Optum Health Education™

Advancing COPD Care in Primary Practice

Early Diagnosis, Targeted Therapy and High Value Interventions

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COPD: Early Diagnosis

Advancing COPD Care in Primary Practice

What is COPD?

Tobacco smoking, and/or inhalation of other toxic particles and gases from household and outdoor air pollution

INTERACT WITH GENETICS, TO CAUSE

Abnormalities of the airways and/or alveoli: bronchitis, bronchiolitis, emphysema

WHICH GIVE THE PATENT SYMPTOMS

- **Dyspnea, cough, sputum production, “exacerbations”**

AND A MEASURABLE PHYSIOLOGIC DEFECT

Exposures that can contribute to COPD

- Cigarette smoking
  - Primary risk factor (>70%) in high-income countries
  - Other types of tobacco smoking
  - Marijuana
- Biomass exposure
- Occupational exposures
- Air pollution
- Genetic factors
  - Alpha-1 antitrypsin

COPD will continue to be a huge burden on the USA

20-year model of health and economic burden

From 2019 to 2038:

• $800B in direct medical costs	$40B / year
• $100B in indirect absenteeism costs	$5B / year
• 315M exacerbations	16M / year
• 9.5M deaths	0.5M / year
• 45M lost quality-adjusted life years	2M / year

Zafari Z, Li S, Eakin MN, Bellanger M, Reed RM. Projecting Long-term Health and Economic Burden of COPD in the United States. Chest. 2021 Apr;159(4):1400-1410. doi: 10.1016/j.chest.2020.09.255. Epub 2020 Oct 2. PMID: 33011203.

Diagnosis of COPD

- **Who to screen for COPD?**
  - Dyspnea (persistent, worse with exercise)
    - Alternate presentations – wheezing, chest tightness, fatigue
  - Chronic cough and/or sputum production
  - Patients with exposure to risk factors (tobacco smoke, other)

- **Physical exam is rarely diagnostic**
  - All that wheezes is not COPD (or asthma)
  - All that is COPD does not wheeze

- **CT findings**
  - Emphysema, air trapping, bronchial wall thickening, mucus plugging

Spirometry in COPD

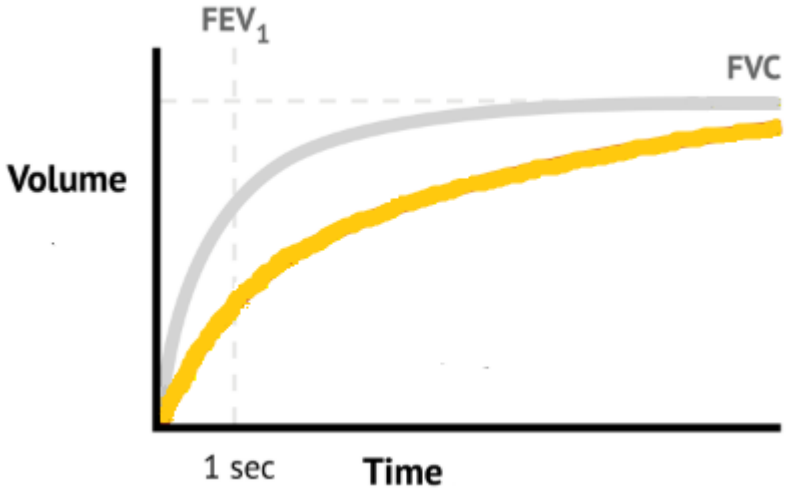
Take the biggest breath you can. Then blow it out as fast as you can!

FEV1 means:

How much can you get out in one second?

FVC means:

How much air can you get out in total?



Obstruction: Reduced FEV1 / FVC ratio

The air moves out slower, so you get less out in the first second

Spirometry to confirm COPD diagnosis

FEV1/FVC < 0.7

This probably slightly overdiagnoses COPD in the elderly

Pulmonary is moving to z-scores, calculated from age-predicted values

Both before and after bronchodilator

If “pre” is not < 0.7, you might still do “post” if low FEV1 or high symptoms

Why do all this?

NHANES 2007-2012

- 13.4% of randomly selected American adults had obstruction on spirometry
- 72% of these were undiagnosed

NHANES III (1988-1994, 71.2% undiagnosed):

- Undiagnosed COPD patients had a HR of 1.23 for mortality

Martinez CH, Mannino DM, Jaimes FA, Curtis JL, Han MK, Hansel NN, Diaz AA. Undiagnosed Obstructive Lung Disease in the United States. Associated Factors and Long-term Mortality. Ann Am Thorac Soc. 2015 Dec;12(12):1788-95. doi: 10.1513/AnnalsATS.201506-388OC. PMID: 26524488; PMCID: PMC4722830.

Why do all this?

The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

Early Diagnosis and Treatment of COPD and Asthma — A Randomized, Controlled Trial

S.D. Aaron, K.L. Vandemheen, G.A. Whitmore, C. Bergeron, L.-P. Boulet, A. Côté, R.A. McIvor, E. Penz, S.K. Field, C. Lemière, I. Mayers, M. Bhutani, T. Azher, M.D. Lougheed, S. Gupta, N. Ezer, C.J. Licskai, P. Hernandez, M. Ainslie, G.G. Alvarez, and S. Mulpuru, for the UCAP Investigators*

NEJM 2024

38,353 interviewed

2857 completed pre- and post-BD spirometry

595 had airflow obstruction

508 entered clinical trial

Healthcare utilization 0.48x as likely in patients who received intervention

So what are we going to do about it?

