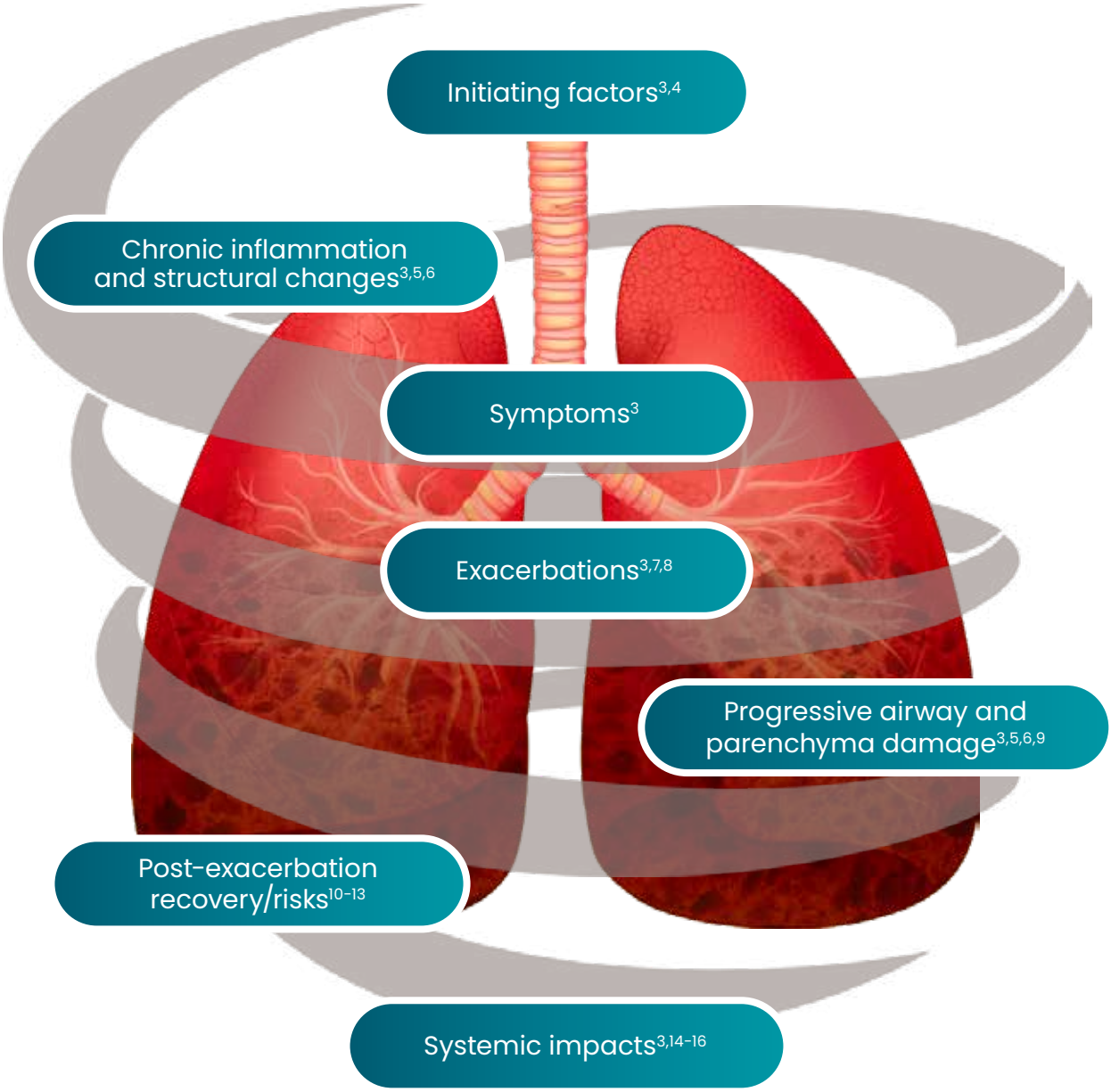
RESPIRATORY
ADVENT
ADVANCES IN
THE SCIENCE OF TYPE 2 INFLAMMATION

Worsening Disease Leads to a Vicious Cycle of COPD[1,2]



