A Breath of Fresh Air: 2023 COPD GOLD Report Updates

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Disclosure Statement

- The speaker has no relevant financial relationship(s) with ineligible companies to disclose.

  and

- None of the planners for this activity have relevant financial relationships with ineligible companies to disclose.

Learning Objectives

At the completion of this activity, the participant will be able to:

1. Review COPD epidemiology, pathophysiology, diagnosis, and management

2. Explain specific updates from the 2023 GOLD Report

3. Describe a pharmacist-led pulmonary service

What is COPD?

- Updated definition for 2023:

  - A heterogeneous lung condition characterized by **chronic respiratory symptoms** due to **abnormalities of the airways and/or alveoli** that cause **persistent, often progressive, airflow obstruction**

Epidemiology

Prevalence

- Reported = 16 million
- Predicted = 28 million

Mortality

- 3rd leading cause of death worldwide
- 3 million deaths annually due to COPD

Economic Burden

- US = $40 billion per year

Global Initiative for Chronic Obstructive Lung Disease. The Global Strategy for Diagnosis, Management and Prevention of COPD (updated 202
DiPiro JT, Yee GC, Haines ST, et al. eds. DiPiro's Pharmacotherapy: A Pathophysiologic Approach, 12th Edition. McGraw Hill; 2023.

Risk factors

Cigarette smoking

Environmental exposure

Occupational exposure

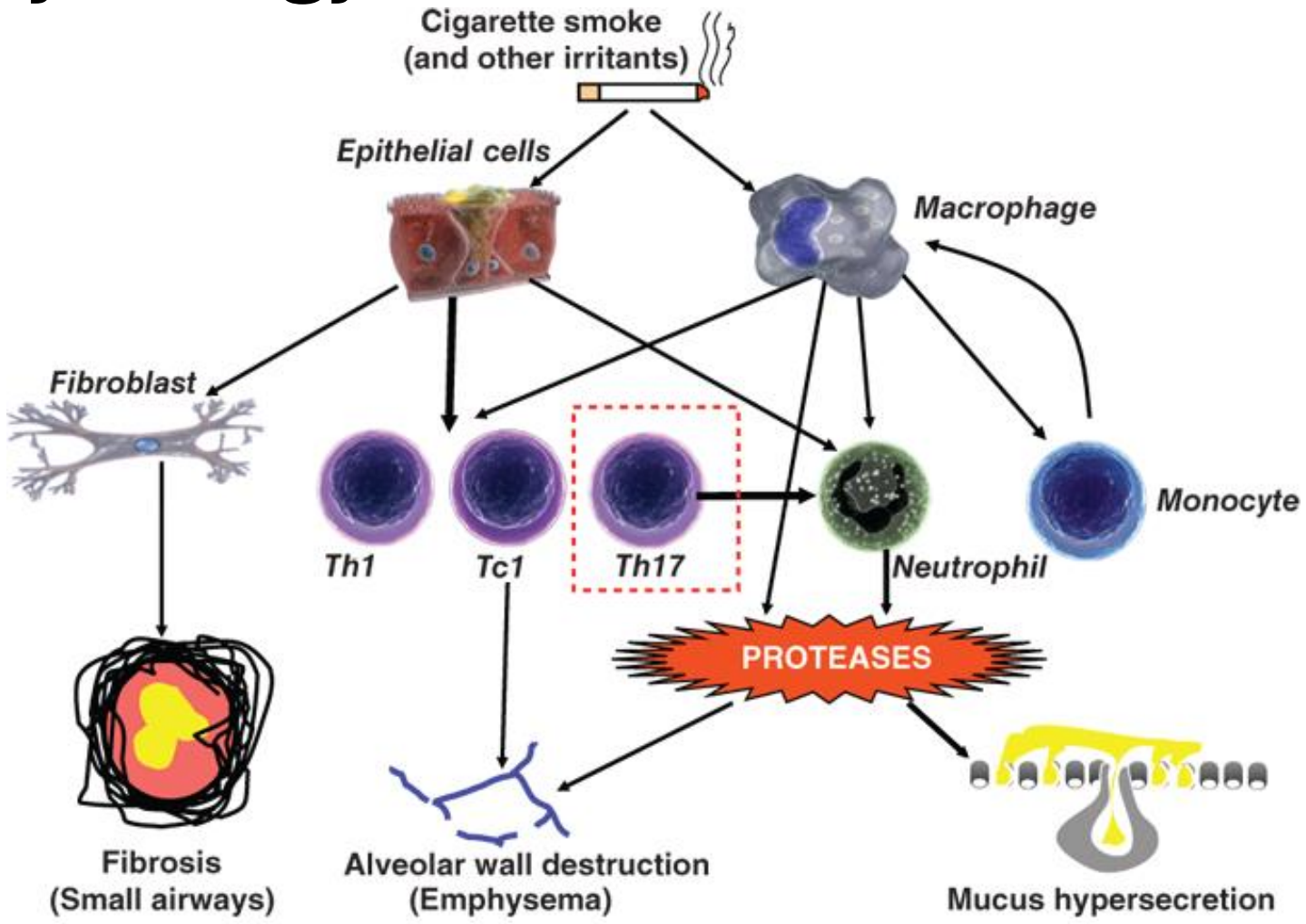
Genetic factors

Age

Asthma history

Severe childhood respiratory infections

Pathophysiology



Source: Laurence L. Brunton, Björn C. Knollmann:
Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 14e:

Brunton LL, Knollmann BC. eds. Goodman & Gilman's: The Pharmacological Basis of Therapeutics, 14th Edition. McGraw-Hill Education; 20

Pathophysiology

Clinical Presentation

- Three cardinal symptoms:

    1. Dyspnea
    2. Chronic cough
    3. Chronic sputum production

Diagnosis

- A diagnosis of COPD should be **considered** in any patient with the following clinical indicators:

Dyspnea that is…	Progressive, worse with exercise, persistent
Recurrent wheeze	
Chronic cough	May be intermittent and unproductive
Recurrent lower respiratory tract infections	
History of risk factors	Tobacco smoke Smoke from home cooking and heating fuels Occupational dusts, vapors, fumes, gases, etc. Host factors (genetics, developmental abnormalities, low birthweight, prematurity, childhood respiratory infections

Global Initiative for Chronic Obstructive Lung Disease. The Global Strategy for Diagnosis, Management and Prevention of COPD (updated 202

Diagnosis

- Obtain a thorough medical history:
  - Exposure to risk factors
  - Past medical history
  - Family history of COPD/other respiratory conditions
  - Pattern of symptom development (COPD usually adult onset)
  - History of hospitalizations for respiratory reasons
  - Comorbidities
  - Impact of symptoms on patient’s quality of life

Diagnosis

- A diagnosis of COPD **must** be confirmed by spirometry

- Post-bronchodilator FEV1/FVC ratio < 0.7 confirms the presence of airflow obstruction

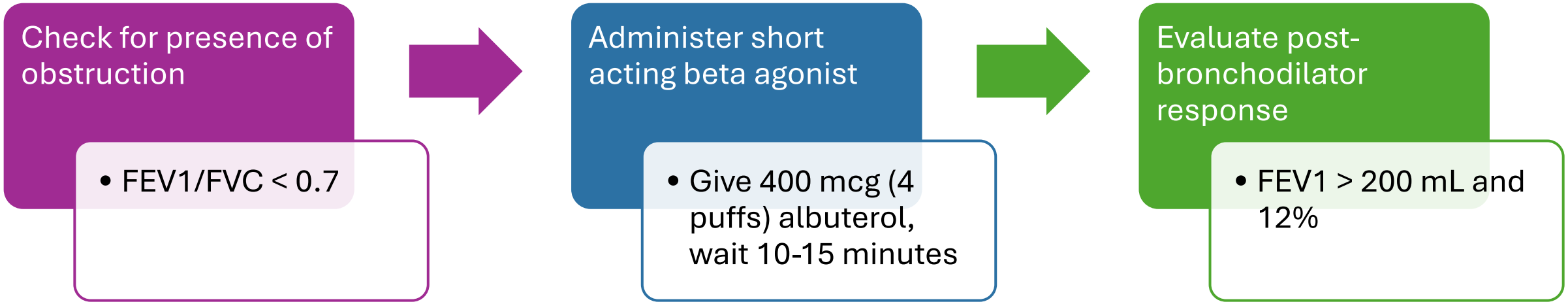
Spirometry Interpretation

- Forced spirometry measures:
  - **FVC** = volume of air forcibly exhaled from the point of maximal inspiration
  - **FEV1** = volume of air exhaled during the first second of this maneuver
  - **FEV1/FVC** = ratio of these two measurements

