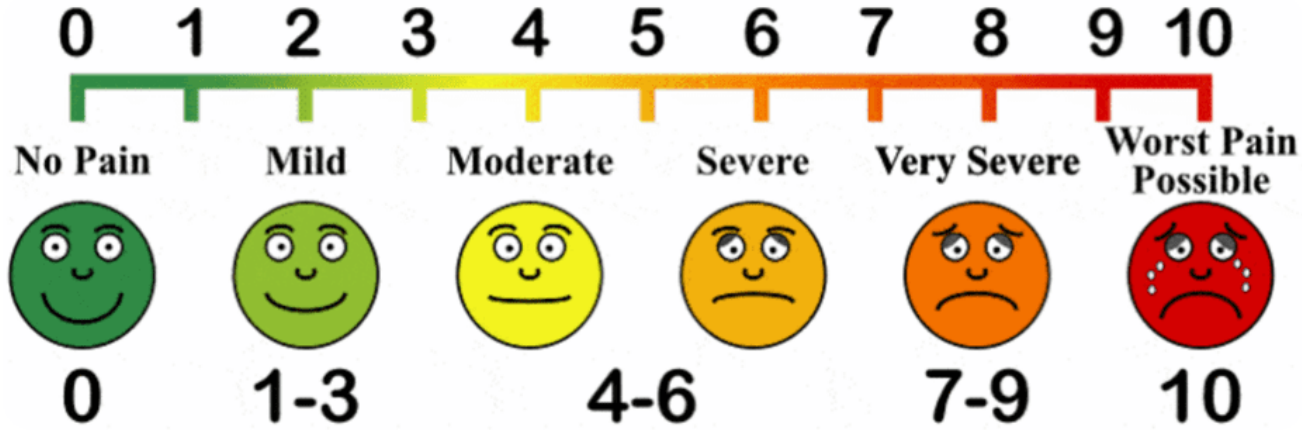
Severity	Variable thresholds to determine severity
Mild (default)	• Dyspnea VAS < 5 • RR < 24 breaths/min • HR < 95 bpm • Resting SaO_2 ≥ 92% breathing ambient air (or patient's usual oxygen prescription) AND change ≤ 3% (when known) • CRP < 10 mg/L (if obtained)
Moderate (meets at least three of five*)	• Dyspnea VAS ≥ 5 • RR ≥ 24 breaths/min • HR ≥ 95 bpm • Resting SaO_2 < 92% breathing ambient air (or patient's usual oxygen prescription) AND/OR change > 3% (when known) • CRP ≥ 10 mg/L *If obtained, ABG may show hypoxemia (PaO_2 ≤ 60 mmHg) and/or hypercapnia ($PaCO_2$ > 45 mmHg) but no acidosis
Severe	• Dyspnea, RR, HR, SaO_2 and CRP same as moderate • ABG show new onset/worsening hypercapnia and acidosis ($PaCO_2$ > 45 mmHg and pH <7.35)

