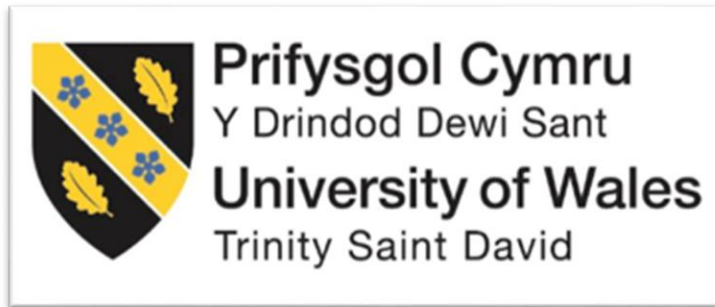




Community Care and Management of Longer-term Conditions
(LCHS7003_LON)

Component 1: booklet

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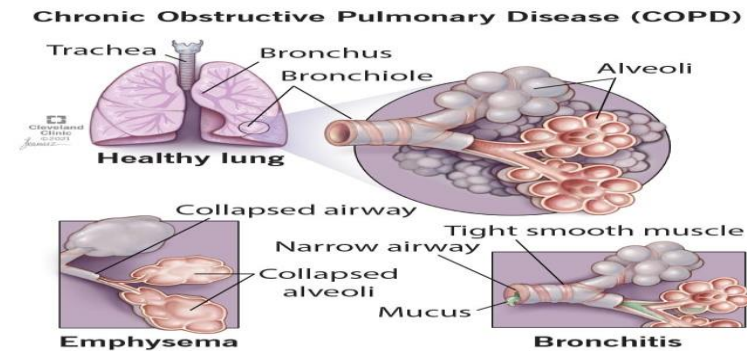
CHRONIC OBSTRUCTIVE PULMONARY DISEASE (~) COPD

INTRODUCTION

Definition:

Damage to the lungs results in the persistent lung condition known as chronic obstructive pulmonary disease (COPD). Inflammation, which restricts airflow into and out of the lungs, is caused by swelling and irritation inside the airways. This restricted airflow is referred to as blockage (NHS England). Breathing difficulties, a mucus-producing cough every day, and wheezing—a tight, whistling sound in the lungs—are among the symptoms (NHS England).

The two most prevalent forms of COPD are emphysema and chronic bronchitis (Celli et al., 2022). People with COPD may have varying degrees of severity for these two illnesses, which typically coexist (Celli et al., 2022). Chronic bronchitis is an infection of the lining of the tubes that transport air to the lungs. These tubes are known as bronchi. The inflammation hinders proper airflow into and out of the lungs and produces excess mucus. Emphysema is characterised by damage to the lungs' tiny air sacs known as alveoli. The injured alveoli cannot pass sufficient oxygen into the circulation (WHO, 2021). COPD is most usually caused by long-term exposure to irritate smoke, fumes, dust, or chemicals. The primary culprit is cigarette smoke.



(Cleveland clinic, 2024)

PREVELENCE OF COPD (UK)

Numerous research employing diverse approaches and data sources have assessed the prevalence of chronic obstructive pulmonary disease (COPD) in the United Kingdom (Rycroft et al., 2012). According to one study that included spirometry testing and four postal respiratory questionnaire surveys in a general practice population, the estimated incidence of COPD was 4.1% overall, with the highest prevalence of 14.7% in those aged 60–69 and 9.6% in those over 40. According to this study, the prevalence is higher than earlier estimates of 1-2% (Rycroft et al., 2012)

A rising trend in COPD prevalence over time was found in another investigation that used routinely collected primary care electronic healthcare records connected with hospital data in England from 2000 to 2019 (Stone et al., 2023). Using verified COPD occurrences in primary or secondary care among persons 40 years of age and older, the prevalence was estimated at 4.9% in 2019.

The frequency rose to 6.7% when potentially undetected cases based on symptoms and inhaler prescriptions without an asthma diagnosis were considered (Stone et al., 2023). Additionally, this study found that the difference between validated and QOF-based prevalence has grown over time and that common criteria, such as Quality and Outcomes Framework (QOF) codes, may underestimate real COPD prevalence (Hollingworth et al., 2014).