- Measurements are evaluated by comparison with reference values based on age, height, sex, and race

Spirometry Interpretation

- Test administrator must ensure optimal technique & quality effort



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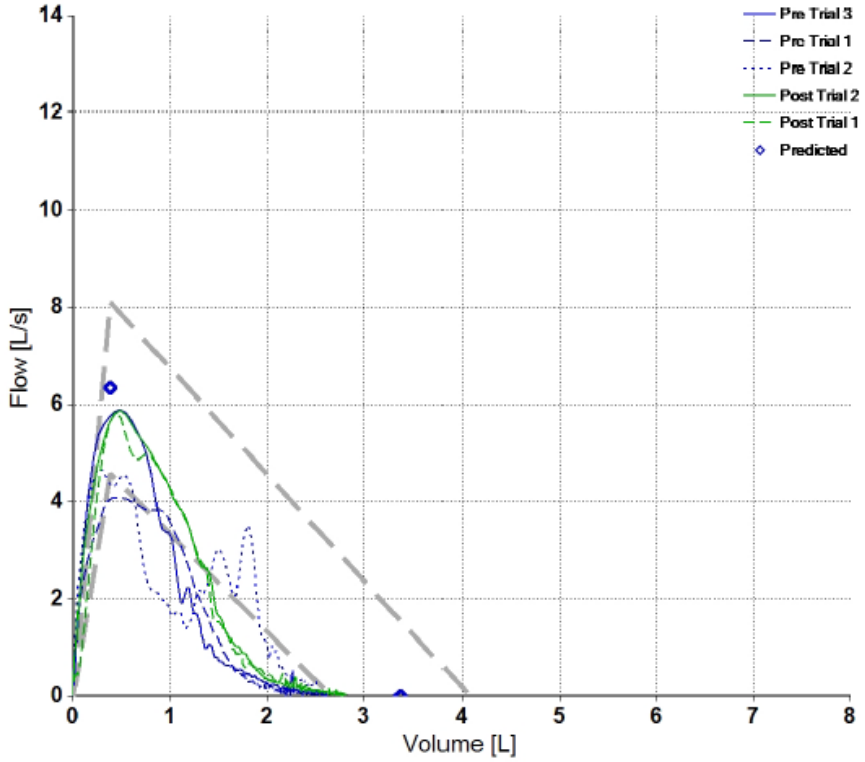
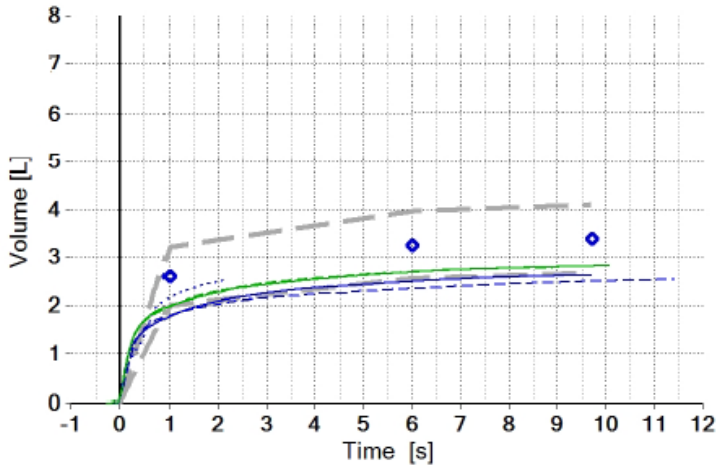
Spirometry – Normal

			Pre					Post				
Parameter	Pred	LLN	Best	Trial 3	Trial 1	~~Trial 2~~	%Pred	Best	Trial 2	Trial 1	%Pred	%Chg
FVC [L]	3.37	2.66	2.62*	2.62*	2.53*	2.51*	78	2.82	2.82	2.78	84	8
FEV1 [L]	2.60	1.99	1.80*	1.77*	1.80*	2.16	69	1.99*	1.99*	1.97*	77	11
FEV1/FVC	0.776	0.678	0.686	0.675*	0.710	0.860	88	0.705	0.705	0.710	91	3
FEF25-75 [L/s]	2.32	1.04	0.94*	0.94*	1.05	2.22	40	1.10	1.10	1.22	47	17
PEF [L/s]	6.34	4.57	5.90	5.90	4.08*	4.71	93	5.89	5.89	5.86	93	0
FET [s]	-	-	9.7	9.7	11.4	2.1	-	10.1	10.1	9.0	-	4

* Indicates value outside normal range or significant post change.

Session Quality	Pre	C (FEV1 Var=0.03L (1.6%); FVC Var=0.09L (3.4%))
	Post	C (FEV1 Var=0.01L (0.7%); FVC Var=0.04L (1.4%))
System Interpretation	Pre	Moderate Obstruction
	Post	Normal Spirometry





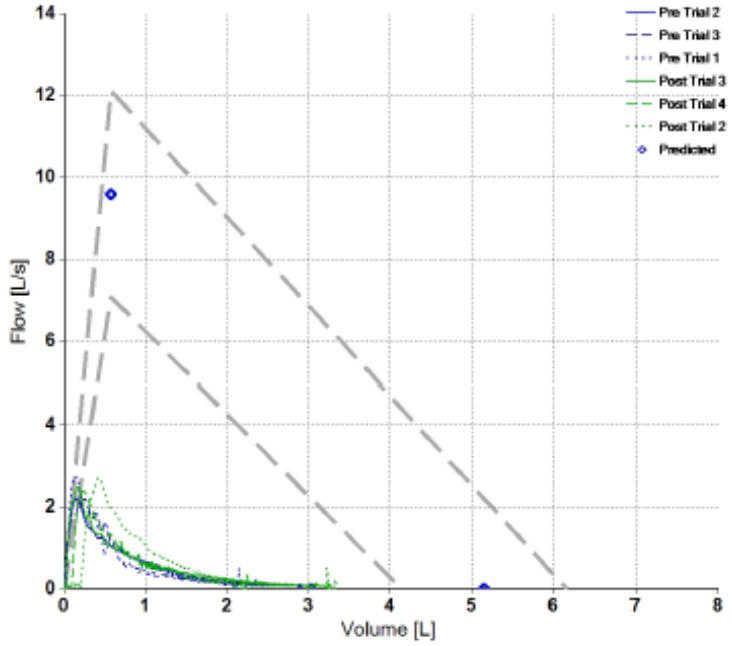
			Pre					Post					
Parameter	Pred	LLN	Best	Trial 2	Trial 3	~~Trial 1~~	%Pred	Best	Trial 3	Trial 4	~~Trial 2~~	%Pred	%Chg
FVC [L]	5.15	4.14	3.08*	3.08*	2.93*	2.40*	60	3.27*	3.27*	3.00*	3.34*	63	6
FEV1 [L]	3.86	3.01	1.10*	1.06*	1.10*	0.96*	28	1.10*	1.07*	1.10*	1.36*	28	0
FEV1/FVC	0.748	0.651	0.356*	0.345*	0.375*	0.401*	48	0.335*	0.327*	0.365*	0.408*	45	-6
FEF25-75 [L/s]	3.06	1.32	0.25*	0.25*	0.25*	0.31*	8	0.28*	0.28*	0.24*	0.32*	9	12
PEF [L/s]	9.60	7.08	2.21*	2.21*	2.21*	2.75*	23	2.52*	2.52*	2.39*	2.72*	26	14
FET [s]	-	-	17.1	17.1	18.1	9.3	-	15.8	15.8	17.9	15.6	-	-8

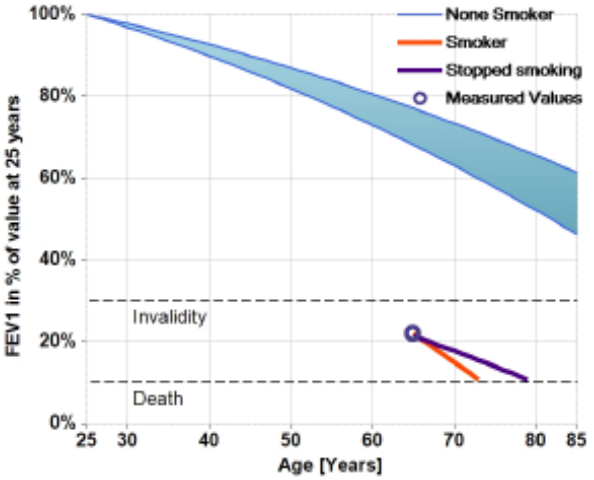
Caution: Poor session quality. Interpret with care

