

Chronic Obstructive Pulmonary Disease (COPD)

Part 2 – Diagnosis & Treatment

PC3303 – Integrated Therapeutics 3

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COMMONWEALTH OF AUSTRALIA

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Asthma and COPD can co-exist

- Asthma – airflow limitation is reversible with use of bronchodilator
- COPD – airflow limitation is not fully reversible
- However, patients can respond to treatment differently → categorisation by ‘phenotype’

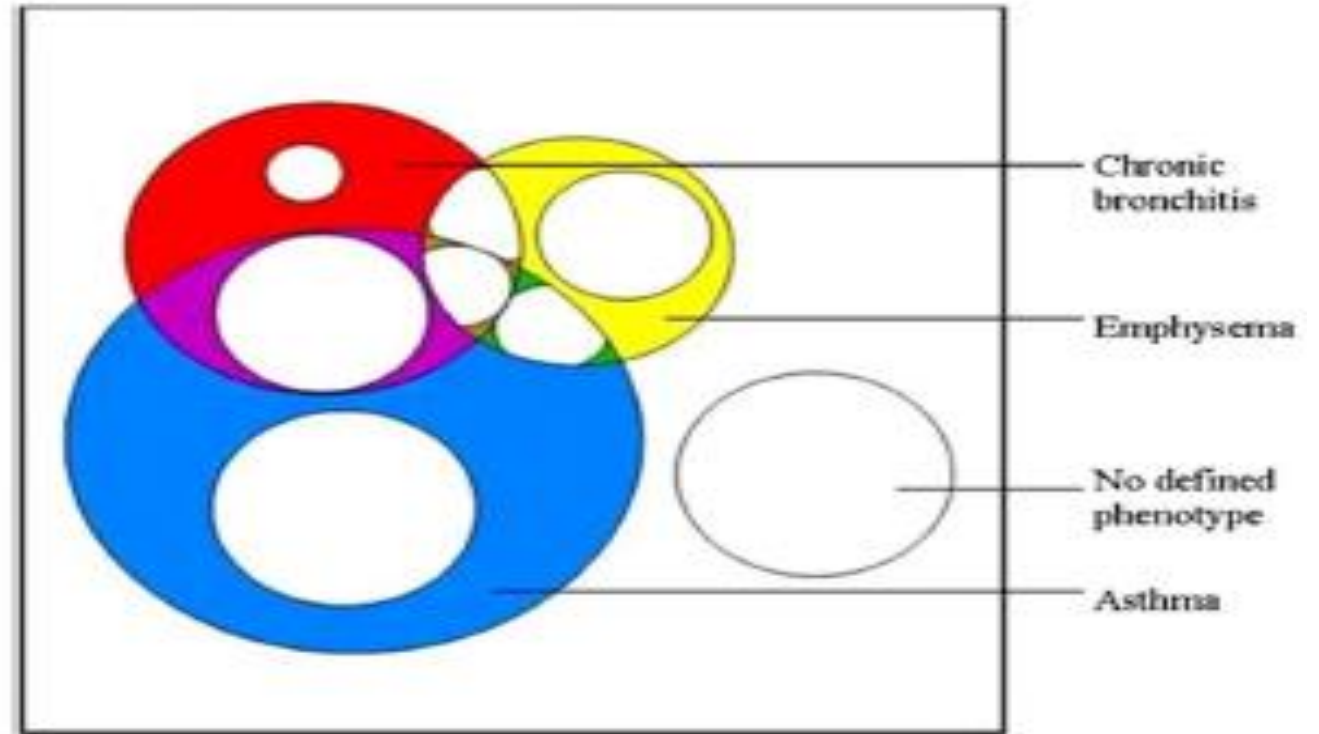


Image taken from: Lung Foundation Australia. The COPD-X plan: Australian and New Zealand guidelines for the management of chronic obstructive pulmonary disease. Lung Foundation Australia website.