GOLD 2026 advocates for active case-finding

- **Performing spirometry in patients with symptoms and/or risk factors**

One example of an approach: Modified "Could it be COPD?" questionnaire for age>=35 and any history of smoking.

- **Do you cough several times most days?**
- **Do you bring up phlegm or mucus most days?**
- **Do you get out of breath more easily than other your age?**

Answering "yes" to 1 or more questions in those over the age of 40 or 2 or more questions in patients 35-40 would be considered a positive result

Example of a Validated Case-Finding Tool: COPD Population Screener (COPD-PS).

Five questions, each with 3-5 potential answers:

1) **During the past 4 weeks how much of the time did you feel short of breath?**
2) **Do you ever cough up any "stuff," such as mucus or phlegm?**
3) **Please select the answer that best describes you in the past 12 months: "I do less than I used to because of my breathing problems."**
4) **Have you smoked at least 100 cigarettes in your ENTIRE LIFE?**
5) **How old are you?**

Martinez FJ, Raczek AE, Seifer FD, Conoscenti CS, Curtice TG, D'Eletto T, Cote C, Hawkins C, Phillips AL; COPD-PS Clinician Working Group. Development and initial validation of a self-scored COPD Population Screener Questionnaire (COPD-PS). COPD. 2008 Apr;5(2):85-95. doi: 10.1080/15412550801940721. PMID: 18415807; PMCID: PMC2430173.

Organizations should consider validation data and licensing requirements when selecting screening tools.

Case finding tool comparison

	Sensitivity (%)	Specificity (%)	Can it be self administered?	Number of questions	Cost
"Could it be COPD" (adapted from GOLD)[1,9] **(Preferred)**	58.8	53.2	Yes	5 (yes/no)	Free
COPD-PS[10]	66	86[1]	Yes	5 (multiple choice)	License required
CAPTURE[11]	48.2	88.6	No, requires trained healthcare professional for peak expiratory flow measurement	5 (yes/no) plus peak expiratory flow measurement	Free
LFQ[12]	73.2	58.2	Yes	5 (multiple choice)	License required
CDQ[13]	64.5	65.2	Yes	8 (multiple choice)	Free
PUMA[9]	58.8	64.2	Yes	6 (multiple choice)	Free

Targeted screening

“

Studies that have evaluated individuals for COPD symptoms and performed spirometry at lung cancer screening have reported airflow obstruction in 34-57% of individuals, emphysema in 68-73% and no prior diagnosis of COPD in 67%.... [with symptoms] being found in over 50% of individuals.

GLOBAL STRATEGY FOR PREVENTION, DIAGNOSIS AND MANAGEMENT OF COPD: 2026 REPORT

Global Initiative for Chronic Obstructive Lung Disease

So you want to do your own spirometry.
Good idea! Some things to consider:

- **Know standards and follow them**

  Graham BL, Steenbruggen I, Miller MR, Barjaktarevic IZ, Cooper BG, Hall GL, Hallstrand TS, Kaminsky DA, McCarthy K, McCormack MC, Oropez CE, Rosenfeld M, Stanojevic S, Swanney MP, Thompson BR. Standardization of Spirometry 2019 Update. An Official American Thoracic Society and European Respiratory Society Technical Statement. Am J Respir Crit Care Med. 2019 Oct 15;200(8):e70-e88. doi: 10.1164/rccm.201908-1590ST. PMID: 31613151; PMCID: PMC6794117.

- **Test supervisor needs training in optimal technique and performance**
- **One study of 17 office spirometers showed that only 1 of 17 met accuracy criteria, and only 60% of patients tested generated results acceptable for clinical use**

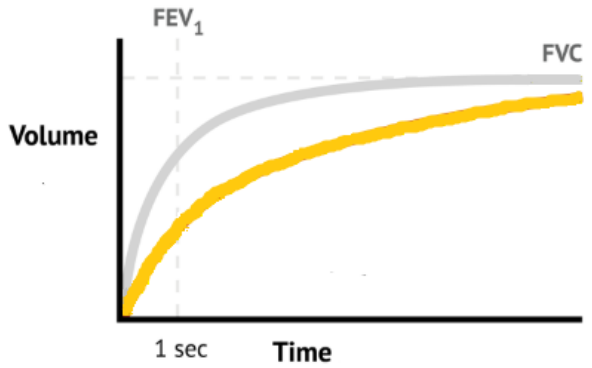
  Hegewald MJ, Gallo HM, Wilson EL. Accuracy and Quality of Spirometry in Primary Care Offices. Ann Am Thorac Soc. 2016 Dec;13(12):2119-2124. doi: 10.1513/AnnalsATS.201605-418OC. PMID: 27598295.

- **Guidelines recommend both pre- and post-bronchodilator spirometry to diagnose COPD**

Common problems with spirometry

- Need three technically satisfactory maneuvers
- If patient is making maximal effort, they will be repeatable

- FVC should be for minimum 6 seconds in adults
- If FVC stops too soon, it will be falsely low
- And FEV1/FVC will be falsely high
- And you will miss obstruction



- N.B. You can't reliably diagnose restrictive lung disease with spirometry alone – have to do PFT with lung volumes

COPD: Targeted Therapy and High Value Interventions

Advancing COPD Care in Primary Practice

Goals for Treatment of Stable COPD

REDUCE SYMPTOMS

- Relieve Symptoms
- Improve exercise tolerance
- Improve Health Status

REDUCE RISK

- Prevent Disease Progression
- Prevent and Treat Exacerbations
- Reduce Mortality

Smoking cessation remains supremely important

- **Clearly improves respiratory symptoms (cough, phlegm, wheeze) and bronchial hyperresponsiveness**
- **It is the only effective treatment for slowing down accelerated decline in FEV1**

Willemse BW, Postma DS, Timens W, ten Hacken NH. The impact of smoking cessation on respiratory symptoms, lung function, airway hyperresponsiveness and inflammation. Eur Respir J. 2004 Mar;23(3):464-76. doi: 10.1183/09031936.04.00012704. PMID: 15065840.