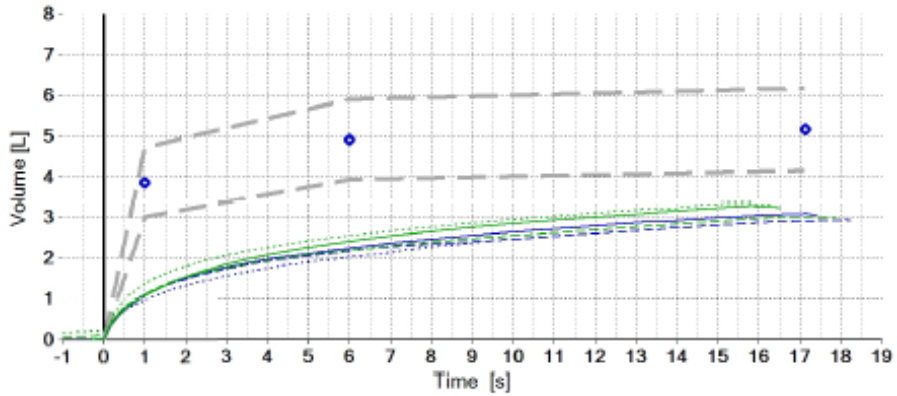
* Indicates value outside normal range or significant post change.

Session Quality	Pre	C (FEV1 Var=0.03L (3.0%); FVC Var=0.15L (5.0%))
	Post	D - Result not repeatable (FEV1 Var=0.03L (2.3%); FVC Var=0.27L (8.3%)
System Interpretation	Pre	Very Severe Obstruction
	Post	Very Severe Obstruction

Spirometry – Irreversible Obstruction (COPD)







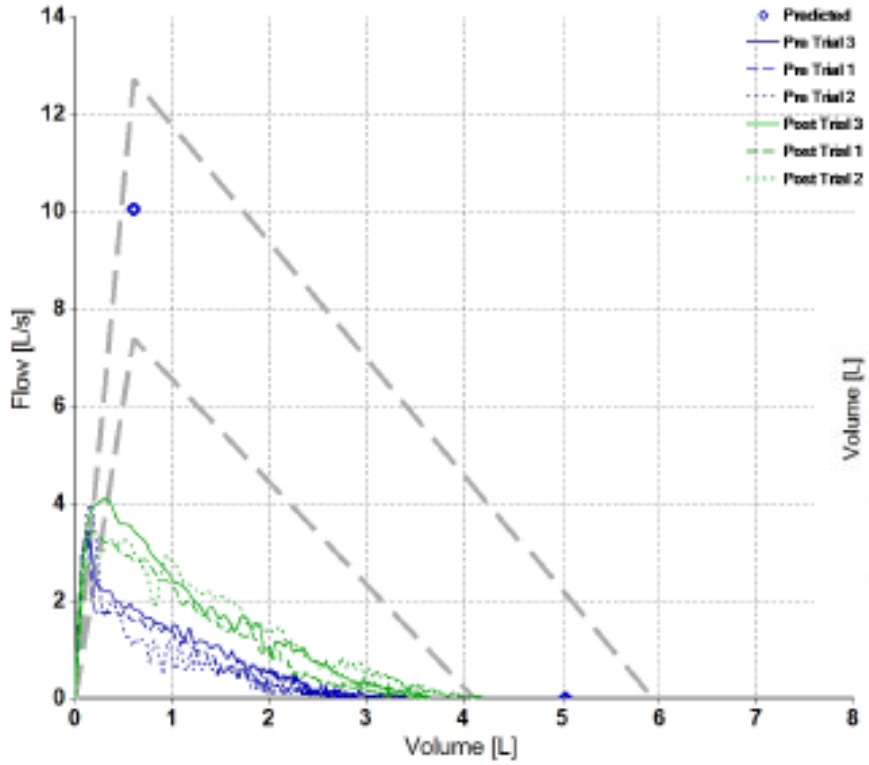
Spirometry – Reversible Obstruction

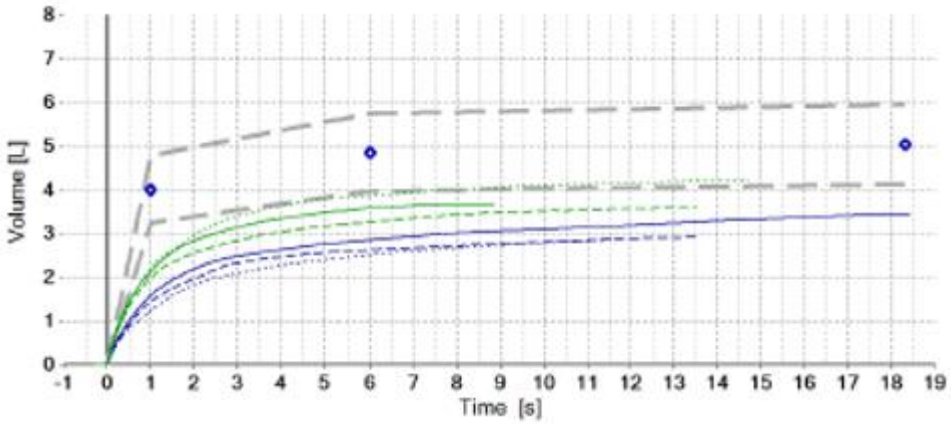
			Pre					Post					
Parameter	Pred	LLN	Best	Trial 3	Trial 1	Trial 2	%Pred	Best	Trial 3	Trial 1	~~Trial 2~~	%Pred	%Chg
FVC [L]	5.02	4.12	3.42*	3.42*	2.91*	2.86*	68	3.66*	3.66*	3.59*	4.21	73	7
FEV1 [L]	4.00	3.23	1.56*	1.56*	1.43*	1.22*	39	2.11*	2.11*	1.97*	2.18*	53	35*
FEV1/FVC	0.795	0.704	0.457*	0.457*	0.492*	0.426*	57	0.576*	0.576*	0.548*	0.518*	72	26
FEF25-75% [L/s]	3.92	2.19	0.53*	0.53*	0.67*	0.48*	14	1.17*	1.17*	0.82*	1.04*	30	121
PEF [L/s]	10.05	7.39	4.02*	3.46*	3.38*	4.02*	40	4.13*	4.13*	3.46*	3.29*	41	3
FET [s]	-	-	18.3	18.3	13.4	11.6	-	8.9	8.9	13.4	14.7	-	-52

Session Quality	Pre	D - Result not repeatable (FEV1 Var=0.13L (8.4%); FVC Var=0.51L (14.9%))
	Post	C (FEV1 Var=0.14L (6.6%); FVC Var=0.07L (1.8%))
System Interpretation	Pre	Severe Obstruction
	Post	Moderate Obstruction
Overall Syst. Interpret.	Significant pre - post change	

Caution: Poor session quality. Interpret with care

* Indicates value outside normal range or significant post change.