Consider Differential Diagnosis

- Heart failure
- Pneumonia
- Pulmonary embolism

- Appropriate testing and treatment

Determine etiology:
viral testing, sputum culture, other



GOLD 2023

Acute exacerbations are a hallmark of COPD

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Symptoms of exacerbations

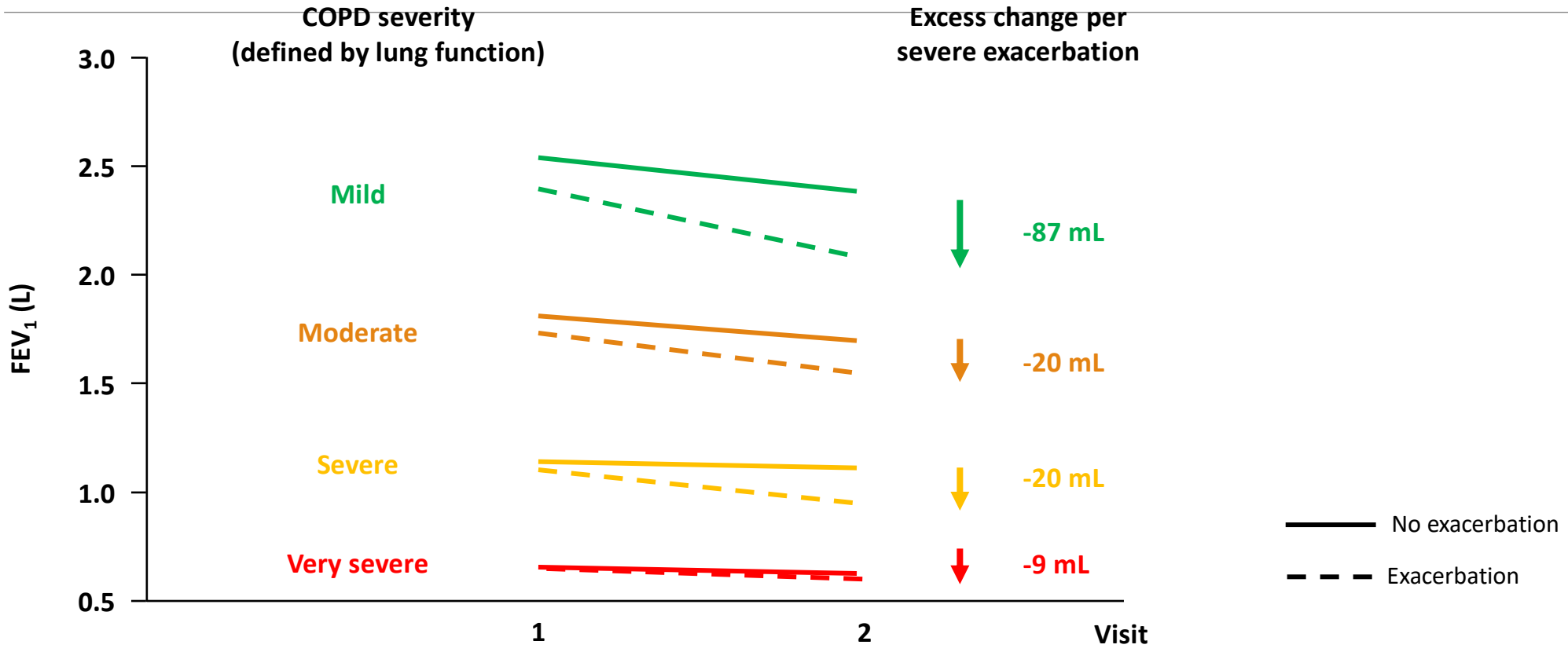
- Dyspnea
- Increased sputum production
- Increased purulent sputum
- Cough
- Breathlessness or difficulty breathing

During a COPD exacerbation, symptoms usually last between 7-10 days

However, some events may longer.

Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease updated 2022

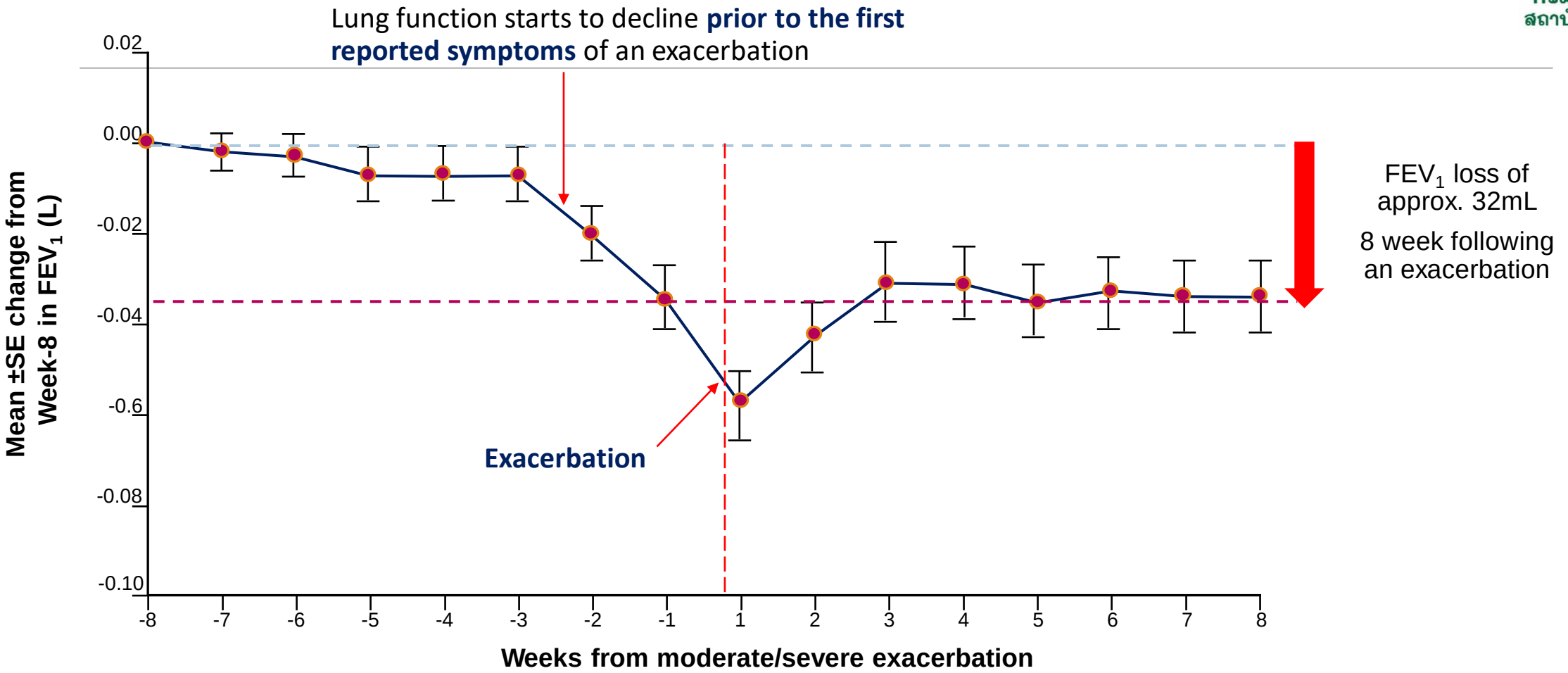
Each exacerbation drive declining in lung function