1. Agusti AG. *Respir Med*. 2005;99(6):670-682. **2.** Kardos P, Keenan J. *MedGenMed*. 2006;8(3):54. **3.** Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. Updated 2023. Accessed March 16, 2023. https://goldcopd.org/wp-content/uploads/2022/12/GOLD-2023-ver-1.1-2Dec2022_WMV.pdf. **4.** Stolz D, et al. *Lancet*. 2022;400(10356):921-972. **5.** Barnes PJ. *J Allergy Clin Immunol*. 2016;138(1):16-27. **6.** Linden D, et al. *Eur Respir Rev*. 2019;28:180063. **7.** Hogea SP, et al. *Clin Resp J*. 2020;14(3):183-197. **8.** Jamieson DB, et al. *Am J Respir Crit Care Med*. 2013;188(2):187-192. **9.** Higham A, et al. *Respir Res*. 2019;20(1):49. **10.** Hansel TT, Barnes PJ. *Lancet*. 2009;374(9691):744-755. **11.** Wageck B, et al. *COPD*. 2019;16(1):93-103. **12.** Donaldson GC, et al. *Thorax*. 2002;57(10):847-852. **13.** Garcia-Aymerich J, et al. *Thorax*. 2011;66(7):585-590. **14.** Barnes PJ, Celli BR. *Eur Respir J*. 2009;33(5):1165-1185. **15.** Dal Negro RW, et al. *Multidiscip Respir Med*. 2015;10(1):24. **16.** Gaddam S, et al. *BMC Pulm Med*. 2016;16:158.

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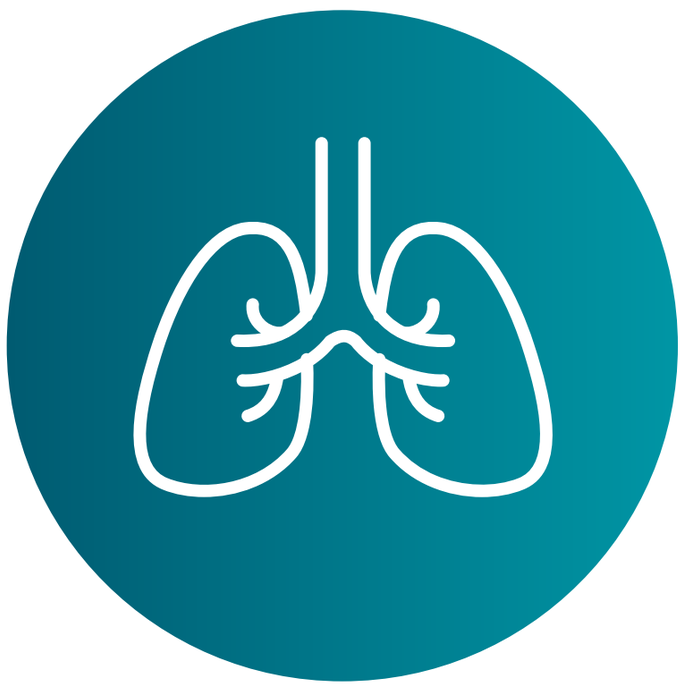
Initiating factors[1,2]

Smoking

Pollutants and environmental/occupational exposure



Abnormal lung growth/development

Genetics and early life events

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1. Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. Updated 2023. Accessed March 16, 2023. https://goldcopd.org/wp-content/uploads/2022/12/GOLD-2023-ver-1.1-2Dec2022_WMV.pdf. 2. Stolz D, et al. *Lancet*. 2022;400(10356):921-972.