According to a mathematical model based on the Health Survey for England 2001, the prevalence of COPD was projected to be 5.3% in people over 45 and 3.1% in people over 15 (Raluy-Callado et al., 2015). The model showed that prevalence varied among subgroups and that estimates were influenced by parameters like age, sex, smoking status, ethnicity, deprivation, and urbanisation. For instance, prevalence varied from 1.7% in affluent rural Asian women to 12.5% in impoverished urban black men (Raluy-Callado et al., 2015). The prevalence of COPD in adults in the UK typically varies from 3% to 7%, depending on the age group, population under study, and case criteria applied. Additionally, the findings indicate that prevalence estimates have risen over the past few decades and that COPD may be underdiagnosed in routine clinical records (Melville et al., 2010).

PREVALENCE OF COPD (WORLD)

The prevalence of chronic obstructive pulmonary disease (COPD), a respiratory disorder that varies by age, sex, and area, is quite high worldwide (Varmaghani et al., 2018). According to post-bronchodilator spirometry, the prevalence of COPD is estimated to be 12.16% worldwide, with a greater prevalence in males (15.70%) than in women (9.93%) (Varmaghani et al., 2018). Geographically,

this frequency varies; the Americas have the highest rates (14.53%), while South-East Asia and the Western Pacific have the lowest percentages (8.80%) (Varmaghani et al., 2018).

The highest incidence and prevalence are reported in men and those 75 years of age and older. Prevalence rates also vary by age and diagnostic criteria (Rycroft et al., 2012).

Differences in COPD diagnosis and classification techniques have an impact on the diversity in prevalence between populations and nations (Boers et al., 2023).

According to projections, the number of cases of COPD among those 25 years of age and older is predicted to increase by 23% between 2020 and 2050, reaching approximately 600 million cases globally (Boers et al., 2023).

In low- and middle-income areas, where instances are predicted to more than double compared to high-income regions, this increase is expected to be more noticeable among women, with a projected 47.1% increase in female cases compared to a 9.4% increase in male cases (López-Campos et al., 2015). Risk factors including smoking, air pollution, and demographic shifts like population ageing all have an impact on the prevalence of COPD worldwide (May & Li, 2014). The total prevalence is still high and is predicted to rise because of these causes, even if standardised mortality rates have decreased in certain Western nations (May & Li, 2014).

In the past, most of the research has shown that men are more likely than women to have COPD and to die from it (Li et al., 2020). However, data from industrialised nations between 2012 and 2013 indicate that the prevalence of COPD is now nearly similar in men and women, most likely as a result of varied cigarette smoking habits (Hollingworth et al., 2014). Despite being exposed to a

comparable amount of smoke, some research has also indicated that women may be more susceptible to airflow obstruction than men (Han, 2020).

According to a global survey, 12.2% of those who have never smoked have COPD (Syamlal et al., 2019). This could be the result of burning solid fuels indoors in low- and middle-income nations or air pollution. In the US, 2.2% of those who have never smoked have COPD (Syamlal et al., 2019). Many of these cases are linked to occupational exposures, such as those in the mining sector and in the preparation and serving of food (Syamlal et al., 2019).

AETIOLOGY OF COPD

The primary risk factor for COPD is tobacco use. More than 70% of COPD cases in high-income nations and 30% to 40% of cases in low- and middle-income countries are caused by tobacco smoking (Martinez, 2016). Smoking causes oxidative damage, cilia malfunction, and an inflammatory response (Martinez, 2016).

Other causes include air pollution, the indoor use of biomass fuels, and occupational exposure to dusts, chemical agents, and fumes (Viegi et al., 2007). Inhaling excessive dosages of insecticides, as well as high quantities of particulate matter, has been related to an increased risk of COPD. Oxidative stress and an imbalance in proteases and antiproteases play essential roles in the aetiology of COPD, particularly in patients with alpha-1 antitrypsin deficiency (Viegi et al., 2007).

➤ Cigarette smoking

The great majority of persons with COPD worldwide have lung damage induced by long-term cigarette smoking. However, because not everyone who smokes develops COPD, additional factors are likely to have a role. One such reason could be genetic alterations that predispose some persons to the illness (Mannino, 2022). Other irritants that might develop COPD are cigar smoke, second hand smoke, pipe smoke, air pollution, and workplace exposure to dust, smoke, or fumes (Mannino, 2022).



Alpha-1-antitrypsin deficiency

COPD affects approximately 1% of the population due to a gene mutation handed down via generations. This is a hereditary variant of emphysema. This gene reduces the amount of a protein called alpha-1-antitrypsin (AAT) in the body (Huang et al., 2019). The liver produces AAT, which is then released into the bloodstream to help protect the lungs from harm caused by smoke, pollutants, and dust. Low levels of this protein, known as alpha-1-antitrypsin (AAT) deficiency, can result in liver damage, lung disorders like COPD, or both. AAT deficiency is typically associated with a family history of COPD, and symptoms appear at a younger age (Huang et al., 2019).