- **There is overwhelming evidence that smoking cessation improves mortality!**

Anthonisen NR, Skeans MA, Wise RA, et al. The effects of a smoking cessation intervention on 14.5-year mortality: a randomized clinical trial. Ann Intern Med. 2005;142(4):233-239. doi:10.7326/0003-4819-142-4-200502150-00005

The Five A's Model – U.S. Public Health Service guideline *Treating Tobacco Use and Dependence*

- **Ask**
  - **Systematically identify all tobacco users at every visit**
- **Advise**
  - **Strongly urge all tobacco users to quit**
- **Assess**
  - **Determine willingness to make a quit attempt**
- **Assist**
  - **Aid the patient in quitting (provide counseling and medications)**
- **Arrange**
  - **Ensure follow-up contact**

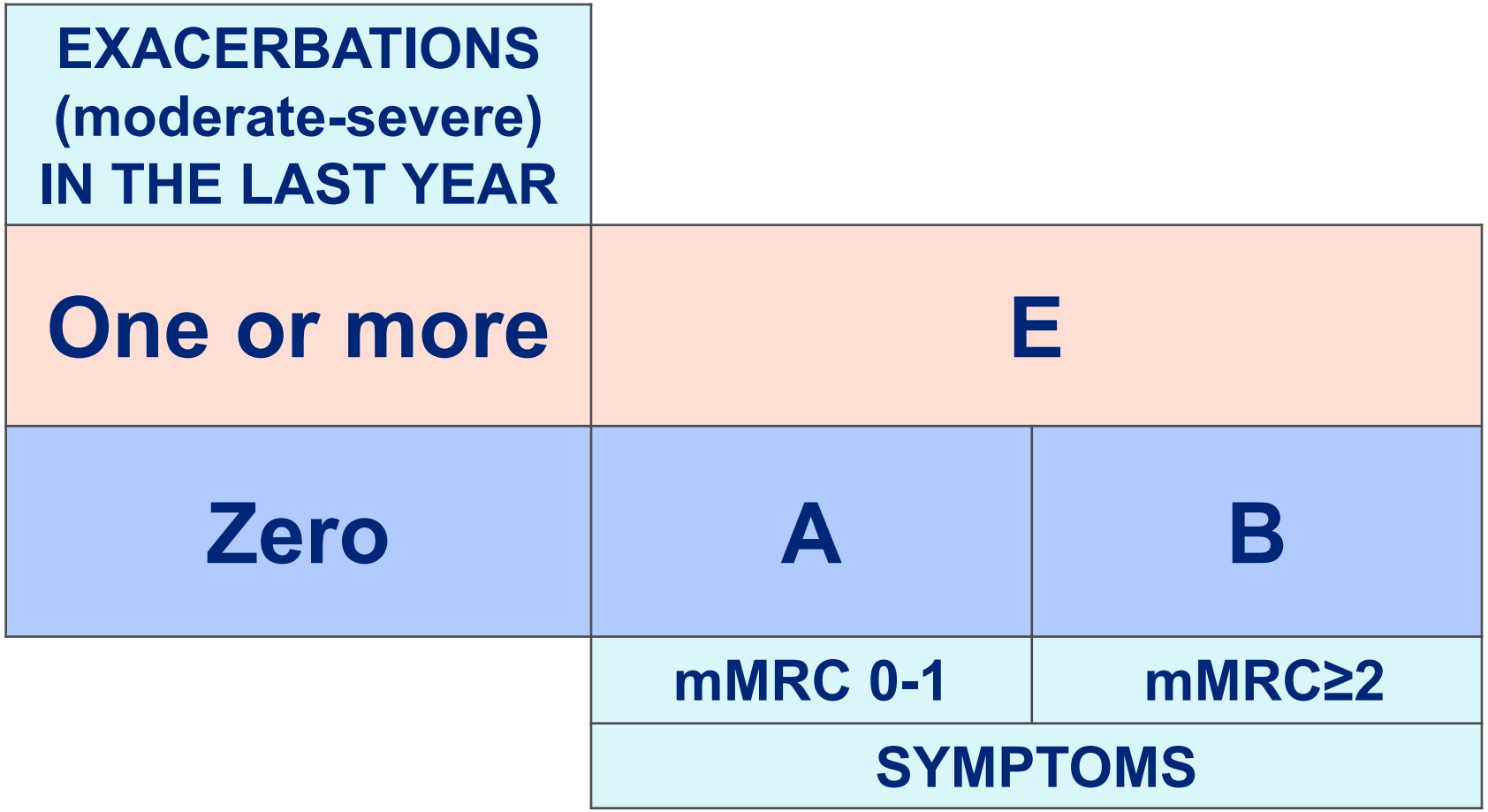
Clinical Practice Guideline Treating Tobacco Use and Dependence 2008 Update Panel, Liaisons, and Staff. A clinical practice guideline for treating tobacco use and dependence: 2008 update. A U.S. Public Health Service report. Am J Prev Med. 2008 Aug;35(2):158-76. doi: 10.1016/j.amepre.2008.04.009. PMID: 18617085; PMCID: PMC4465757.