Diagnosis

- Usually based on a:
 - History of smoking or exposure to another noxious agent PLUS
 - A FEV1/FVC < 0.7 post-bronchodilator
- I.e. airflow limitation not reversible with a bronchodilator

Severity

- COPD Assessment Test (CAT)

CAT™ ASSESSMENT

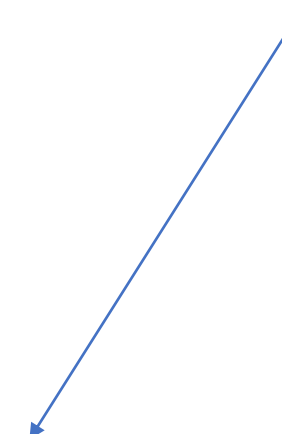
For each item below, place a mark (x) in the box that best describes you currently. Be sure to only select one response for each question.

EXAMPLE: I am very happy	0	<input checked="" type="radio"/>	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	

Figure taken from: Global Initiative for Chronic Obstructive Lung Disease, Inc. Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. GOLD COPD website. <https://goldcopd.org/gold-reports/#>.

STEPWISE MANAGEMENT OF STABLE COPD

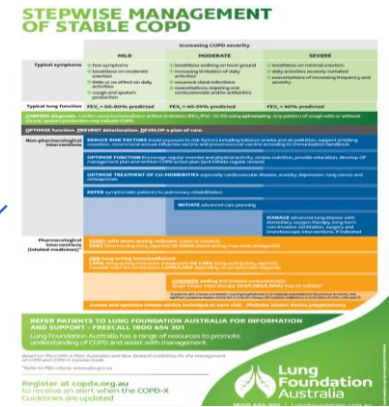
	MILD	MODERATE	SEVERE
Typical symptoms	<ul style="list-style-type: none"> few symptoms breathless on moderate exertion little or no effect on daily activities cough and sputum production 	<ul style="list-style-type: none"> breathless walking on level ground increasing limitation of daily activities recurrent chest infections exacerbations requiring oral corticosteroids and/or antibiotics 	<ul style="list-style-type: none"> breathless on minimal exertion daily activities severely curtailed exacerbations of increasing frequency and severity
Typical lung function	FEV ₁ > 80% predicted	FEV ₁ ≈ 50-80% predicted	FEV ₁ < 50% predicted
CONFIRM diagnosis.	Confirm post-bronchodilator airflow limitation (FEV ₁ /FVC < 0.70) using spirometry . Any pattern of cough with or without chronic sputum production may indicate COPD.		
OPTIMISE function. PREVENT deterioration. DEVELOP a plan of care.			



	Increasing COPD severity		
	MILD	MODERATE	SEVERE
Typical symptoms	<ul style="list-style-type: none"> few symptoms breathless on moderate exertion little or no effect on daily activities cough and sputum production 	<ul style="list-style-type: none"> breathless walking on level ground increasing limitation of daily activities recurrent chest infections exacerbations requiring oral corticosteroids and/or antibiotics 	<ul style="list-style-type: none"> breathless on minimal exertion daily activities severely curtailed exacerbations of increasing frequency and severity
Typical lung function	FEV ₁ ≈ 60-80% predicted	FEV ₁ ≈ 40-59% predicted	FEV ₁ < 40% predicted
CONFIRM diagnosis.	Confirm post-bronchodilator airflow limitation (FEV ₁ /FVC < 0.70) using spirometry . Any pattern of cough with or without chronic sputum production may indicate COPD.		
OPTIMISE function. PREVENT deterioration. DEVELOP a plan of care.			

Figure taken from: Lung Foundation Australia. Stepwise Management of Stable COPD. Lung Foundation Australia website. Updated 2022. Available at <https://lungfoundation.com.au/resources/stepwise-management-of-stable-copd/>

Non-Pharmacological Treatment



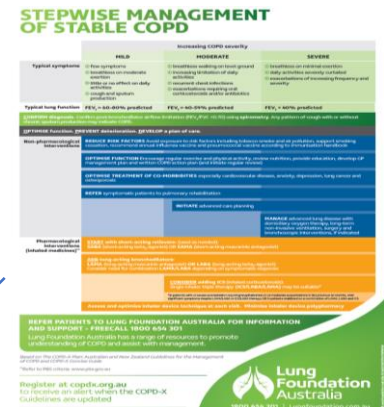
- **Smoking cessation!!**
- Pulmonary rehabilitation
- Regular exercise
- Vaccination
 - Influenza
 - Pneumococcal
 - COVID
 - Etc.
- COPD action plan