➤ Environment Exposure

Lung irritation and oedema can result from prolonged exposure to smoke, dust, vapours, and chemical fumes during work. This may increase the chance of developing COPD (Ryu et al., 2023). People in poorer nations who are exposed to fumes from burning fuel for heating and cooking in homes with inadequate ventilation are more likely to develop COPD (Schikowski et al., 2013)

➤ Asthma

Although asthma is not thought to be a direct cause of COPD, there is evidence that asthma, especially when it is persistent and associated with other risk factors, might result in ACOS, a clinical syndrome containing characteristics of both diseases (Şen et al., 2015). This overlap implies that asthma may have a role in the emergence of airflow restriction similar to COPD (Şen et al., 2015).

How the lungs are affected

Chronic inflammation of the lung parenchyma and alveoli, pulmonary vasculature, and central and peripheral airways is the hallmark of COPD. Physiological and structural alterations result from repeated injury and repair (Aldonyte et al., 2015). The lung's structural and inflammatory alterations worsen with the severity of the illness and continue even after quitting smoking (Aldonyte et al., 2015).

The primary elements of these alterations are airway remodelling and constriction, an increase in goblet cells, enlargement of the central airways' mucus-secreting glands, alveolar loss, and, lastly, vascular bed alterations that result in pulmonary hypertension (De Oliveira Rodrigues et al., 2021).

COMPLICATIONS:

○ Physically

Patients with chronic obstructive pulmonary disease (COPD) experience a variety of physical consequences that affect their **body composition, activity tolerance, respiratory function**, and **general quality of life** (Rossi et al., 2017). Even when spirometry reveals minor airflow limitation, COPD is characterised by progressive airflow obstruction, which might be mild in the early stages but is nevertheless linked to physiological deficits such **decreased exercise tolerance, impaired gas exchange**, and **decreased diffusing capacity** (Rossi et al., 2017).

Physical activity may be restricted by this airflow restriction, which could have a detrimental impact on patients' **survival and quality of life** Lee et al., 2017).

Coughing and dyspnoea are common in COPD patients, and they significantly increase symptom burden and lower health-related quality of life (HRQoL). These respiratory symptoms are associated with physical inactivity and are correlated with the severity of the condition (Mihaltan et al., 2021).

Lower levels of physical activity are linked to 24-hour respiratory symptoms, including early morning, midday, and overnight symptoms, which doctors may exaggerate (Tramontano & Palange, 2023). The burden of symptoms and illness outcomes are further worsened by inactivity (Tramontano & Palange, 2023).

- **Psychological**

Significant psychological effects are linked to chronic obstructive pulmonary disease (COPD), especially given the high frequency of co-occurring anxiety and sadness (Crisan et al., 2025). These symptoms affect almost one-third of people with COPD and are linked to worse health outcomes, such as lower health-related quality of life and higher mortality risk (Coventry et al., 2014)

Psychological distress is correlated with the severity of COPD; patients with severe COPD report lower levels of self-compassion and **higher levels of anxiety, sadness, and guilt than those with moderate disease** (Zareifopoulos et al., 2019).

- **Social**

Caring for people with Chronic Obstructive Pulmonary Disease (COPD) has a variety of social ramifications that impact the carers themselves as well as their larger family networks (Cruz et al., 2015). The pressures of caregiving have a substantial detrimental effect on family carers' physical and mental health, relationships, social connections, and financial or work status (Figueiredo et al., 2013).

These loads are exacerbated by the progressive nature of COPD; carers of patients in advanced stages report higher subjective burden, more anxiety and depressive symptoms, and worse self-rated mental health than carers of patients in early stages (Rocker et al., 2010).

Family-based pulmonary rehabilitation programs and other family-based interventions have demonstrated the ability to enhance coping mechanisms and psychosocial adjustment for both patients and carers, indicating that including families in care plans may lessen certain social and emotional effects (Marques et al., 2014).

However, current therapies frequently lack clarity regarding the precise role that carers play, which restricts how their efficacy may be interpreted (Marques et al., 2014).

NHS TREATMENT

Chronic obstructive pulmonary disease (COPD) has no known cure; however, medication can help manage symptoms and decrease the disease's progression (NHS England, 2022).

Treatment including:

- **Stop smoking:** The best approach to keep COPD from growing worse if you smoke is to quit.

Quitting smoking can help stop more harm to your lungs and airways, even though any harm already done cannot be undone (NHS, 2022).