Vaccination for People with COPD (GOLD 2026)

- Influenza vaccination
- COVID-19
- Pneumococcal (PCV21 or PCV20)
- Respiratory syncytial virus
- Pertussis (Tdap)
- Zoster

OK, I know everyone wants to talk about pharmacotherapy.

GOLD ABE Assessment Tool (GOLD 2026)



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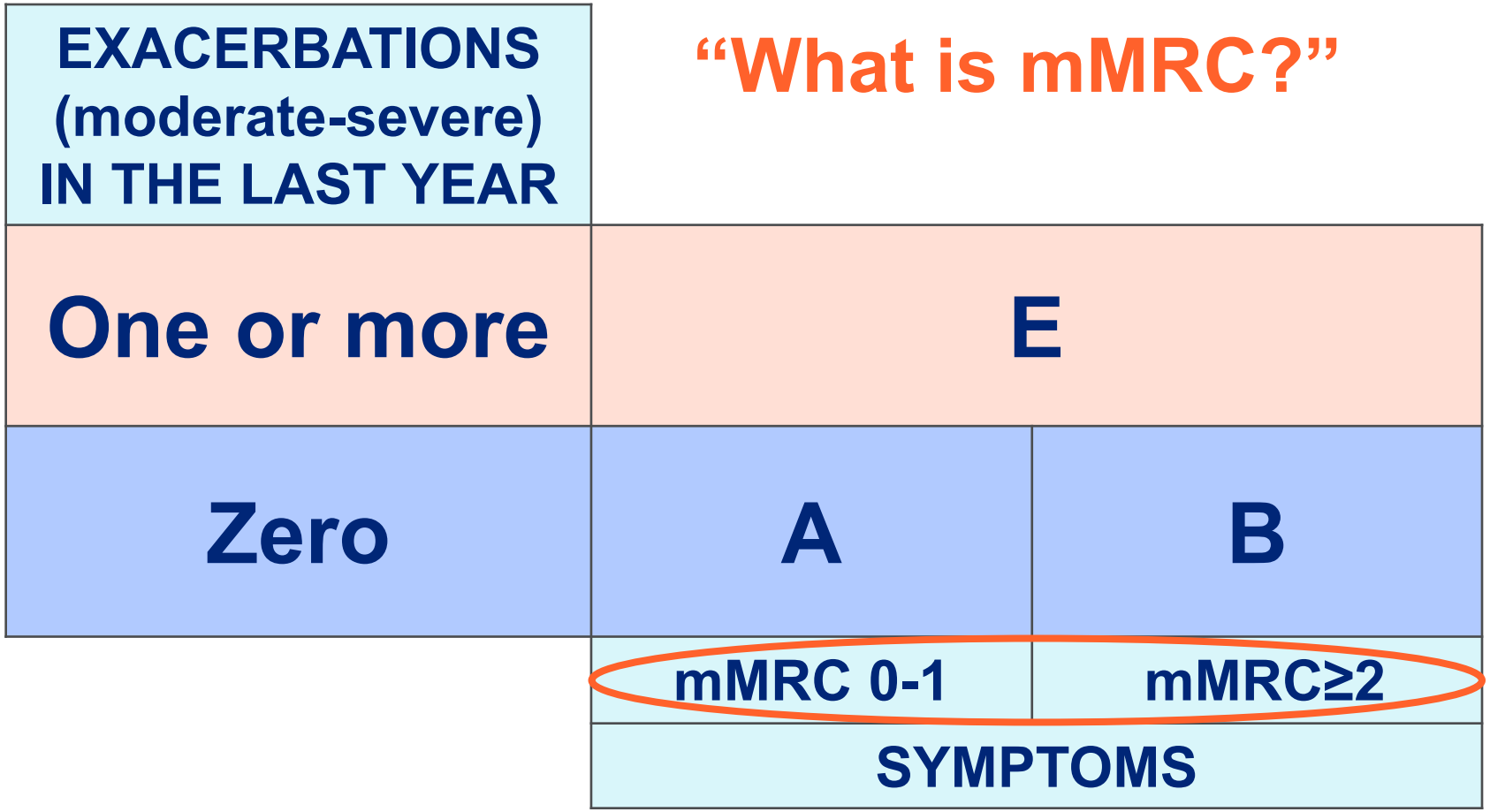

Modified Medical Research Council Dyspnea scale

- Grade 0: I only get breathless with strenuous exercise
- Grade 1: I get short of breath when hurrying on the level, or walking up a slight hill

THIS IS THE CUTOFF BETWEEN GOLD GROUP A AND B

- Grade 2: I walk slower than people of the same age on the level because of breathlessness, or I have to stop for breath when walking on my own pace on the level
- Grade 3: I stop for breath after walking about 100 meters or after a few minutes on the level
- Grade 4: I am too breathless to leave the house, or I am breathless when dressing or undressing

Initial therapy - if there are no moderate-severe exacerbations in the last year

Group A

- Not much breathlessness (mMRC grade 0-1)
- Just a PRN bronchodilator

Group B

- Significant breathlessness (mMRC grade 2 or higher)
- Prescribe a LABA + LAMA

“LABA LAMA?”