REDUCE RISK FACTORS Avoid exposure to risk factors including tobacco smoke and air pollution, support smoking cessation, recommend annual influenza vaccine and pneumococcal vaccine according to immunisation handbook
OPTIMISE FUNCTION Encourage regular exercise and physical activity, review nutrition, provide education, develop GP management plan and written COPD action plan (and initiate regular review)
OPTIMISE TREATMENT OF CO-MORBIDITIES especially cardiovascular disease, anxiety, depression, lung cancer and osteoporosis
REFER symptomatic patients to pulmonary rehabilitation
INITIATE advanced care planning
MANAGE advanced lung disease with domiciliary oxygen therapy, long-term non-invasive ventilation, surgery and bronchoscopic interventions, if indicated

Figure taken from: Lung Foundation Australia. Stepwise Management of Stable COPD. Lung Foundation Australia website. Updated 2022. Available at <https://lungfoundation.com.au/resources/stepwise-management-of-stable-copd/>

Pharmacological Treatment

- Check adherence & inhaler technique



Pharmacological interventions (inhaled medicines)**

START with short-acting relievers: (used as needed):
SABA (short-acting beta₂-agonist) OR **SAMA** (short-acting muscarinic antagonist)

ADD long-acting bronchodilators:
LAMA (long-acting muscarinic antagonist) OR **LABA** (long-acting beta₂-agonist)
 Consider need for combination **LAMA/LABA** depending on symptomatic response

CONSIDER adding ICS (inhaled corticosteroids):
 Single inhaler triple therapy (**ICS/LABA/LAMA**) may be suitable*

*in patients with ≥1 severe exacerbation requiring hospitalisation or ≥2 moderate exacerbations in the previous 12 months, AND significant symptoms despite LAMA/LABA or ICS/LABA therapy; OR in patients stabilised on a combination of LAMA, LABA and ICS.

Assess and optimise inhaler device technique at each visit. Minimise inhaler device polypharmacy

Figure taken from: Lung Foundation Australia. Stepwise Management of Stable COPD. Lung Foundation Australia website. Updated 2022. Available at <https://lungfoundation.com.au/resources/stepwise-management-of-stable-copd/>

LABAs in COPD

- Some are more common in COPD → indacaterol, salmeterol, olodaterol
- Indacaterol – common S/E is post-inhalation cough
- **Vilanterol** (available in combination with LAMA, ICS or both)

Indacaterol <ul style="list-style-type: none">• Onset ~5 mins• Once daily	Olodaterol <ul style="list-style-type: none">• Onset ~5-10 mins• Once daily
Salmeterol <ul style="list-style-type: none">• Onset ~10-30 mins• Twice daily	Formoterol <ul style="list-style-type: none">• Onset ~1-3 mins• Twice daily

Inhaled Anticholinergics - SAMAs and LAMAs

- Acetylcholine is a neurotransmitter of the parasympathetic nervous system
- Acetylcholine induces bronchoconstriction and increased secretions when it acts on muscarinic receptors in the airways

Short-acting	Long-acting
✓ Ipratropium	✓ Aclidinium – BD dosing ✓ Glycopyrronium – OD dosing ✓ Tiotropium – OD dosing ✓ Umeclidinium – OD dosing

Inhaled Anticholinergics - SAMAs and LAMAs


- Adverse effects
 - Dry mouth, throat irritation
 - Dry eyes
 - Urinary retention
 - Constipation
- Counselling
 - Avoid contact with your eyes, close your eyes or wear eye protection during nebulisation (e.g. of ipratropium)
 - Do not use LAMAs for immediate relief of symptoms
 - Onset of action is too long
 - Avoid using a SAMA (i.e. ipratropium) with a LAMA

Inhaled Corticosteroids in COPD






- Added to LABA/LAMA combination
- Indicated for moderate to severe COPD, especially if there are recurrent exacerbations
- Benefits
 - Reduced exacerbations
 - Improved QoL
- Adverse effects
 - Pneumonia
- Triple inhaler therapy:
 - Trelegy[®] - Fluticasone + Umeclidinium + Vilanterol
 - Breztri[®] - Budesonide + Glycopyrronium + Formoterol
 - Trimbow[®] - Beclometasone + Glycopyrronium + Formoterol


Inhalers for Chronic Obstructive Pulmonary Disease (COPD)