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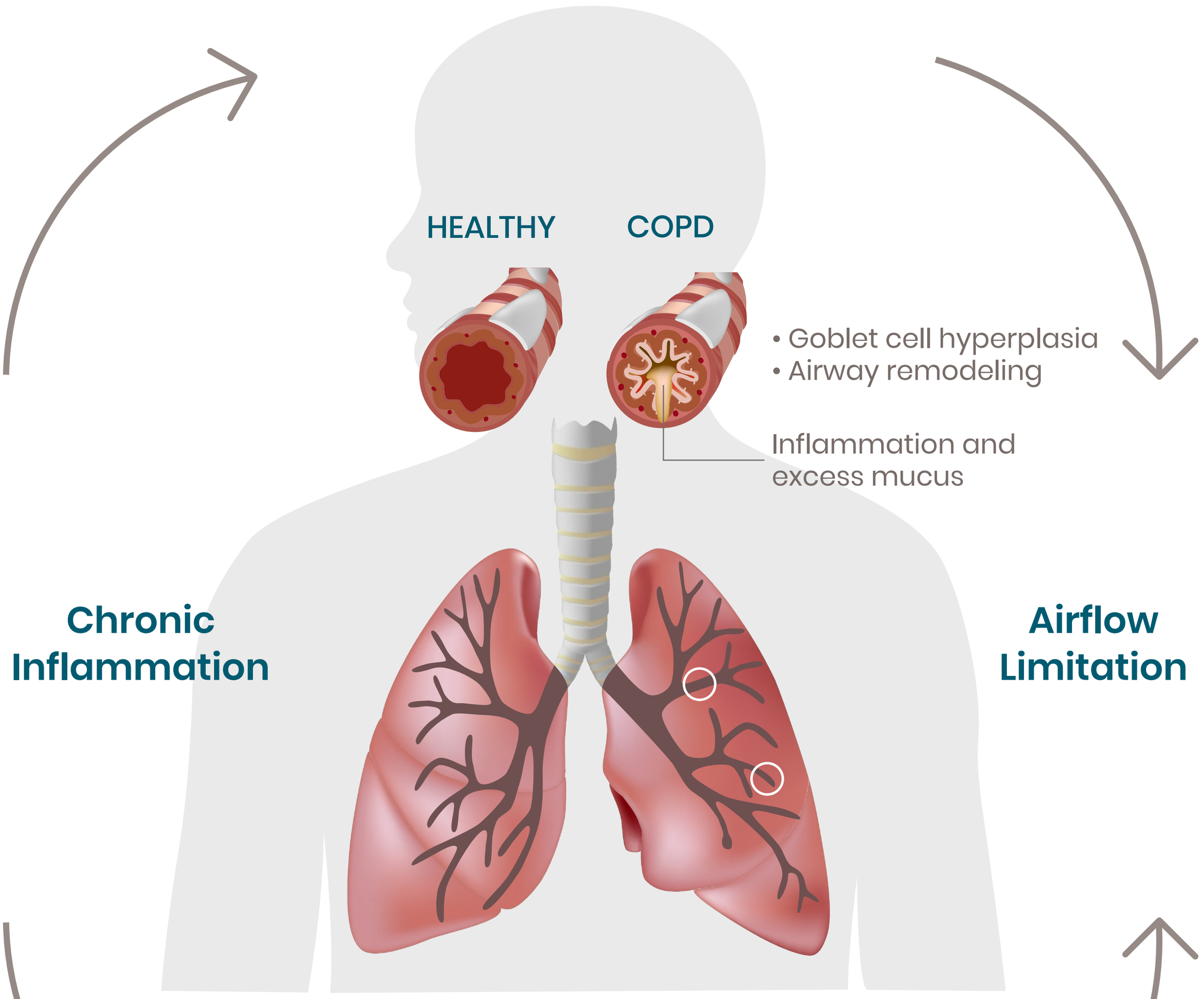
Chronic inflammation and structural changes[1–3]