[a]Data on the first 2000 patients who returned for a second visit in the COPDGene study visit 5 years after enrollment were evaluated to determine the association between acute COPD exacerbations and FEV_1 decline in all GOLD stages; [b]A post hoc analysis of the WISDOM study in 360 patients with moderate to very severe COPD to characterize lung function before, during, and after a COPD exacerbation.

Dransfield MT et al. *Am J Respir Crit Care Med*. 2017;195:324-330.

Lung function may not recover to pre-exacerbation levels



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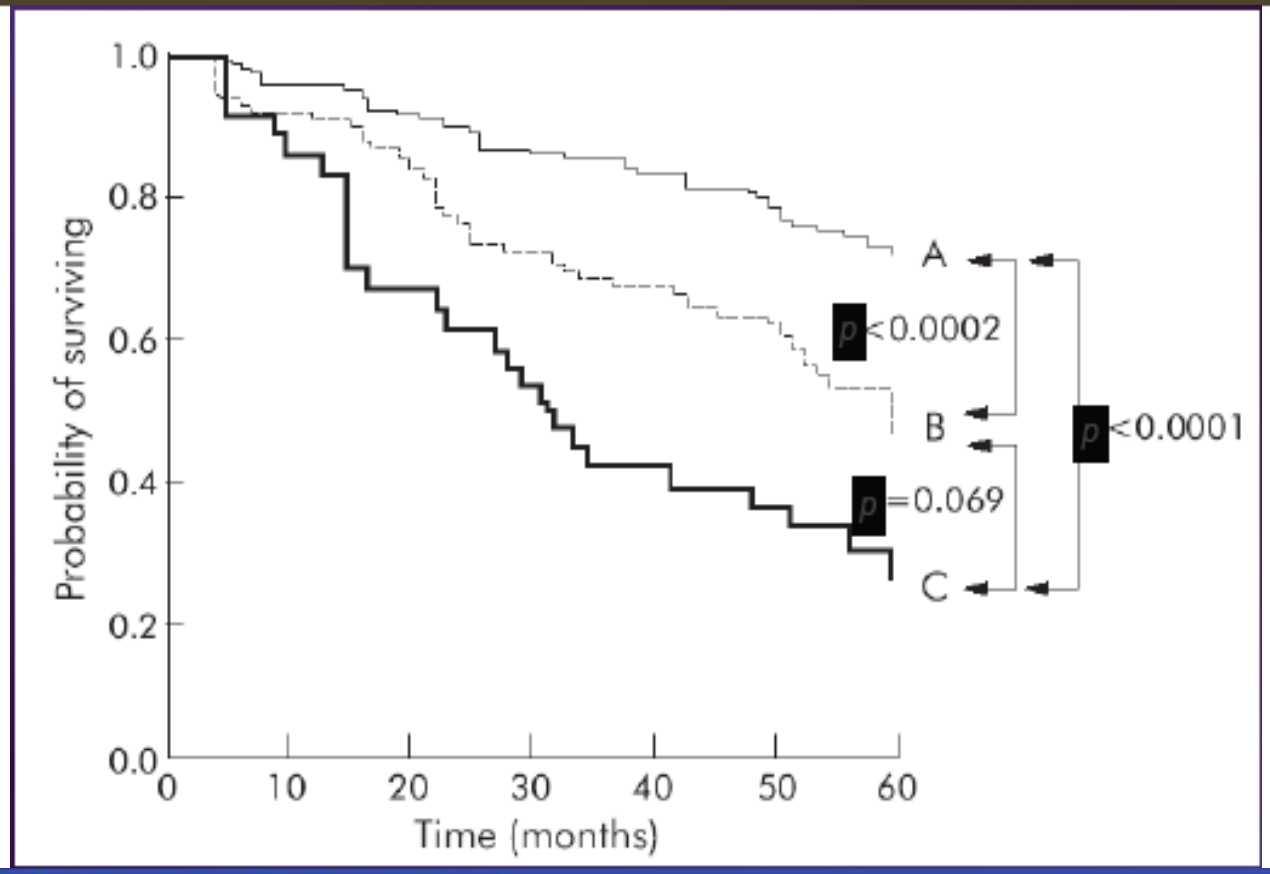
Watz H et al. *Respir Res*. 2018;19:251.