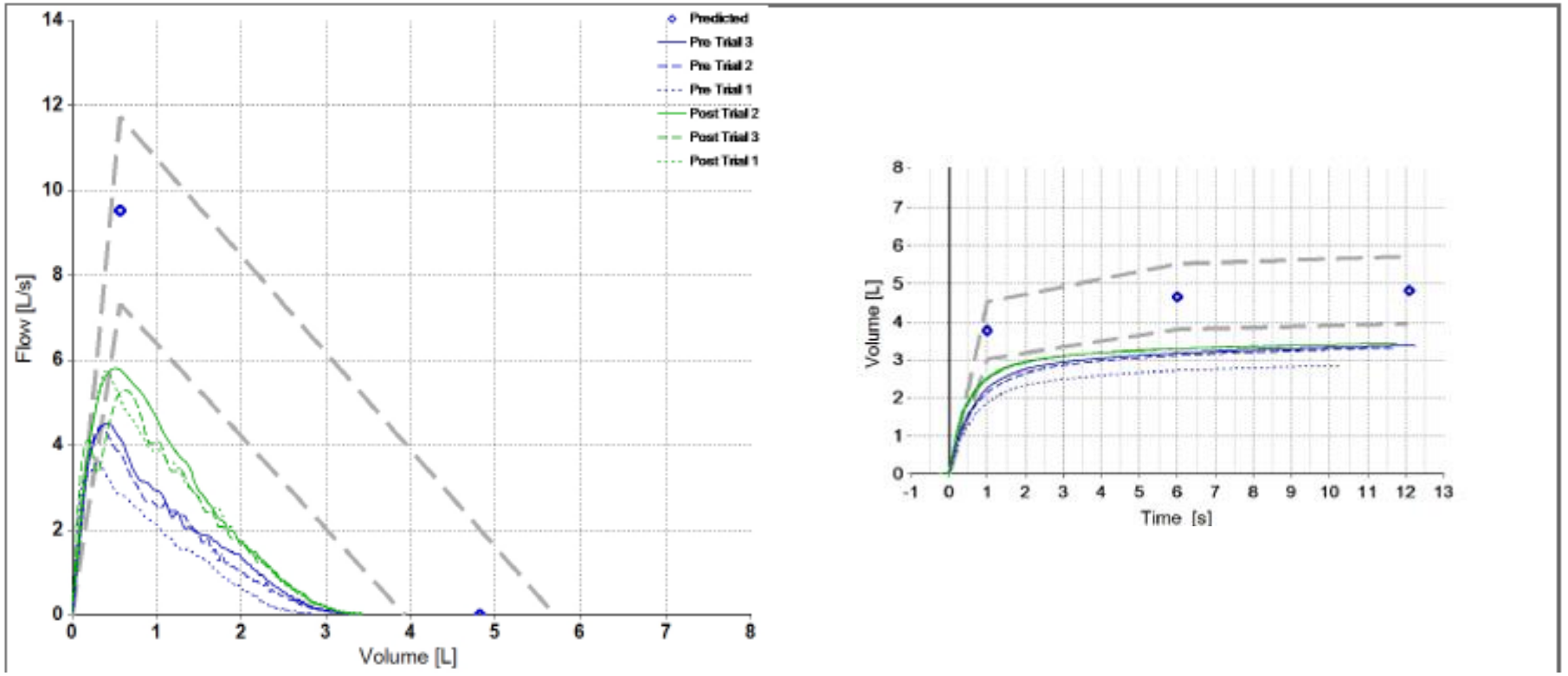




Spirometry – Restriction

			Pre					Post					
Parameter	Pred	LLN	Best	Trial 3	Trial 2	Trial 1	%Pred	Best	Trial 2	Trial 3	Trial 1	%Pred	%Chg
FVC [L]	4.82	3.93	3.36*	3.36*	3.30*	2.84*	70	3.42*	3.42*	3.37*	3.35*	71	2
FEV1 [L]	3.77	3.02	2.23*	2.23*	2.12*	1.86*	59	2.53*	2.53*	2.48*	2.49*	67	13*
FEV1/FVC	0.781	0.684	0.664*	0.664*	0.642*	0.655*	85	0.738	0.738	0.737	0.745	94	11
FEF25-75% [L/s]	3.41	1.89	1.39*	1.39*	1.23*	1.17*	41	1.90	1.90	1.90	1.94	56	37
PEF [L/s]	9.53	7.32	4.52*	4.52*	4.47*	3.62*	47	5.81*	5.81*	5.29*	5.74*	61	29
FET [s]	-	-	12.1	12.1	11.2	10.2	-	11.6	11.6	9.3	9.1	-	-4
Session Quality	Pre	B (FEV1 Var=0.12L (5.2%); FVC Var=0.07L (2.0%))											
	Post	A (FEV1 Var=0.04L (1.4%); FVC Var=0.06L (1.7%))											
System Interpretation	Pre	Moderate Obstruction											
	Post	Restriction probable: further examination recommended											
Overall Syst. Interpret.	Significant pre - post change												

* Indicates below LLN or significant post change.



Severity Assessment

- Once COPD diagnosis is made with spirometry, an assessment of airflow limitation severity can be made based on post-bronchodilator FEV1:

GOLD 1	Mild	FEV1 ≥ 80% predicted
GOLD 2	Moderate	50% ≤ FEV1 < 80% predicted
GOLD 3	Severe	30% ≤ FEV1 <50% predicted
GOLD 4	Very Severe	FEV1 < 30% predicted

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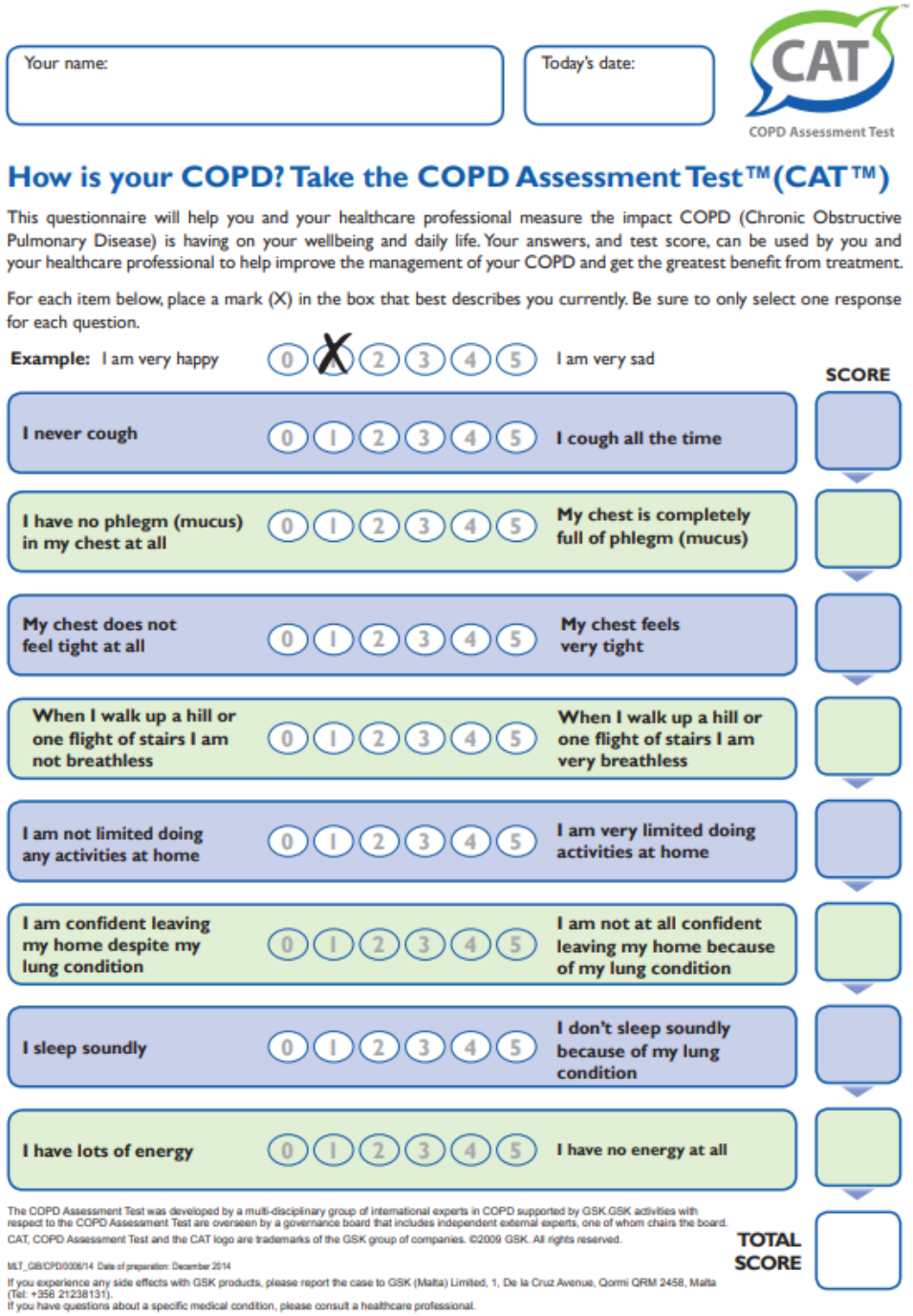
Symptom Assessment

Modified Medical Research Council Dyspnoea Scale

0	"I only get breathless with strenuous exercise"
1	"I get short of breath when hurrying on the level or walking up a slight hill"
2	"I walk slower than people of the same age on the level because of breathlessness or have to stop for breath when walking at my own pace on the level"
3	"I stop for breath after walking about 100 yards or after a few minutes on the level"
4	"I am too breathless to leave the house" or "I am breathless when dressing"