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LABA LAMA

- **Long-Acting Beta-Agonist (like albuterol) and Long-Acting Muscarinic Antagonist (like ipratropium (Atrovent)**
- **Side effect profile is very good (certainly better than inhaled corticosteroids!)**
- **This is the recommended initial therapy for most patients with COPD – so get to know these, and use them!**
- **Often, your decision will be made, practically, by "what does the insurance cover?"**

umeclidinium/vilanterol
(Anoro)
- *Dry powder inhaler*
- ***Once daily***

tio[Saved to H: Drive]lodaterol
(Stiolto)
- *Soft mist inhaler*
- ***Once daily***

glycopyrrolate/ formoterol
(Bevespi)
- HFA MDI
- Twice daily

You'll note I haven't said a word about inhaled steroids…

Side-effect	Cohort studies	Population-based case-control studies	Randomized con-trolled trials	Systematic reviews and meta-analysis
Pneumonia	+	+	+	+
Tuberculosis	+	+		+
Non-tuberculous mycobacterial pulmon-ary diseases		+		
Diabetes	+	+		+
Bone fracture	+	+		+
Cataract	+	+		+
Peptic ulcer hemorrhages		+		
Local reactions (oral candidiasis, dysphonia)	+	+	+	+
Skin bruising	+		+	+

Avdeev S, Aisanov Z, Arkhipov V, Belevskiy A, Leshchenko I, Ovcharenko S, Shmelev E, Miravitlles M. Withdrawal of inhaled corticosteroids in COPD patients: rationale and algorithms. Int J Chron Obstruct Pulmon Dis. 2019 Jun 10;14:1267-1280. doi: 10.2147/COPD.S207775. PMID: 31354256; PMCID: PMC6572750.

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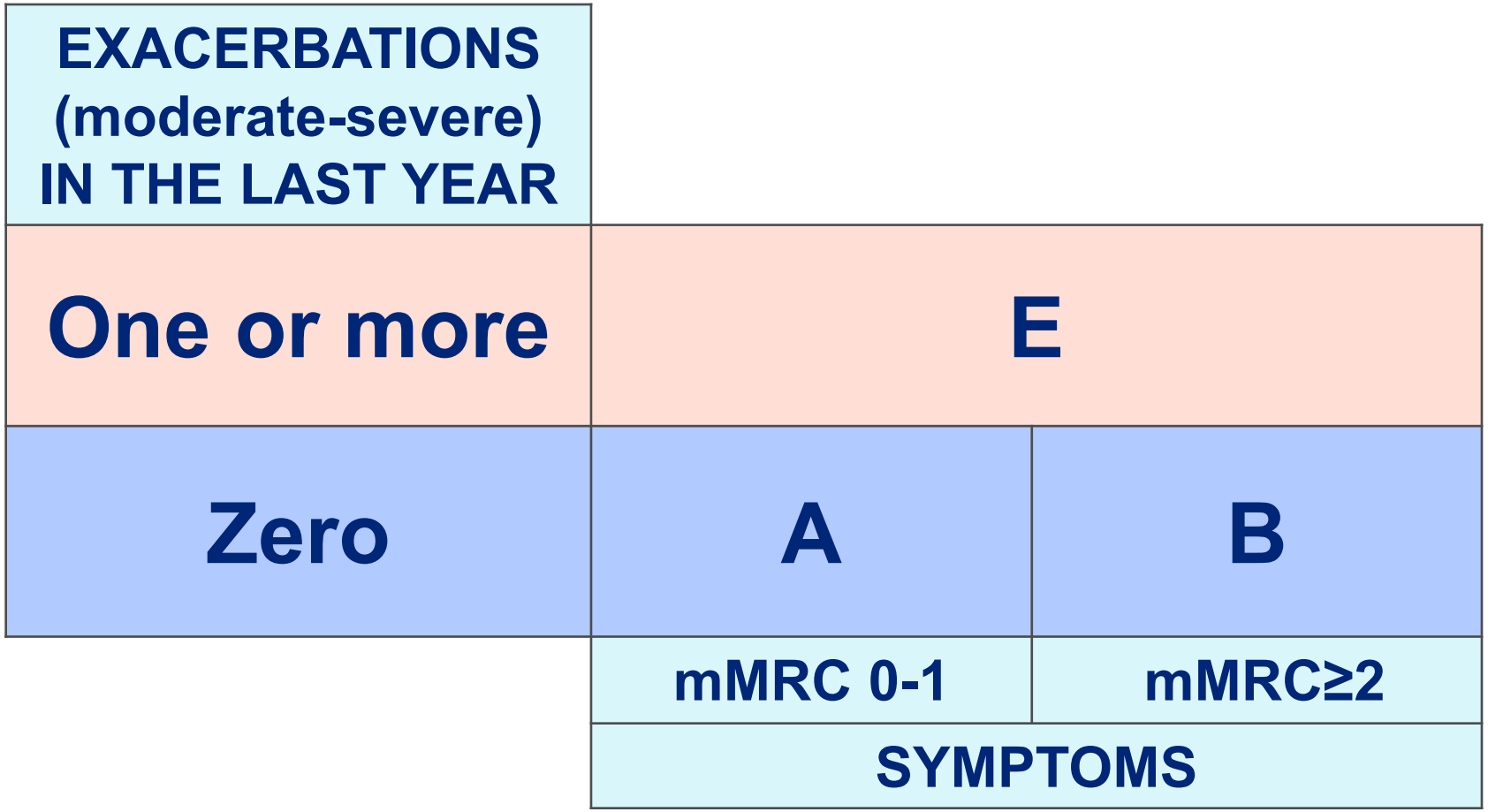