Acute Exacerbations and Survival



Group A = Patients with no acute exacerbations
Group B = Patients with 1–2 acute exacerbations of COPD requiring hospital management
Group C = Patients with > 3 acute exacerbations

Soler-Cataluña JJ, et al. Thorax 2005;60:925-931.

Mild	Moderate	Severe
รักษาด้วย short acting bronchodilators (SABDs) เพียงอย่างเดียว *หรือ* สามารถเพิ่มยาเอง รักษาได้ที่บ้าน	รักษาด้วย SABDs ร่วมกับ antibiotics *และ/หรือ* oral corticosteroids	ผู้ป่วยที่เสี่ยงต่อภาวะหายใจล้มเหลว เฉียบพลันต้องนอนรักษาตัวในโรงพยาบาล *หรือ* เข้ารับการรักษาที่ห้องฉุกเฉิน

พร้อมการวินิจฉัยแยกโรคที่มีอาการใกล้เคียงกัน แต่การรักษาแตกต่างออกไป

สามารถดูอาการที่บ้าน หรือ คลินิก/สถานพยาบาลเบื้องต้น

รักษาที่โรงพยาบาล

อาการที่ต้องประเมิน
- หายใจหอบเหนื่อยเฉียบพลัน หรือ เหนื่อยมากขึ้นขณะพัก
- Respiratory rate (RR) >30 ครั้ง/นาที
- SpO_2 <90% (room air) หรือ ลดลงจากเดิมในผู้ป่วยที่มีภาวะออกซิเจนต่ำเรื้อรัง
- สับสน หรือ ซึมลง
- ตรวจพบอาการที่เกิดขึ้นใหม่หรือ เปลี่ยนไปจากเดิม เช่น cyanosis , edema
- ได้การรักษาเบื้องต้นแล้ว อาการไม่ทุเลา
- มีโรคร่วมอื่นที่มีผลกระทบต่อการรักษา เช่น heart failure, arrhythmia เป็นต้น
- ผู้ป่วยมีข้อจำกัดของการดูแลรักษาที่บ้าน

	รุนแรง	กึ่งวิกฤต	วิกฤต
ภาวะหายใจล้มเหลว	ไม่มี	มี	มีและอันตรายถึงชีวิต
RR (ครั้ง/นาที)	20-30	>30	>30
กล้ามเนื้อช่วยหายใจ	ไม่ใช้	ใช้	ใช้
ระดับการรับรู้	ปกติ	ปกติ	ลดลง ซึม หมดสติ
การตอบสนองต่อการให้ออกซิเจน	ดี FiO2 ≤0.35	ดี FiO2 ≤0.40	FiO2 > 0.40
การเพิ่มขึ้นของค่า $PaCO_2$	ไม่มี	ไม่เกิน 20 mmHg	>20 mmHg หรือ มีภาวะเลือดเป็นกรด(pH≤7.25)
การรักษา	ห้องฉุกเฉิน	หอผู้ป่วยใน	หอผู้ป่วยวิกฤต