Doherty DE et al. COPD: Consensus Recommendations for early diagnosis and treatment. Journal of Family Practice, Nov 2006

Symptom Assessment



Your name:

Today's date:

CAT
COPD Assessment Test

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

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

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

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

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

TOTAL SCORE

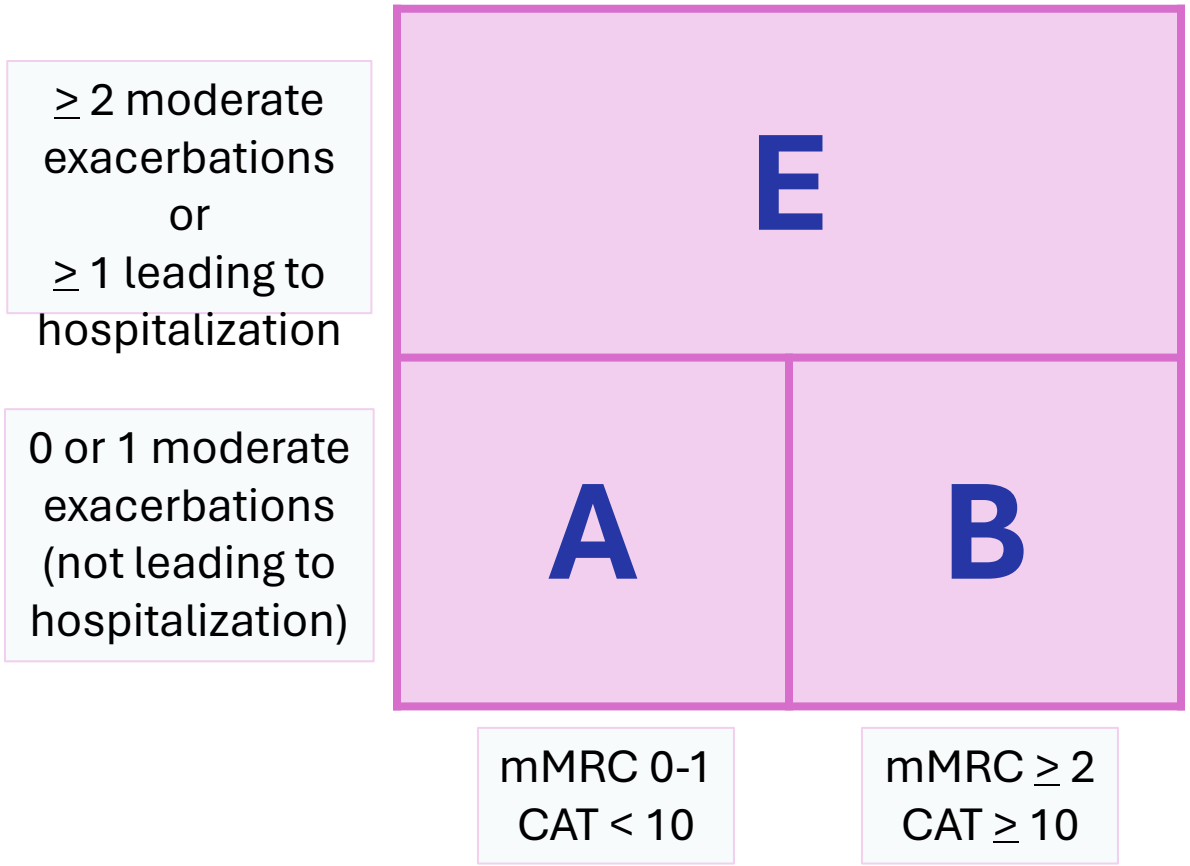
MLT_GB/CPD/0006/14 Date of preparation: December 2014

If you experience any side effects with GSK products, please report the case to GSK (Malta) Limited, 1, De la Cruz Avenue, Qormi QRM 2458, Malta (Tel: +356 21238131).
If you have questions about a specific medical condition, please consult a healthcare professional.

COPD Assessment Test, GSK

Combined Initial Assessment

- Big change in 2023 Report: ABCD → ABE



Case

A 70 year-old male presents to your clinic with symptoms of dyspnea and a chronic, productive cough that began a few months ago and is not improving. He reports a smoking history of 22 pack years and quit 5 years ago, no history of asthma, and worked in a sawmill for 30 years. He has no other significant PMH or medication history. He wants to know what you can do to help him.

1. What risk factors does he have for COPD?
    a) Age, smoking history, occupational exposure

Case

You decide based on his history to order a spirometry test that yields the following results:

- Best post-bronchodilator FEV1/FVC = 0.508
- FEV1 = 68% predicted

1. Do his results indicate a diagnosis of COPD?
   a) Yes
2. What severity grade is he?
   a) 2, moderate

Case

Your patient is diagnosed with Grade 2 (moderate) COPD. You complete a CAT assessment and his score is 20. He reports he has not been hospitalized or been treated for any respiratory reasons in the last several years. His CBC he received in office indicates he has an eosinophil count of 160 cells/μL.

1. Which GOLD Group is he in?
    a) B

TREATMENT

Non-Pharmacologic and Pharmacologic

Treatment Goals

Reduce Symptoms

- Relive symptoms
- Improve exercise tolerance
- Improve health status

Reduce Risk

- Prevent disease progression
- Prevent and treat exacerbations
- Reduce mortality

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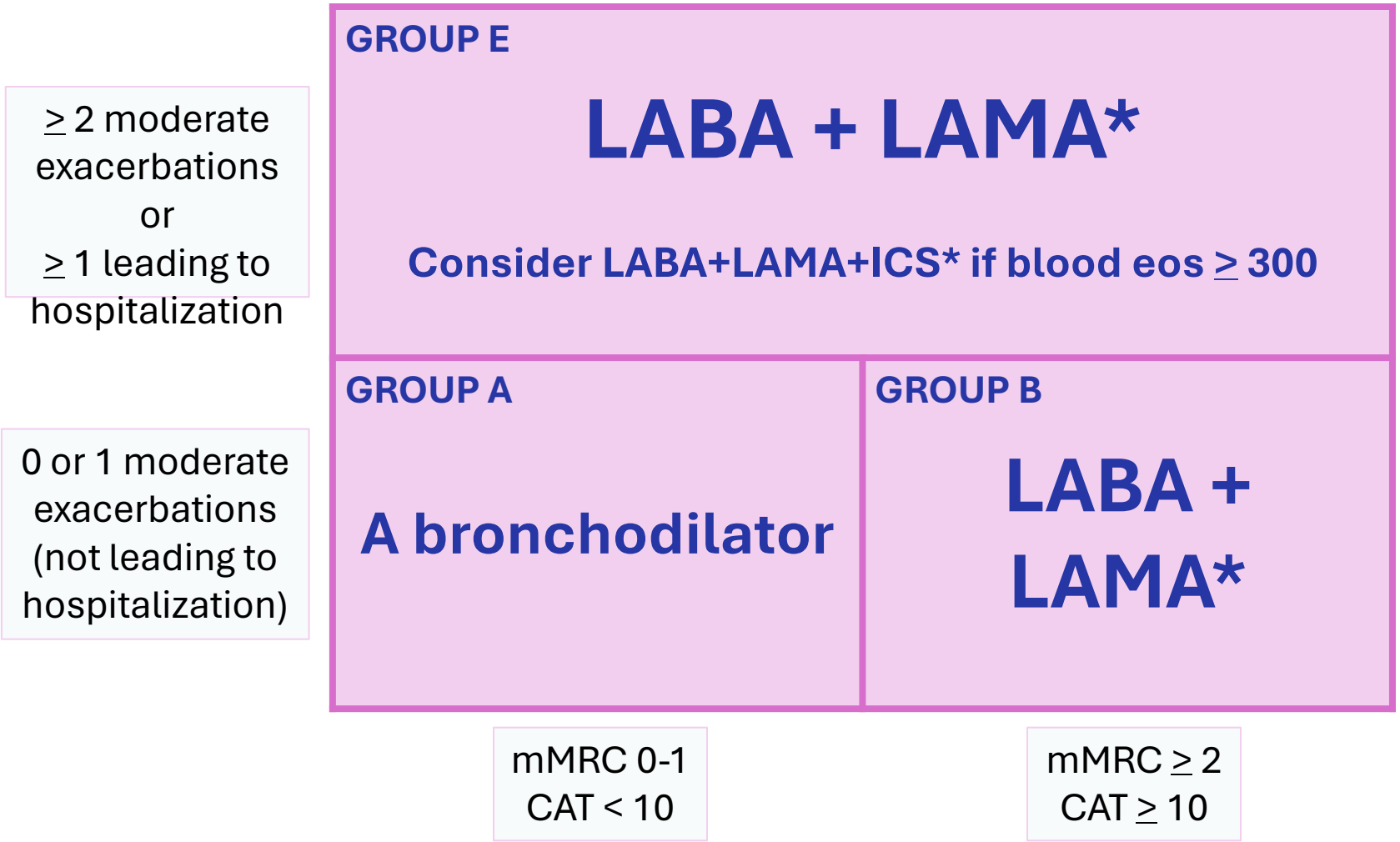
Non-Pharmacological Treatment