SABAs (Short-acting β_2 -agonists)	
	Aiomir Autohaler (salbutamol)
	Asmol pMDI (salbutamol)
	Bricanyl Turbuhaler (terbutaline)
	Ventolin pMDI (salbutamol) Also available as: Zempreon pMDI









SAMAs (Short-acting muscarinic antagonists)	
	Atrovent pMDI (ipratropium)

*PBS listed for COPD at this strength only
#PBS listed for asthma at other strengths
pMDI: Pressurised metered dose inhaler

LAMAs (Long-acting muscarinic antagonists)	
	Braltus Zonda (tiotropium)
	Bretaris Genuair (acridinium)
	Incruse Ellipta (umeclidinium)
	Seebri Breezhaler (glycopyrronium)
	Spiriva Handihaler & Respimat (tiotropium)

LABAs (Long-acting β_2 -agonists)	
	Onbrez Breezhaler (indacaterol)

ICS/LAMA/LABA combinations	
	Breztri Aerosphere pMDI (budesonide/glycopyrronium/ formoterol)
	Trelegy Ellipta[#] (fluticasone furoate/ umeclidinium/vilanterol) *100/62.5/25
	Trimbow pMDI[#] (beclomethasone/ glycopyrronium/formoterol) *100/10/6

ICS/LABA combinations			
	Symbicort Turbuhaler[#] (budesonide/formoterol) *400/12 Also available as: Rilast		Seretide pMDI[#] (fluticasone propionate/ salmeterol) *250/25 Also available as: Evocair, Fluticasone + Salmeterol Cipla, Pavtide, SalplusF
	Symbicort Rapihaler pMDI[#] (budesonide/formoterol) *200/6 Also available as: Rilast		Seretide Accuhaler[#] (fluticasone propionate/ salmeterol) *500/50 Also available as: Fluticasone + Salmeterol Cipla, Pavtide
	Bufomix Easyhaler[#] (budesonide/ formoterol) *400/12		Salflumix Easyhaler[#] (fluticasone propionate/ salmeterol) *500/50
	DuoResp Spiromax[#] (budesonide/formoterol) *400/12 Also available as: BiResp Spiromax		Breo Ellipta[#] (fluticasone furoate/vilanterol) *100/25

LAMA/LABA			
	Anoro Ellipta (umeclidinium/vilanterol)		Spiolto Respimat (tiotropium/olodaterol)
	Brimica Genuair (acridinium/formoterol)		Ultibro Breezhaler (glycopyrronium/indacaterol)

The products included were those available on the PBS as at June 2024. Check TGA and PBS current population, age and clinical criteria. Please visit www.ebs.tga.gov.au for full Product Information of the products listed. Lung Foundation Australia provides clinical education, resources and patient support and information. Call 1800 654 301 or visit lungfoundation.com.au. June 2024. © Lung Foundation Australia. Next review and update December 2024.

Theophylline

- No longer recommended for treatment of COPD in Australia
 - **Evidence pre-dates current standard of care**
- Class: Methylxanthine
- MOA:
 - Causes bronchial smooth muscle relaxation
 - Pulmonary vasodilator
 - CNS stimulation

Theophylline (Nuelin[®] SR)

- Adverse effects

- Hypotension
- Tachycardia
- Palpitations
- Headache
- Insomnia
- Tremor

- Narrow therapeutic index

- Trough level 10-20mg/L

- **Interactions!!**

- Drugs
- Tobacco smoking

- ***Your COPD patient tries to quit smoking after having been taking theophylline 200mg BD for 3 months. What will happen to their theophylline level??***

COPD Exacerbations

- Acute onset
- Beyond normal day-to-day variations
 - Increasing dyspnoea, tachypnoea, cough frequency, sputum production
 - Right heart failure → observable ankle oedema
- Following a hospitalisation for COPD, the 12-month mortality rate is ~25%.
- May be triggered by infection (viral or bacterial) **or** non-infective causes (e.g. pollutants, stressors, heart failure, etc.)