โรคปอดอุดกั้นเรื้อรังที่มีอาการกำเริบที่*ห้องฉุกเฉิน*

ประเมินความรุนแรง ให้การรักษาและติดตามผล

สาเหตุการกำเริบ เฉียบพลันและวินิจฉัย แยกโรค

CXR
ABG
EKG

Oxygen supplement	**Systemic corticosteroids**
• เพื่อให้ SpO_2 92-94%	• Prednisolone 30-40 มิลลิกรัม/วัน ระยะเวลา 5-7 วัน
Antibiotic (5-7 วัน)	**Bronchodilator(s)**
• ในกรณีที่เสมหะมากขึ้น หรือเปลี่ยนสีไปจากเดิม	• SABA±SAMA MDI + spacer 4-6 puffs หรือ Nebulizer ทุก 20 นาที ในชั่วโมงแรก (หากอาการดีขึ้น สามารถปรับเป็นทุก 2-4 ชม)

- หายใจเหนื่อยขึ้น
- $PaCO_2$ ⇑20 mmHg หรือ pH≤7.25
- ระดับการรับรู้ลดต่ำ กระสับกระส่าย
- มีอาการสำลักและอาเจียน
- ไม่สามารถขับเสมหะเองได้เอง
- มีความผิดปกติของระบบไหลเวียน

มีข้อใดข้อหนึ่ง

- RR >35 ครั้ง/นาที
- SpO_2 <88% หรือ PaO_2 <55 mmHg ขณะได้รับออกซิเจน หรือ pH≤7.25
- สับสน ซึม หมดสติ
- BP drop จนต้องได้รับ vasopressors

มีข้อใดข้อหนึ่ง → **ET-Tube**

ไม่มี

- RR >30 ครั้ง/นาที
- ภาวะหายใจล าบากรุนแรง เช่น กล้ามเนื้อหายใจอ่อนแรง มีการใช้กล้ามเนื้อ accessory หรือ paradoxical respiration
- SpO2 88-92% โดยใช้ FiO2 ≤0.40 หรือ pH 7.25-7.35
- ระบบไหลเวียนโลหิตปกติ

มีข้อใดข้อหนึ่ง → **NIV**

ไม่มี

HFNC

ไม่ดีขึ้น

O_2 1-5 L/min

ดีขึ้น → **D/C**

ไม่มี → ประเมินที่ 1-2 ชม. ถ้าอาการคงที่ ประเมินทุก 4-8 ชม

Systemic corticosteroid in COPD

Dose 40 mg prednisolone for 5 days

Longer duration of oral corticosteroid increases risk of pneumonia and mortality

Oral prednisolone equally effective to IV

Inhaled corticosteroid

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Nebulized budesonide alone: suitable alternative for treatment exacerbation in some patients

GOLD 2023

Study	Design	No.	Population	Time	Intervention	Comparators	Primary Outcomes
Morice et al 1996	RCT, open label	19	Severe acute airway obstruction (asthma or COPD)	5 days	Neb BUD 2 mg BID (4 mg/day)	Oral prednisolone 30 mg QD	**FEV1 increases** compared with baseline values between the groups were almost **similar**, but the **biochemical markers associated with corticosteroid adverse effects were better with the nebulized budesonide** group than with the corticosteroid group.
Maltais et al 2002	RCT, DB	199	AECOPD requiring hospitalisation	10 days	Neb BUD 2 mg QID (8 mg/day)	Oral prednisolone 30 mg BID Placebo nebulization and placebo oral	**Statistically and clinically** significant differences in **FEV1** compared to placebo were observed for both active groups but **not between nebulised budesonide and SCS.**
Mirici et al 2003	RCT, DB	40	Moderate to severe AECOPD	10 days	Neb BUD 4 mg BID (8 mg/day)	IV prednisolone 40 mg QD	Between groups, There were **no significant differences** between groups for all parameters (**PEFR, PaO2, PaCO2, pH and SaO2**) at all time periods.
Gunen et al 2007	RCT, SB	121	hospitalised with ATS level II AECOPD	≥10 days	Neb BUD 1.5 mg QID (6 mg/day)	IV prednisolone 40 mg QD, Placebo	No statistically significant difference was found for any of the primary variables (No. of patients with early and delayed discharge; exacerbation rates and rehospitalization rates within 1 month of discharge
Nemagouda 2014	RCT, open label	125	Hospitalised patients with AECOPD	5 days	Neb BUD 2 mg QID (8 mg/day)	IV hydrocortisone 200 mg TID or Oral prednisolone 40 mg QID	Primary outcome variables of **FVC, FEV1 and PEFR after 24 hours, after 72 hours, and at Day 5** were not statistically significantly
Ucar et al 2014	RCT, open label	86	moderate or severe COPD exacerbation	until D/C	Neb BUD 2 mg BID (4 mg/day) 4 mg BID (8 mg/day)	IV methylprednisolone 40 mg QD	There were **no significant differences** between the groups for all parameters (**PaO2, SaO2, FVC**) at all time periods, except for **higher FEV1 value in the 8-mg NB group at baseline.**
Sun et al 2015	RCT, open label	30	AECOPD per GOLD criteria	7 days	Neb BUD 3 mg BID (6 mg/day)	IV methylprednisolone 40 mg QD for 3 days, then 8 mg oral methylprednisolone BID	Symptoms, pulmonary function and blood gas analysis were significantly improved after treatment in the two groups ($P < 0.05$) and **no significant differences** between the two groups ($P > 0.05$). There were no significant differences of IL-8, TNF-a and hs-CRP levels in the two groups ($P > 0.05$).
Ding et al 2016	RCT, SB	471	Moderate to severe AECOPD	≥7 days	Neb BUD 2 mg TID (6 mg/day)	IV methylprednisolone 40 mg QD	There were **no statistically significant differences** between treatments in any of the efficacy variables except PaO2 in favor of SCS at 7 to 10 days after admission.