- **Smoking cessation**
- Vaccination
- Active lifestyle and exercise
- Pulmonary rehabilitation
- Oxygen therapy
- Lung volume reduction surgery
- Transplant

Initial Pharmacological Treatment



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

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Group A

- “A bronchodilator” → can be long-acting or short-acting

- **Preferred** → long-acting
  - Except in cases of patients with very occasional shortness of breath

Treating Group A

- Long-acting beta-2 agonists (LABAs)

- MOA: relax airway smooth muscle by stimulating beta-2 adrenergic receptors

- Adverse effects: tachycardia, tremor

Generic (Brand)	Dosage Form	Dosage	Duration (hours)
Formoterol (Perforomist)	Nebulizer solution	20 mcg twice daily	12+
Aformoterol (Brovana)	Nebulizer solution	15 mcg twice daily	12+
Salmeterol (Serevent Diskus)	DPI	One inhalation (50 mcg) twice daily	12+
Indacaterol (Arcapta Neohaler)	DPI (Capsules)	One inhalation (75 mcg) once daily	24
Olodaterol (Striverdi Respimat)	Inhalation Spray	Two inhalations (2.5 mcg) once daily	24

Treating Group A

- Long-acting muscarinic antagonists (LAMAs)

- MOA: block the bronchoconstrictor effects of ACh on M3 muscarinic receptors in airway smooth muscle

- Adverse effects: dry mouth

Generic (Brand)	Dosage form	Dosage	Duration (hrs)
Tiotropium (Spiriva Handihaler)	DPI (Capsules)	Inhale one cap (18 mcg) once daily	24+
Tiotropium (Spiriva Respimat)	Inhalation Spray	Two inhalations (2.5mcg/actuation) daily	24+
Aclidinium bromide (Tudorza Pressair)	DPI	One inhalation (400 mcg) twice daily	12
Umeclidinium (Incruse Ellipta)	DPI	One inhalation (62.5 mcg) once daily	24
Revefenacin (Yupelri)	Nebulizer solution	One vial (175mcg) once daily	24

Treating Group A

- Short-acting beta-2 agonists and muscarinic antagonists (SABAs and SAMAs)

Generic (Brand)	Dosage form	Dosage	Max. dose/day	Nebulizer dose	Duration (hours)
SABAs					
Albuterol (ProAir/Ventolin/ Proventil) 90 mcg/puff	HFA	2 puffs Q4-6H PRN	12	0.083% (2.5 mg/3mL) Q4-6H PRN	2-6
Albuterol (ProAir Respiclick, Digihaler) 90 mcg/inh	DPI	2 inhalations Q4-6H PRN	12	Not available	2-6
Levalbuterol (Xopenex) 45 mcg/puff	HFA	2 puffs Q4-6H PRN	12	0.63-1.25 mg 3 times daily PRN	3-8
SAMAs					
Ipratropium (Atrovent) 17 mcg/puff	HFA	2 puffs Q4-6H PRN	12	500 mcg Q4-8H PRN	2-8

Group B

- Previously a long acting bronchodilator was recommended as monotherapy

- LAMA + LABA therapy now preferred for initial treatment

Group B Evidence

Efficacy of umeclidinium/vilanterol versus umeclidinium and salmeterol monotherapies in symptomatic patients with COPD not receiving inhaled corticosteroids: the EMAX randomised trial	
Methods	24-week, double-blind, parallel-group randomized control trial
Interventions	Umeclidinium/vilanterol 62.5-25 mcg 1 puff daily (n = 812) Umeclidinium 62.5 mcg 1 puff daily (n = 804) Salmeterol 50 mcg 1 puff twice daily (n = 809)
Patients	Age $\geq$ 40, current/former smokers, CAT score $\geq$ 10, $\leq$ 1 moderate exacerbation and no severe exacerbations
Endpoints	Primary – trough FEV1 at week 24 Secondary – Transition Dyspnea Index at week 24
Results	UMEC/VI vs UMEC – 66 mL difference ($p < 0.001$) UMEC/VI vs SAL – 141 mL difference ($p < 0.001$)
	All 3 groups had clinically important improvements in TDI; UMEC/VI improvement significantly greater than UMEC and SAL ($p < 0.001$)
Conclusions	In symptomatic, low exacerbation risk COPD patients (GOLD Group B), LAMA/LABA therapy is preferred over LAMA or LABA monotherapy

Treating Group B

- LABA + LAMA combinations

Generic (Brand)	Dosage form	Dosage	Duration (hrs)
Umeclidinium/Vilanterol (Anoro Ellipta)	DPI	One inhalation (62.5/25 mcg) once daily	24
Tiotropium/Olodaterol (Stiolto Respimat)	Inhalation Spray	Two inhalations (2.5/2.5 mcg) once daily	24+
Glycopyrrolate/Formoterol fumarate (Bevespi Aerosphere)	HFA	Two puffs (9/4.8 mcg) twice daily	12
Aclidinium/Formoterol fumarate) (Duaklir Pressair)	DPI	One inhalation (400/12 mcg) twice daily	12

Lexicomp. Lexi-Drugs.

Group E

- Considerations:
  1. LAMA + LABA is the preferred initial treatment option.

  2. Use of LABA + ICS in COPD is not encouraged. If there is an indication for ICS, LAMA + LABA + ICS is preferred.

  3. Consider LAMA + LABA + ICS if eosinophils > 300. The effect of ICS on exacerbation prevention is correlated to blood eosinophil count.

Group E Evidence

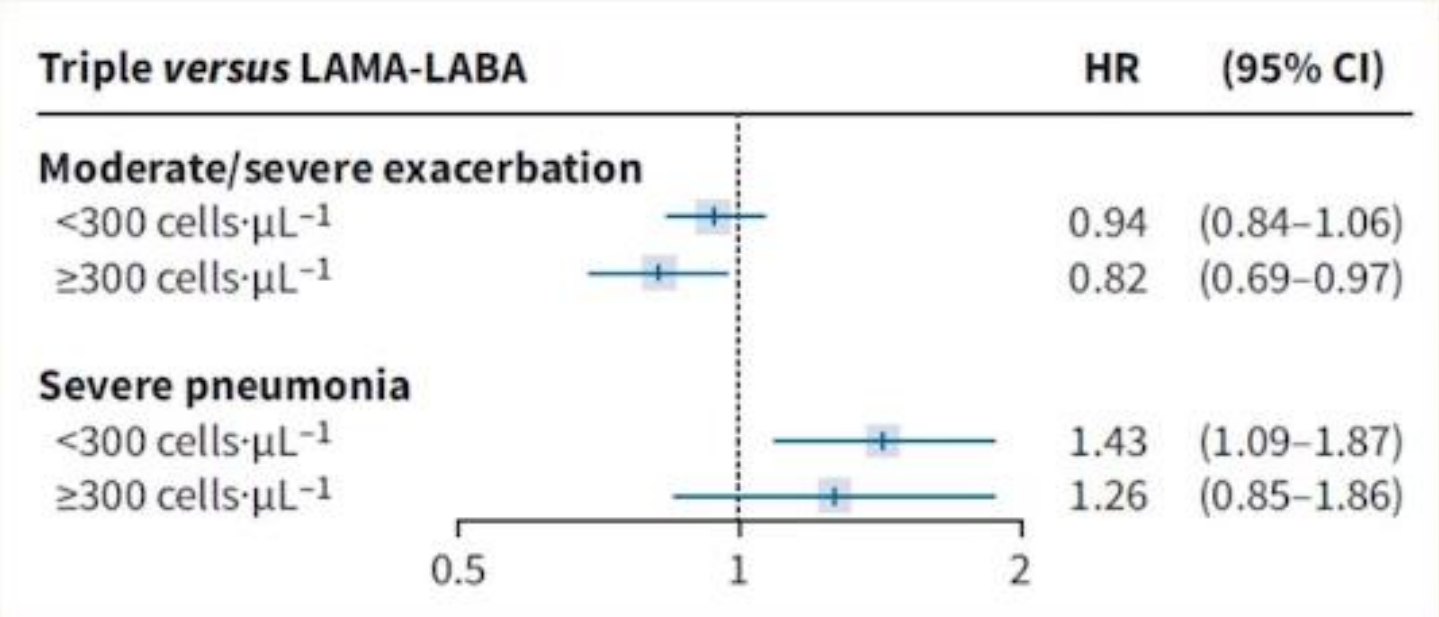
- Single-inhaler triple versus dual bronchodilator therapy for GOLD group E and other exacerbating patients with COPD: real-world comparative effectiveness and safety