Structural Changes of Airways



Parenchymal Destruction

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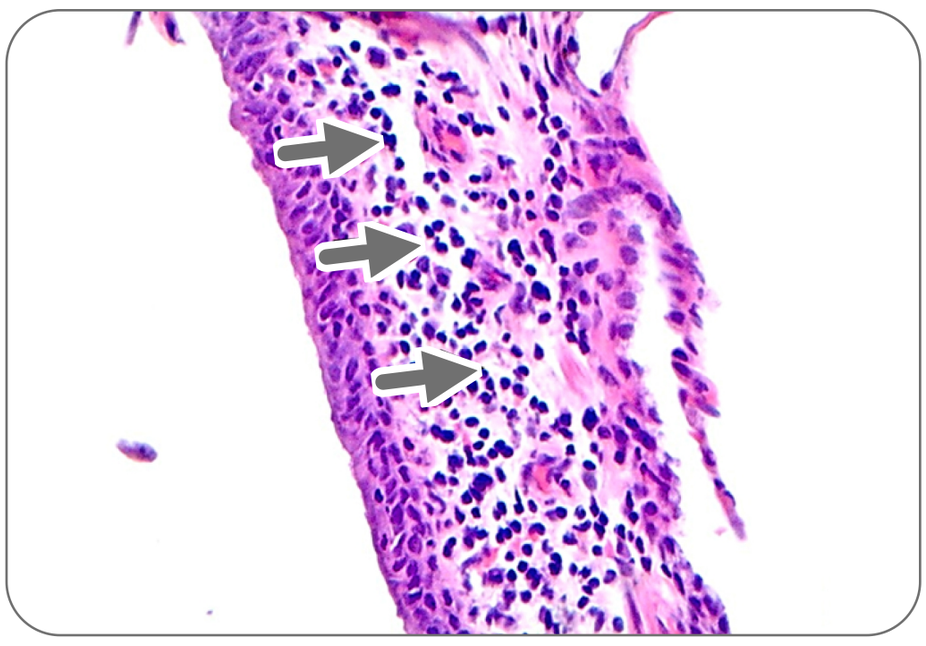
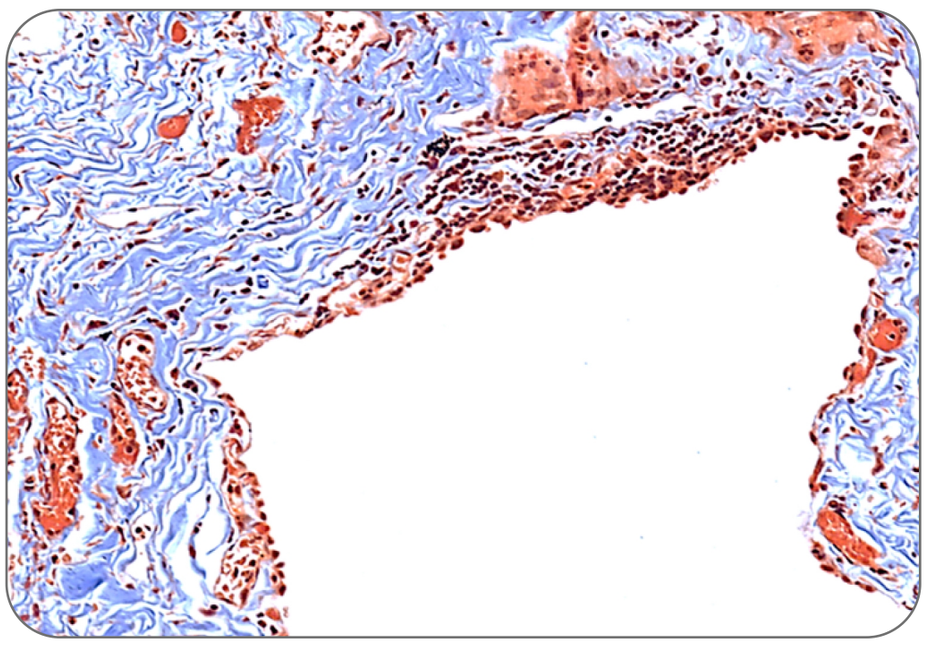
Progressive airway and parenchyma damage[1-4]