COVID-19 and COPD

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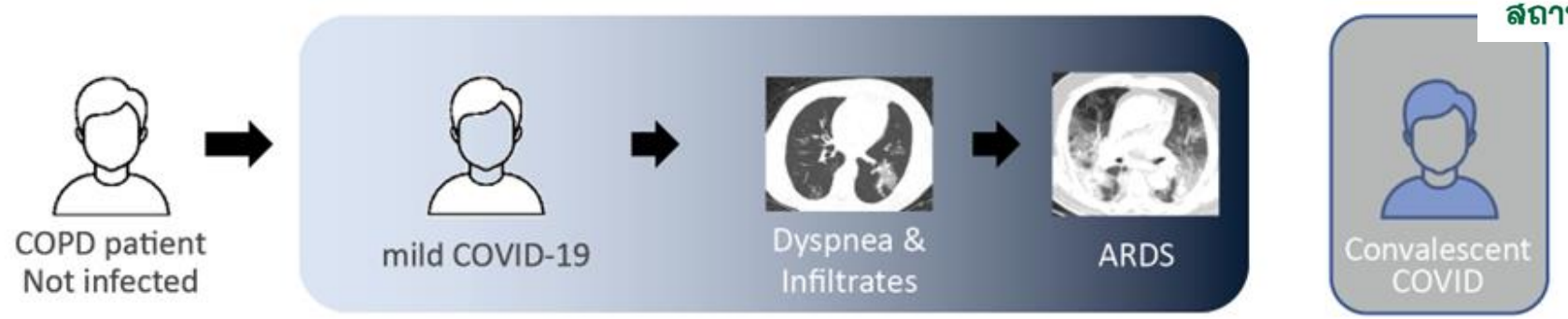

Clinical Features	**COPD:** Cough, SOB	Mild constitutional symptoms Fever > 37.5 °C, ↑ SOB Dry Cough, Fatigue, Diarrhea	↑↑ SOB ± hypoxia $PaO_2/FiO_2 \leq 300$ mmHg	ARDS SIRS/Shock Cardiac Failure VTE	Fatigue SOB Cough
Abnormal Investigations		SARS-CoV-2 PCR CXR/CT, SpO_2 Lymphopenia Thrombocytopenia CRP, D-dimer	CXR/CT, SpO_2 Lymphopenia Thrombocytopenia Transaminases D-dimer, PCT	SpO_2 CRP, LDH, IL-6 D-dimer, ferritin troponin, BNP	PFT CT Chest
	Continue Usual COPD Maintenance Therapy				
Possible Interventions	Home Exercise Protective Strategies	Protective Strategies, COPD Exacerbation Therapy Low intensity exercise *Therapeutic Trials*	Controlled Oxygen Systemic Steroids Remdesivir Anticoagulation *Therapeutic Trials*	NIV, HFNT IMV Prone positioning Anticoagulation *Therapeutic Trials*	Home exercise PR

THANK YOU

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