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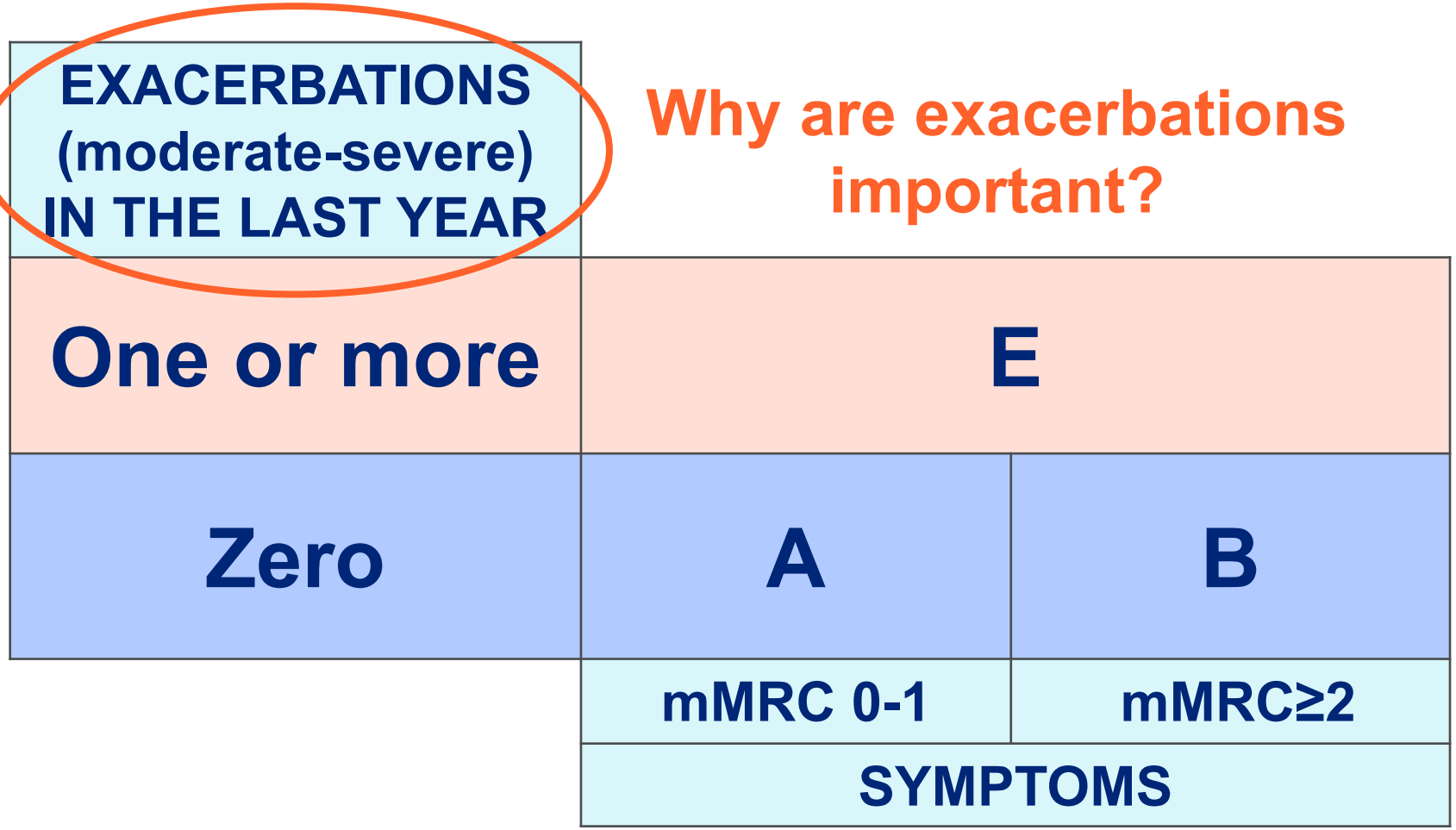

Target exacerbations

GOLD 2026: Even one moderate or severe exacerbation treated with steroids and/or antibiotics:

- **Significantly impacts the health status of the patient (often for a prolonged period of time),**
- **Enhances the rate of lung function decline**
- **Worsens the prognosis of the patient**

Soler-Cataluña JJ, Martínez-García MA, Román Sánchez P, Salcedo E, Navarro M, Ochando R. Severe acute exacerbations and mortality in patients with chronic obstructive pulmonary disease. Thorax. 2005 Nov;60(11):925-31. doi: 10.1136/thx.2005.040527. Epub 2005 Jul 29. PMID: 16055622; PMCID: PMC1747235.

Exacerbations are associated with much of the healthcare costs of COPD.

Target exacerbations

History of exacerbations is the strongest predictor of future exacerbation risk.

Hurst JR, Vestbo J, Anzueto A, Locantore N, Müllerova H, Tal-Singer R, Miller B, Lomas DA, Agusti A, Macnee W, Calverley P, Rennard S, Wouters EF, Wedzicha JA; Evaluation of COPD Longitudinally to Identify Predictive Surrogate Endpoints (ECLIPSE) Investigators. Susceptibility to exacerbation in chronic obstructive pulmonary disease. N Engl J Med. 2010 Sep 16;363(12):1128-38. doi: 10.1056/NEJMoa0909883. PMID: 20843247.

Target exacerbations

Patients newly diagnosed with COPD may have experienced exacerbations that they did not report to a clinician. Clinicians should ask about prior respiratory events:

- **Hospital diagnosis of COPD exacerbation**
- **Prior exacerbations treated with steroids and/or antibiotics**
- **Prior episodes of bronchitis and/or pneumonia**

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Observational studies have shown that even one moderate or severe exacerbation prior to initiating maintenance pharmacological therapy increases the risk of subsequent events; this risk is further increased if there are more frequent or severe events. Consequently, Group E has been modified to include individuals with one moderate exacerbation in the previous year.

GLOBAL STRATEGY FOR PREVENTION, DIAGNOSIS AND MANAGEMENT OF COPD: 2026 REPORT

Global Initiative for Chronic Obstructive Lung DIsease

How bad does an exacerbation have to be, to be “moderate”?