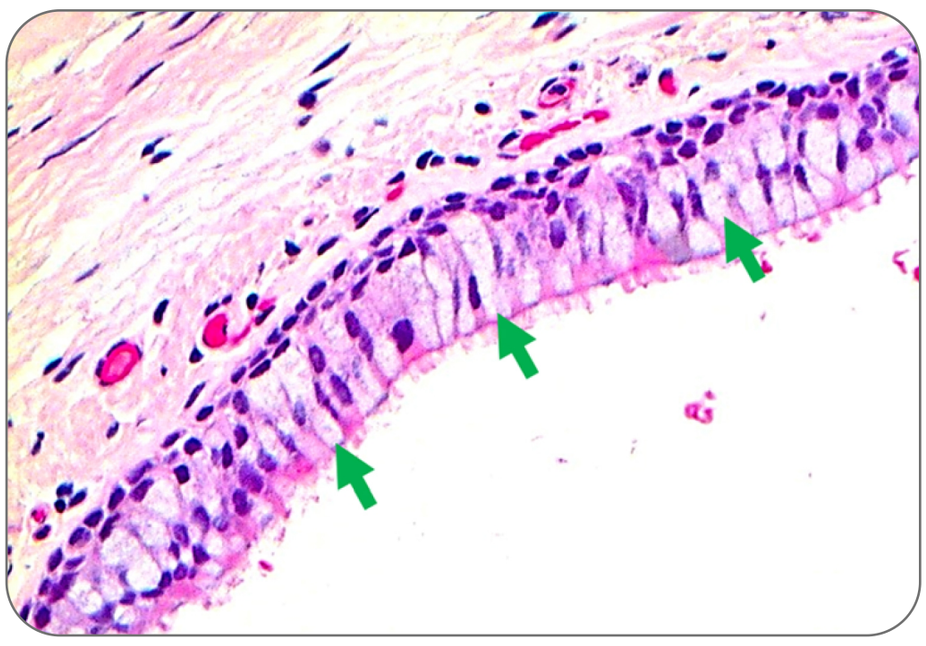


Inflammatory cell infiltration
(eg, neutrophils, macrophages, T cells)[1]



Increased airway wall thickness[1]

Mucus overproduction and plugging[1]



Goblet cell hyperplasia[1]

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1. Higham A, et al. *Respir Res*. 2019;20(1):49. 2. Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. Updated 2023. Accessed March 16, 2023. https://goldcopd.org/wp-content/uploads/2022/12/GOLD-2023-ver-1.1-2Dec2022_WMV.pdf. 3. Barnes PJ. *J Allergy Clin Immunol*. 2016;138(1):16-27. 4. Linden D, et al. *Eur Respir Rev*. 2019;28:180063.

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Symptoms[1]

Respiratory symptoms

Cough

Dyspnea

Wheeze

Chest tightness

Other symptoms

Fatigue

Sleep disturbance

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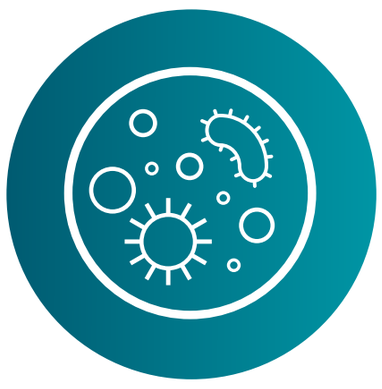
Exacerbations can be triggered by[1-4]:



Respiratory Infections[1,2]

Most common causes of acute exacerbations of COPD
- Viral: rhinovirus, influenza, parainfluenza, pneumovirus[1,2]
- Bacterial: *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catharralis*[2]

Pollution and Allergens[1,3]

- Smoking
- Ozone
- Carbon monoxide
- Particulate matter (PM2.5, PM10)
- Sulfur dioxide
- Allergic phenotype (ie, hay fever or allergic response to pollen, house dust, or animals)[3]

Seasonal Variation[1]

A few published studies show more common severe exacerbations during winter months

History of previous exacerbations is the most consistent predictor of COPD exacerbations[1]

close

1. Hogea SP, et al. *Clin Resp J*. 2020;14(3):183-197. 2. Global Initiative for Chronic Obstructive Lung Disease (GOLD) Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. Updated 2023. Accessed March 16, 2023. https://goldcopd.org/wp-content/uploads/2022/12/GOLD-2023-ver-1.1-2Dec2022_WMV.pdf. 3. Jamieson DB, et al. *Am J Respir Crit Care Med*. 2013;188(2):187-192.