- Study design
  - Patients ≥ 40, GOLD Group E, no prior therapy
  - Followed for up to a year
  - Hazard ratio for blood eos ≥ 300 vs < 300 cells/μL
    - Moderate-severe exacerbation
    - Severe pneumonia

Suissa S. Eur Respir J. 2023 Sep 9;62(3):2300883

Group E Evidence

- Results



Suissa S. Eur Respir J. 2023 Sep 9;62(3):2300883

Treating Group E

- Inhaled corticosteroids (ICS)

Strongly Favors Use	• History of hospitalizations for exacerbations of COPD • ≥ 2 moderate exacerbations of COPD per year • Blood eosinophils ≥ 300 • History of or concomitant asthma
Favors Use	• 1 moderate exacerbation of COPD per year • Blood eosinophils 100 to < 300
Against Use	• Repeated pneumonia events • Blood eosinophils < 100 • History of mycobacterial infection

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Treating Group E

- Inhaled corticosteroids (ICS) pneumonia considerations:
  - Evidence suggests that ICS use modifies the airway microbiome
  - TORCH Trial found no significant reduction in death, but rate of pneumonia significantly higher in patients receiving fluticasone vs placebo
  - Patients at higher risk of developing pneumonia:
    - Aged > 55
    - History of prior exacerbations or pneumonia
    - BMI < 25
    - Poor mMRC grade and/or severe airflow obstruction

Calverley PM, Anderson JA, Celli B, et al. N Engl J Med. 2007 Feb 22;356(8):775-89.

Treating Group E

- LABA + LAMA + ICS Inhalers

Generic (Brand)	Dosage form	Dosage	Duration (hrs)
Fluticasone, Umeclidinium, and Vilanterol (Trelegy Ellipta)	DPI	One inhalation (100/62.5/25 mcg) once daily	24
Budesonide, Glycopyrrolate, and Formoterol (Breztri Aerosphere)	HFA	Two inhalations (160/9/4.8 mcg) twice daily	12

Lexicomp. Lexi-Drugs.

Case

Your 70 year-old male patient who was diagnosed with Grade 2, Group B COPD now needs treatment recommendations.

1. What non-pharmacological recommendations could you make?
    a) Ensure vaccinations are up to date
    b) Pulmonary rehabilitation

Case

Your 70 year-old male patient who was diagnosed with Grade 2, Group B COPD now needs treatment recommendations.

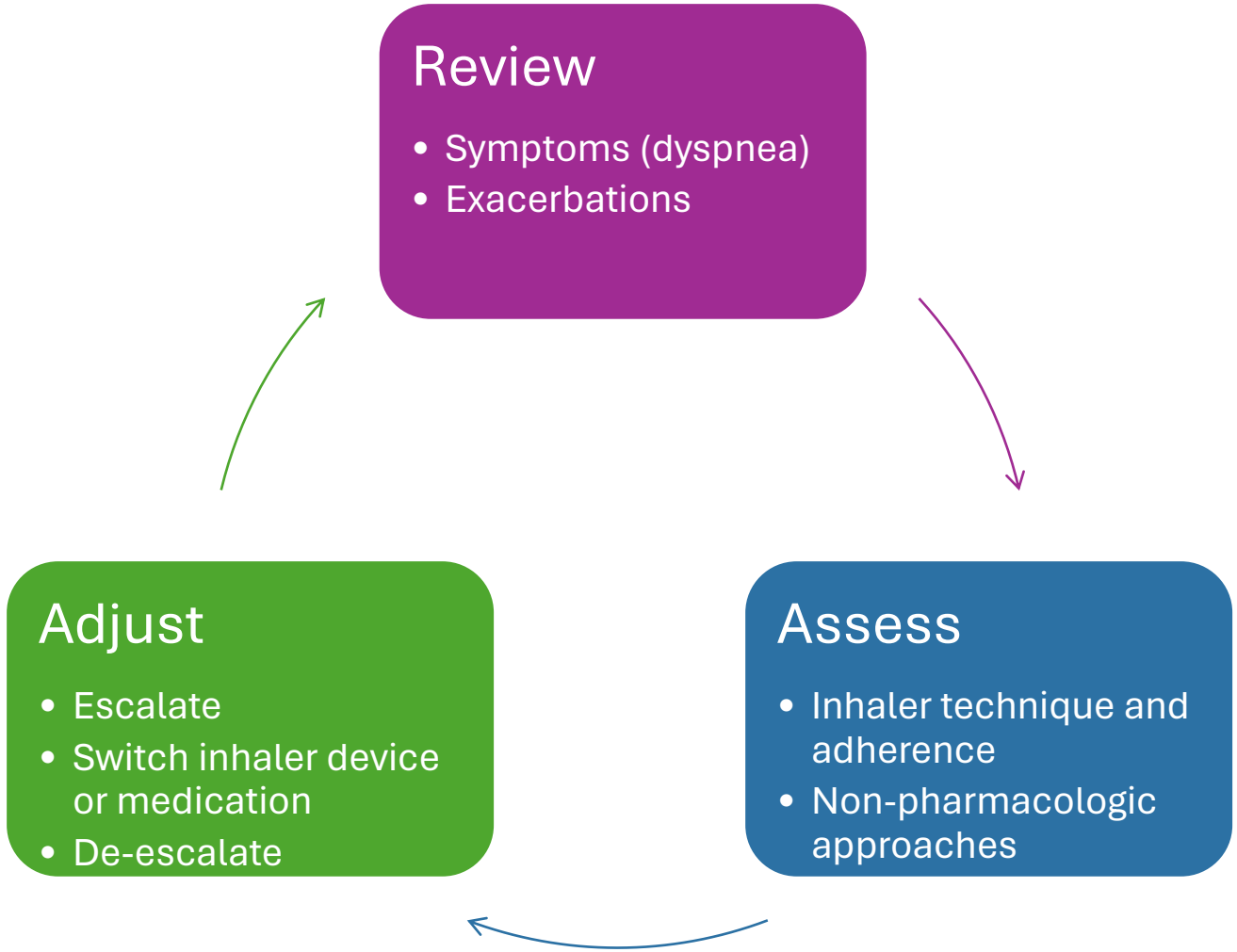
1. What pharmacological recommendations could you make?
    a) LAMA/LABA combination inhaler i.e. Anoro, Stiolto, Bevespi
    b) SABA rescue inhaler

Case

You decide to initiate Anoro 62.5-25 mcg/inh 1 puff once daily and albuterol 90 mcg/act 2 puffs every 4-6 hours as needed.