COPD Exacerbations

- SABAs and SAMAs
 - Higher doses
 - Salbutamol - 100microg MDI x 4-8 puffs via spacer PRN
 - Salbutamol - 2.5-5mg via nebuliser PRN
 - Ipratropium – 21microg MDI x 4 puffs via spacer Prn
 - Ipratropium – 500microg via nebuliser PRN
- Corticosteroids
 - Oral prednisolone – 30-50mg mane for 5 days then stop
- Antibiotics
 - **Only** indicated if the patient has **all 3 of:**
 - Acute increase in dyspnoea, increased sputum volume, and purulent sputum
 - +/- fever
 - **Use** amoxicillin or doxycycline
 - **Avoid** amoxicillin with clavulanic acid (= unnecessary broader spectrum treatment)

Summary: COPD-X

- Confirm diagnosis
- Optimise function
- Prevent deterioration
- Develop a plan of care
- Manage exacerbations

COPD Action Plan taken from: Lung Foundation Australia. Resources. Lung Foundation Australia website.

Updated 2021. Available at <https://lungfoundation.com.au/resources/copd-action-plan/>

MY COPD ACTION PLAN Your doctor, nurse and other members of your healthcare team can help you fill in your COPD Action Plan. Review it each year, and also after a flare-up.

MY DETAILS

Name _____
Date of birth _____
Date of influenza immunisation (annual) _____
Date of pneumococcal immunisation _____

MY HEALTHCARE TEAM

Doctor _____
Phone _____
Other members of your healthcare team
Name _____
Profession _____
If I am unwell, I can call _____ on _____ for after hours advice.

I have a usual amount of phlegm/breathlessness. I can do my usual activities.

ACTION: Take your usual COPD medicines.

My FEV₁ is _____ I retain CO₂ Yes No Unknown

Medicine	Inhaler colour	Number of puffs	Times per day

I need to use home oxygen on _____ setting or L/min for _____ hours/day.

I am coughing more. I have more phlegm. It is harder to breathe than normal.

ACTION: Take your flare-up medicines. Monitor your COPD symptoms closely. Call your doctor.

Take _____ puffs of _____ (reliever) _____ times every _____ hours / A.M. / P.M. (circle)
 Use a spacer

I have taken my extra medicines but I am not getting better.

Take action now to manage your symptoms. Call your doctor.

Shortness of breath or wheeze	Phlegm has changed colour or fever
ACTION: Take _____ prednisolone tablets (1mg, 5mg, 25mg (circle) _____ times per day for _____ days.	ACTION: Take _____ antibiotic tablets _____ times per day for _____ days. Antibiotic name _____

My COPD symptoms have changed a lot. I am worried.

Difficulty sleeping/woken easily Blood in phlegm or swollen ankles.	Very short of breath/wheezy High fever or confusion Chest pain or slurred speech.
--	---


ACTION: Call your healthcare team today. **ACTION: Call 000 now.**

CAUTION: Ambulance/Paramedics: Oxygen supplementation to maintain SpO₂ 88 - 92% to reduce risk of hypercapnia.

Health professional authorisation

This COPD Action Plan was prepared on ____ / ____ / ____ by _____ in consultation with the patient.

Signature: _____
Profession: _____
Authorised by (if prepared by a non-prescriber): _____
Signature: _____
 Entered into recall system

 Lung Foundation Australia
1800 654 301 | Lungfoundation.com.au

Activity 2

- Assign MOA and place-in-therapy

- ✓ Salbutamol
- ✓ Ciclesonide
- ✓ Formoterol
- ✓ Tiotropium
- ✓ Aclidinium
- ✓ Budesonide
- ✓ Terbutaline
- ✓ Umeclidinium
- ✓ Beclometasone
- ✓ Vilanterol
- ✓ Fluticasone
- ✓ Glycopyrronium
- ✓ Indacaterol
- ✓ Ipratropium
- ✓ Salmeterol
- ✓ Theophylline
- ✓ Olodaterol

Class	Drug	Main Indication (Asthma vs COPD)
SABA		
SAMA		
LABA		
LAMA		
Methylxanthine		
ICS		

Activity 3

- **Personal Reflection – Mrs X (Part 1)**
- Newly diagnosed with COPD
- Anxious +++
- Presents you with a new script
- *Have you seen a patient like Mrs X?*
- *How do you engage with Mrs X to develop rapport?*

References

- Lung Foundation Australia. COPD Overview. Lung Foundation Australia website. <https://lungfoundation.com.au/health-professionals/conditions/copd/overview>. Updated 2023.
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- National Heart, Lung, and Blood Institute (NHLBI). The Basics of Chronic Obstructive Pulmonary Disease (COPD). NHLBI website. Updated June 2018.
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