Old definition: Bad enough to get systemic corticosteroids and/or antibiotics

GOLD 2026 approach: Rome classification

Meets at least three of five criteria:

- **Dyspnea VAS ≥ 5**
- **Respiratory rate ≥ 24 breaths/min**
- **Heart rate ≥ 95 bpm**
- **Resting SaO2 < 92% breathing ambient air (or patient's usual oxygen prescription) AND/OR change > 3% (when known)**
- **CRP ≥ 10 mg/L (if available)**

For initial therapy, Group E patients should get:

For initial therapy, Group E patients should get:

a LABA + LAMA.

(Unless…)

The mighty eosinophil

	Test	Result
	WBC	5.8 x10E3/uL
	RBC	4.35 x10E6/uL
	Hemoglobin	13.1 g/dL
	Hematocrit	39.1 %
	MCV	90 fL
	Lymphs	30 %
	Platelets	224 x10E3/uL
	Immature Grans (Abs)	0.0 x10E3/uL
	Eos (Absolute)	**0.9 x10E3/uL**
	Baso (Absolute)	0.1 x10E3/uL
	MCH	30.1 pg
	MCHC	33.5 g/dL
	Neutrophils	47 %
	Immature Granulocytes	0 %
	Monocytes	7 %
	Eos	15 %
	Basos	1 %
	Neutrophils (Absolute)	2.7 x10E3/uL
	Lymphs (Absolute)	1.8 x10E3/uL
	Monocytes(Absolute)	0.4 x10E3/uL
	RDW	13.9 %

Optum Health Education, Evidence-Based COPD Management for the PCP, Curtis Sather, MD, FACCP, January 29, 2025

- **Most commonly indicate atopic disease**
- **In a population where ICS use was low, greater FEV1 decline observed in patients with COPD, airflow obstruction and higher blood eosinophil counts**
- **Blood eosinophil counts predict the magnitude of the effect of ICS (added on top of regular maintenance bronchodilator treatment) in preventing future exacerbations**
- **Recommended by GOLD to guide the use of ICS as part of pharmacological management**
- **Remember the test will be low and unhelpful if already on systemic corticosteroids**
- **Multiply by 1,000**

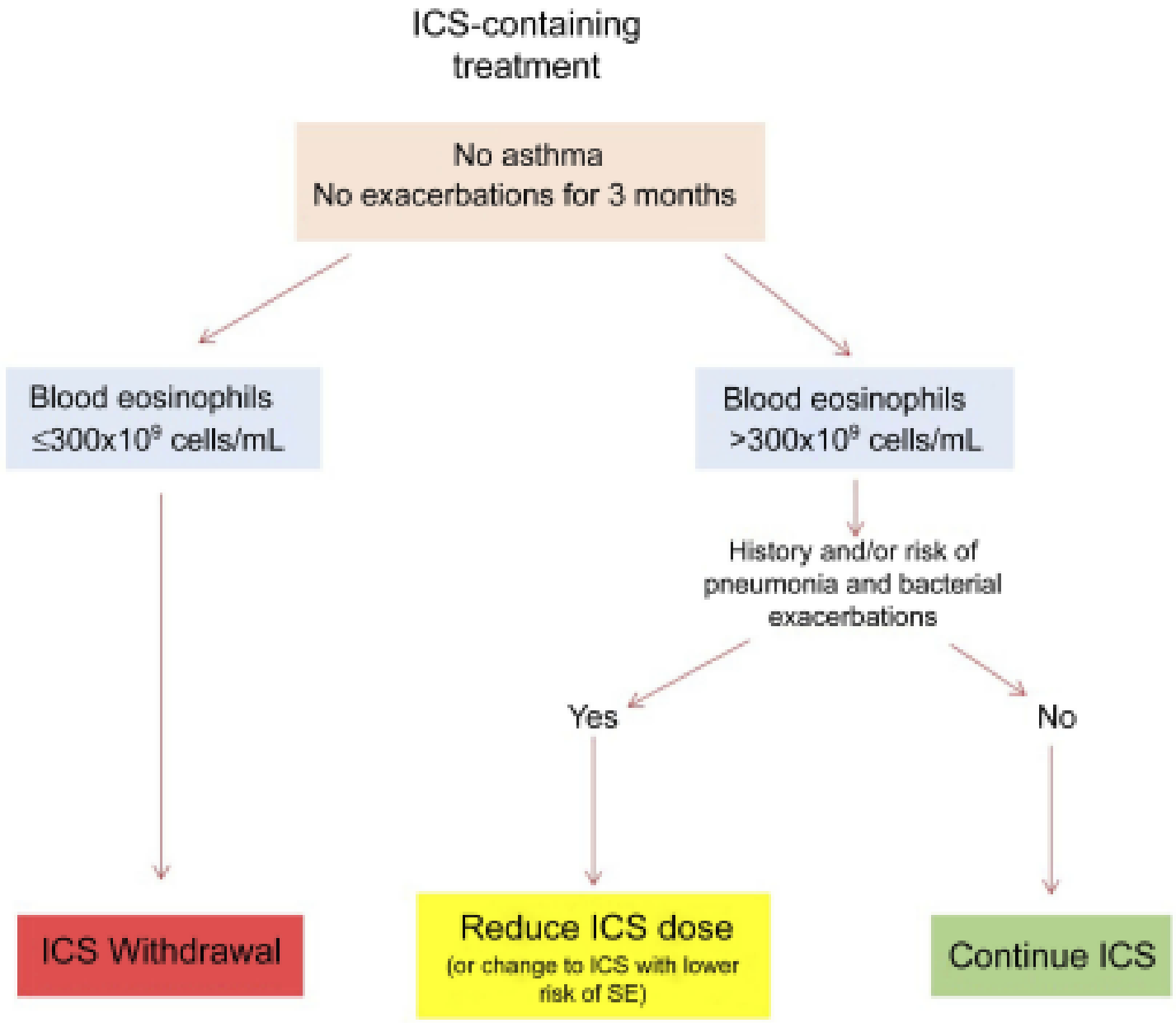
OK, who should actually get inhaled corticosteroids? Consider LABA + LAMA + ICS in:

1) Group E patients with blood eosinophils ≥ 300
2) Group E patients with blood eosinophils between 100 and 300, who continue to have moderate-severe exacerbations
3) Patients on discharge from hospital for COPD exacerbation (instead of just LAMA + LABA, if eos ≥ 100)

IN ALL CASES THAT EOSINOPHIL COUNT SHOULD BE OFF STEROIDS

4) Patients with concomitant asthma

A proposed algorithm for inhaled corticosteroid (ICS) withdrawal in patients with COPD



Avdeev S, Aisanov Z, Arkhipov V, Belevskiy A, Leshchenko I, Ovcharenko S, Shmelev E, Miravitlles M. Withdrawal of inhaled corticosteroids in COPD patients: rationale and algorithms. Int J Chron Obstruct Pulmon Dis. 2019 Jun 10;14:1267-1280. doi: 10.2147/COPD.S207775. PMID: 31354256; PMCID: PMC6572750.

Assessing and treating exacerbations

Differential diagnosis

- **Pneumonia, CHF, MI, arrthyhmia, pulmonary embolism**

Consider – CXR, troponin, BNP, ECG, D-dimer / CT angio of chest

Management

- **Systemic corticosteroids – 40 prednisone (or equiv) – up to 5 days**
- **If purulent sputum + dyspnea, fever or increased sputum volume, or prior positive sputum culture – antibiotics (also 5 days)**
  - **Aminopenicillin with clavulanic acid, a macrolide or a tetracycline**
- **Bronchodilators (albuterol +/- ipratropium)**

What to monitor at followup visits

- Symptoms
- Exacerbations
- Dosages of prescribed medications
- Adherence to the regimen
- Inhaler technique
- Effectiveness of the current regime
- Side effects
- Smoking status
- Comorbidities

Hospital discharge and follow-up

- After hospitalization for COPD exacerbation:
  - Readmissions with 30 days in 30-50% of patients

- LABA + LAMA + ICS may reduce re-hospitalization
  - Particularly if eos ≥ 100
  - But only if eos checked before systemic corticosteroids started

- Early follow-up (within 1 month) has been related to fewer readmissions
- Early rehabilitation post hospital discharge (i.e., < 4 weeks) is associated with improved quality of life and increased exercise capacity

Comorbid conditions

2008 study of 20K subjects:

- **Lung function impairment associated with more comorbid disease (diabetes, hypertension, cardiovascular disease)**
- **Comorbid disease associated with a higher risk of hospitalization and mortality that was worse in people with impaired lung function**

Mannino DM, Thorn D, Swensen A, Holguin F. Prevalence and outcomes of diabetes, hypertension and cardiovascular disease in COPD. Eur Respir J. 2008 Oct;32(4):962-9. doi: 10.1183/09031936.00012408. Epub 2008 Jun 25. PMID: 18579551.

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Patients with COPD often suffer CVD and *vice versa*, although these may be ignored by the attending physician who focuses on her/his disease of interest (lung or heart)….

Unfortunately, these CVDs often go unnoticed and, therefore, untreated.

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Comorbid conditions

- Cardiovascular disease - ischemic heart disease, heart failure
- Musculoskeletal impairment - osteoporosis, sarcopenia
- Diabetes mellitus
- Normocytic anemia
- Metabolic syndrome
- Weight loss, nutritional abnormalities

What if they keep having dyspnea ?

- General advice
  - Adherence – Are they using their regimen?
  - Technique – have them demonstrate what they do, watch a video
  - Comorbidities – are they having CVD?

- Specifically for dyspnea
  - Consider a different LABA + LAMA (or upgrade to that if not already on)
  - Implement pulmonary rehab
  - Consider other medications e.g. ensifentrine (specialist referral?)

Don’t underestimate the benefits of pulmonary rehabilitation

Exercise capacity and Lung function	• 43 meters longer on 6 minute walk [1] • 7 watts higher on cycle ergometer [1] • Slower decline in FEV1 over 3 years [2]
Quality of life	• Clinically significant improvements in dyspnea, fatigue, emotional function, and mastery [3]
Health care utilization	• Decreased hospital days • Mixed studies on readmission rates [4]
Mortality	• PR enrollment within 90 days of hospital D/C for AECOPD *associated with* lower 1 year mortality (19.6% vs 7.3%)

Benefits are not permanent! Exercise capacity, symptoms, and HRQoL return to pre-rehab values after ~12 months. Pulmonary rehab maintenance programs may help benefits persist 12-24 mos.

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What if they keep having exacerbations?

- General advice
  - Adherence – Are they using their regimen?
  - Technique – have them demonstrate what they do, watch a video
  - Comorbidities – are they having CVD?

- Specifically for exacerbations
  - Escalate to LABA + LAMA (if not already on)
  - If eos ≥ 100, escalate to LABA + LAMA + ICS
  - Consider other medications e.g. roflumilast, chronic azithromycin, if eos ≥ 300, dupilumab or mepolizumab (specialist referral?)

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