1. What side effects should you counsel the patient on for the Anoro?
   a) Dry mouth
2. What side effects should you counsel the patient on for the albuterol?
   a) Increased heart rate, tremor

Monitoring & Follow-up



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Inhaler technique

- On average, more than 2/3 of patients make at least one error using an inhalation device
- Considerations in choosing a device:
  - MDI: require coordination between device triggering and inhalation; must be able to take slow, deep breath
    - Spacers available for those who struggle with this
  - DPI: only appropriate if the patient can make a forceful and deep inhalation

Follow-up Pharmacological Treatment

DYSPNEA

LABA or LAMA

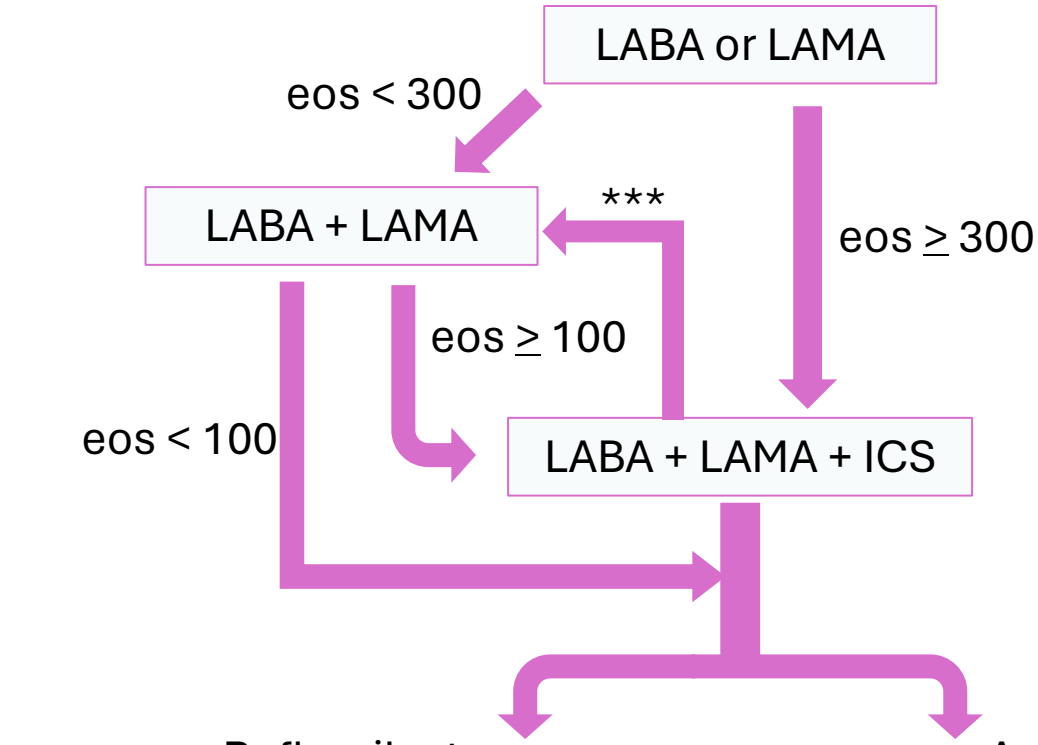
↓

LABA + LAMA

↓

- Consider switching inhaler device or medication
- Implement or escalate non-pharmacological treatments
- Investigate & treat other causes of dyspnea

EXACERBATIONS



***Consider de-escalation of ICS if pneumonia or other considerable side effects

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Follow-up Therapy

- Roflumilast (Daliresp)
  - MOA: inhibits PDE4 leading to increased cAMP which reduces inflammation, mucus production, and pulmonary remodeling
  - Dosing: 250mcg by mouth once daily x4 weeks, then 500 mcg once daily thereafter
  - Adverse effects: diarrhea, nausea, reduced appetite, weight loss (5-10% body weight), headache

Follow-up Therapy

- Azithromycin
  - MOA: macrolide antibiotic with anti-inflammatory effects
  - Dosing: 250 mg/day or 500 mg three times per week
  - Adverse effects: bacterial resistance, QTc prolongation, impaired hearing

Case

You follow up with your 70 year old in 3 months and find he is using his albuterol inhaler up to 3 times daily and isn't feeling much benefit from the Anoro you initiated. Upon assessment of his inhaler technique, he is taking a weak, shallow breath and doesn't feel he's able to take a deeper breath.

1. What is your next step in his therapy?
    A. Switch to a non-DPI LAMA/LABA
    B. Switch to a triple therapy inhaler
    C. Add on Roflumilast
    D. Continue Anoro

Case

You follow up with your 70 year old in 3 months and find he is using his albuterol inhaler up to 3 times daily and isn't feeling much benefit from the Anoro you initiated. Upon assessment of his inhaler technique, he is taking a weak, shallow breath and doesn't feel he's able to take a deeper breath.

1. What is your next step in his therapy?
   - **A. Switch to a non-DPI LAMA/LABA**
   - B. Switch to a triple therapy inhaler
   - C. Add on Roflumilast
   - D. Continue Anoro

COPD Exacerbations

- Definition: an event characterized by increased dyspnea and/or cough and sputum that worsens in < 14 days

- Currently, they are classified after the event has occurred as:
  - Mild: treated with short-acting bronchodilators (SABDs) only
  - Moderate: treated with SABDs and oral corticosteroids +/- antibiotics
  - Severe: patient requires hospitalization or visits the emergency room

Exacerbation Precipitating Factors

- Respiratory infection (i.e. pneumonia)
- Pulmonary embolism
- Heart failure
- Cardiac arrhythmias
- Environmental exposure (pollution)
- Inhaler non-adherence

Exacerbation Treatment Setting

- Potential indications for hospital assessment:
  - Severe symptoms
  - Acute respiratory failure
  - Onset of new physical signs (i.e. cyanosis, peripheral edema)
  - Failure of initial medical management
  - Presence of serious comorbidities (i.e. CHF, arrhythmias)
  - Insufficient home support

- 5-year mortality rate = 50%

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Exacerbation Treatment

- Goals
  1. Minimize negative impact of the current exacerbation
  2. Prevent the development of subsequent events

- 3 main treatment options:
  - Short acting bronchodilators
  - Oral corticosteroids (OCS)
  - Antibiotics

Exacerbation Treatment

- SABAs with or without SAMAs
  - Systematic review of delivery method found no significant difference; although, nebulizers may be easier to use for sicker patients

Medication	Exacerbation Dosing
Albuterol MDI Levalbuterol MDI	1 to 2 inhalations every 1 hour for 2 to 3 doses, then every 2 to 4 hours, as needed
Albuterol nebulizer	2.5 mg every 1 hour for 2 to 3 doses, then every 2 to 4 hours as needed
Levalbuterol nebulizer	0.63 to 1.25 mg every 1 hour for 2 to 3 doses, then every 2 to 4 hours as needed
Ipratropium MDI	2 inhalations every 4 to 6 hours as needed
Ipratropium nebulizer	500 mcg every 6 to 8 hours as needed
Albuterol/Ipratropium (Duoneb) nebulizer	1 vial every 1 hour (up to 3 doses), then every 2 to 4 hours as needed

Lexicomp. Lexi-Drugs.

Exacerbation Treatment

- Oral corticosteroids (OCS)
  - Prednisone 40 mg x 5 days is recommended (or other steroid equivalent)
  - Benefits:
    - Shortens recovery time
    - Improves FEV1
    - Improves oxygenation
    - Reduces risk of early relapse
    - Reduces treatment failure
    - Reduces length of hospitalization

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OCS Evidence

Short-term vs Conventional Glucocorticoid Therapy in Acute Exacerbations of Chronic Obstructive Pulmonary Disease: The REDUCE Randomized Clinical Trial	
Methods	Randomized, placebo-controlled, double-blind, non-inferiority, multicenter trial in 5 Swiss teaching hospitals
Interventions	Prednisone 40 mg x 5 days (n = 56) Prednisone 40 mg x 14 days (n = 57)
Patients	Age ≥ 40, smoking history > 20 pack years, exacerbation of COPD
Endpoints	Time to next exacerbation within 180 days
Results	Intention to treat hazard ratio: 0.95 (90% CI, 0.70 to 1.29; *P* = .006) Per-protocol hazard ratio: 0.93 (90% CI, 0.68 to 1.26; *P* = .005)
Conclusions	5-day treatment with systemic glucocorticoids was noninferior to 14-day treatment with regard to re-exacerbation within 6 months, and significantly reduced glucocorticoid exposure. These findings support the use of a 5-day glucocorticoid treatment in acute exacerbations of COPD

21):2223–2231.

Exacerbation Treatment

- Antibiotics
  - Should be given to patients with 3 cardinal symptoms:
    1. Increased dyspnea
    2. Increased sputum volume
    3. Increased sputum purulence
  - OR given to patients with 2 cardinal symptoms, if one is increased sputum purulence
  - OR given to patients requiring mechanical ventilation

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Exacerbation Treatment

- Antibiotics
  - Choice should be based on local bacterial resistance patterns
  - Usually, initial treatment includes amoxicillin-clavulanate, azithromycin, or doxycycline
  - In patients with frequent exacerbations, severe airflow obstruction, and/or exacerbations requiring mechanical ventilation, sputum cultures should be collected
  - Duration should be limited to 5 days

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Pharmacist-led Pulmonary Service

- How can pharmacists help?
  - Administering spirometry tests
  - Interpreting spirometry results
  - Inhaler education/technique
  - Optimizing treatment regimens
  - Cost assistance
    - Manufacturer coupons
    - Patient assistance programs

Questions?

Need More Information?

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