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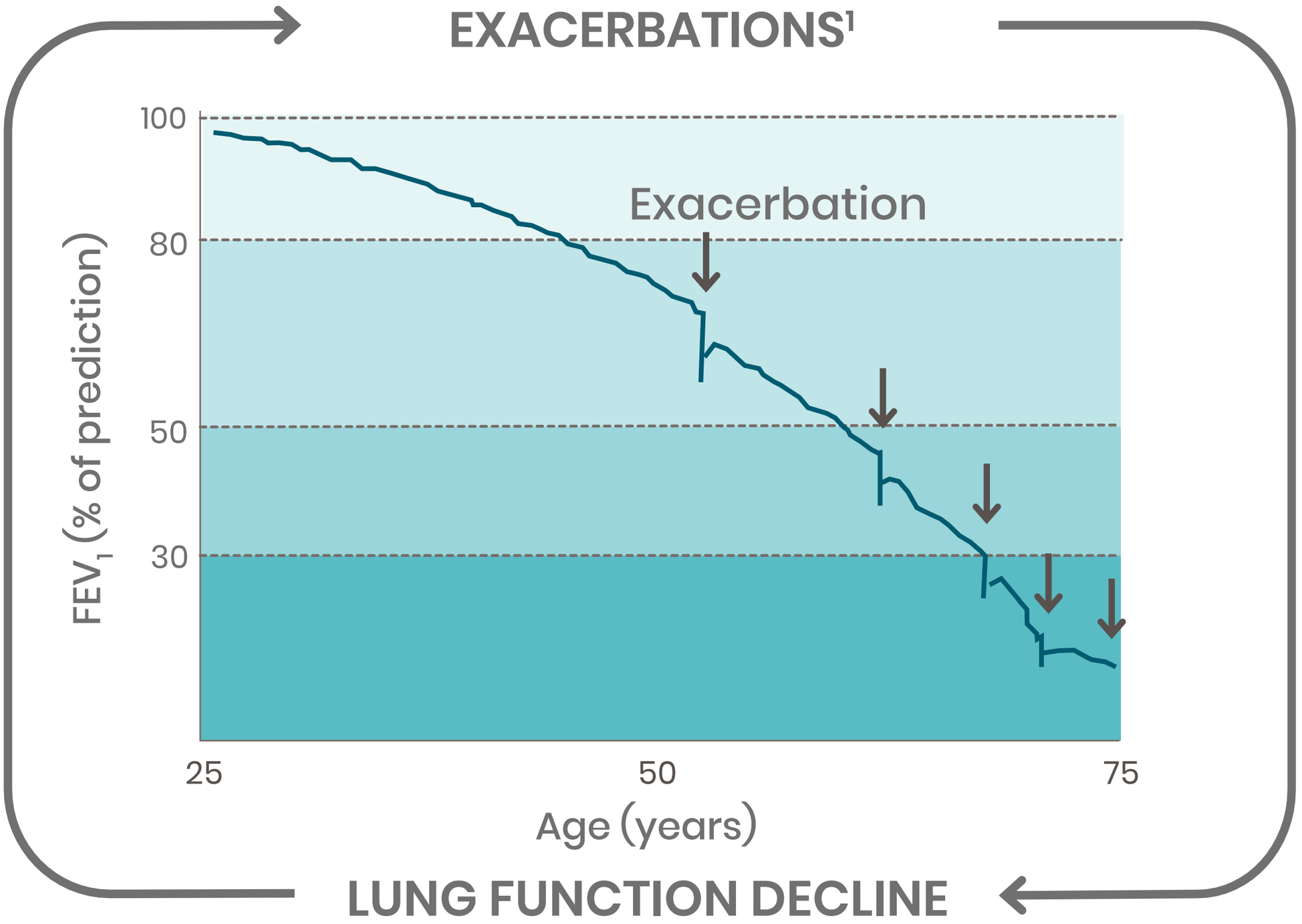
Post-exacerbation recovery/risks[1-6]



Trajectory is based on a hypothetical COPD patient experiencing exacerbations and is reflective of published evidence demonstrating that exacerbations contribute to greater lung function decline[1-4]

Following an exacerbation, FEV_1 often returns to baseline within several months, but for a small fraction of patients, FEV_1 does not return to pre-exacerbation levels[5]

Patients who experience frequent exacerbations show a significantly faster decline in FEV_1[2]

Low FEV_1 is a risk factor for COPD exacerbations and hospitalizations[6]

close

FEV_1, forced expiratory volume in 1 second.

1. Hansel TT, Barnes PJ. *Lancet*. 2009;374(9691):744-755. 2. Donaldson GC, et al. *Thorax*. 2002;57(10):847-852. 3. Wedzicha JA, Seemungal TAR. *Lancet*. 2007;370(9589):786-796. 4. Dransfield MT, et al. *Am J Respir Crit Care Med*. 2017;195(3):324-330. 5. Wageck B, et al. *COPD*. 2019;16(1):93-103. 6. Garcia-Aymerich J, et al. *Thorax*. 2011;66(7):585-590.

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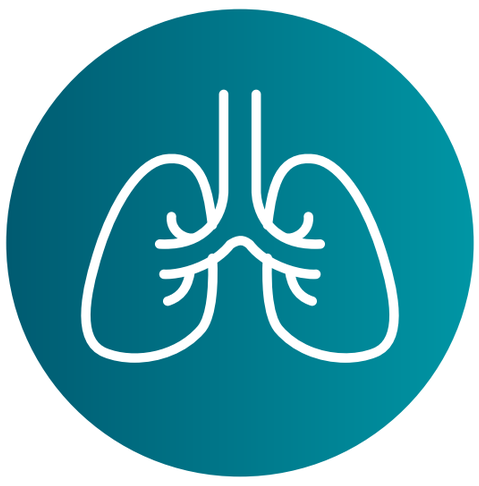
Multimorbidities associated with COPD

COPD is associated with high rates of comorbid conditions, some of which can contribute to increased mortality[1,2]

Pulmonary



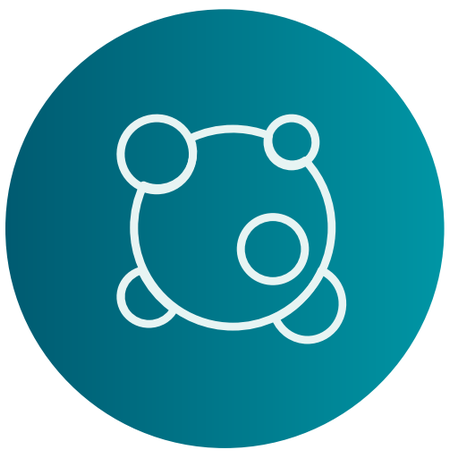
- Lung cancer[1-3]
- Bronchiectasis[1,3]
- Asthma[3]
- Pulmonary arterial hypertension[1,2]

Extrapulmonary

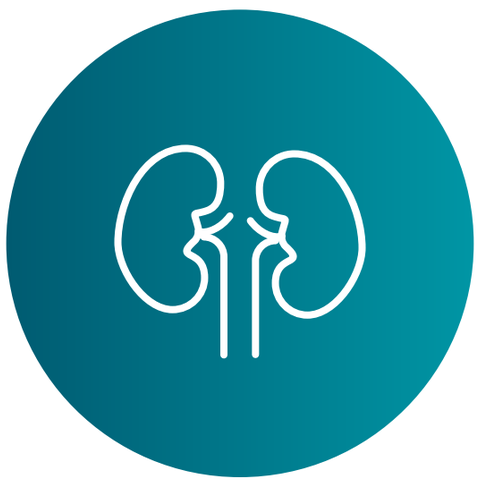
Cardiovascular[1-3]

Musculoskeletal/ Osteoporosis[1-3]

Neurologic[1-3]



Metabolic[1,2]



Renal[4]

Gastrointestinal[1,3]

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1. Global Initiative for Chronic Obstructive Lung Disease (GOLD). Global strategy for the diagnosis, management, and prevention of chronic obstructive pulmonary disease. Updated 2023. Accessed March 16, 2023. https://goldcopd.org/wp-content/uploads/2022/12/GOLD-2023-ver-1.1-2Dec2022_WMV.pdf. 2. Barnes PJ, Celli BR. *Eur Respir J*. 2009;33(5):1165-1185. 3. Dal Negro RW, et al. *Multidiscip Respir Med*. 2015;10(1):24. 4. Gaddam S, et al. *BMC Pulm Med*. 2016;16:158.

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