Even those with more advanced COPD will benefit by stopping, even though this may be all the treatment required in the early stages of the disease.



- **Inhalers** : The treatment of chronic obstructive pulmonary disease (COPD) involves the complex use of inhaled corticosteroids (ICS) (Heran et al., 2024). The main goals of their use are to lessen symptoms and exacerbations, although randomised trials show that they have little effect in lowering mortality or improving quality of life (Heran et al., 2024).



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- **Surgery and lung transplantation:** For certain patients with end-stage COPD, lung transplantation is a therapy option that may improve survival and quality of life; however, patient selection, scheduling, and complication management are still crucial considerations (Guillamet, 2019).
- **pulmonary rehabilitation:** A therapy plan known as pulmonary rehabilitation (PR) consists of:

types of exercise intended for individuals with chronic lung issues

details on how to take care of your body and lungs, suggestions for treating your lung disease, and

methods for dealing with dyspnoea (Asthma and lung UK, 2023).

THEORETICAL FRAMEWORKS

Several interrelated biological mechanisms are highlighted in theoretical frameworks for comprehending the pathophysiology of COPD. One well-known theory concerns the role of mitochondria in COPD, wherein tissue remodelling, innate immunological signalling, inflammasome activation, and pulmonary inflammation are all influenced by mitochondrial dysfunction (Kang & Shadel, 2016). This viewpoint places mitochondria at the centre of COPD pathogenesis by integrating increased protease burden from chronic inflammation, reactive oxygen species production, oxidant damage, and accelerated cell death responses as multiple factors to disease development (Kang & Shadel, 2016).

Another framework emphasises cell surface receptors and innate immunity, especially in relation to exposure to cigarette smoke. This strategy emphasises how tobacco-related stimuli attract and activate neutrophils and monocytes, promoting chemotaxis, adhesion, phagocytosis, and the release of enzymes and reactive oxygen species (De Cunto et al., 2020). The significance of innate immune systems and receptor-mediated pathways in lung damage and remodelling generated by cigarette smoke is highlighted using mouse smoking models to clarify genetic and physiological factors regulating these immune responses (De Cunto et al., 2020).

THEORETICAL MODELS

There are several uses for theoretical models of chronic obstructive pulmonary disease (COPD), such as **economic modelling of disease progression, prediction of physical activity, and assessment of disease management** (Pollok et al., 2019).

The integrative Physical Activity-related Health Competence (PAHCO) model defines the movement, control, and self-regulation competencies that facilitate an active lifestyle in order to conceptualise physical activity in COPD patients (Carl et al., 2021).

Although the aim of these models varies (economic modelling, physical activity prediction, and disease treatment evaluation), they all place a strong emphasis on connecting clinical and patient-centered characteristics to outcomes (Tabberer et al., 2016). The PAHCO model focusses on competence-related determinants of physical activity, the illness management model stresses process and intermediate results, and the economic model incorporates several disease features to forecast progression and outcomes (Tabberer et al., 2016).

LOCAL AND NATIONAL AGENDA

In the UK, the implementation of local and national political health and social care agendas, especially regarding COPD, demonstrates a complicated interaction between practical service delivery issues and policy directions (Hamilton et al., 2008)

Primary treatment Organisations (PCOs) in England and Wales are entrusted with providing cost-effective, patient-centered respiratory

services in response to central policies aimed at moving long-term condition treatment into the community while ensuring financial viability (Sheikh et al., 2019). However, a variety of local conditions, such as **organisational difficulties**, **professional attitudes**, and **financial limitations**, affect how these services are designed and implemented (Sheikh et al., 2019).

To lower hospital admissions, many PCOs concentrate on patients with complicated needs. However, they encounter obstacles that hinder the growth of services for COPD and other respiratory illnesses, **including a lack of funds, clinician resistance, contradicting policies, and workforce demoralisation** (Darker et al., 2018).

National clinical programs, like those in Ireland, offer findings pertinent to the UK environment on a larger scale (Darker et al., 2018). The quality of leadership, governance structures, political and social circumstances, resource constraints, resistance to change brought on by inadequate communication, and outside pressures like general practitioner contracts all have an impact on how such programs are implemented. These components emphasise the significance of considering both direct and indirect obstacles when organising and carrying out health system upgrades, which can guide COPD-related projects in the UK (Magnusson, 2010).

Additionally, the UK's Global Health Respiratory Network, which involves interdisciplinary collaborations and international cooperation, is a prime example of a cooperative approach to respiratory health research and capacity building. Although this network's primary focus is on global health, its approach of combining clinical, social, and health systems research could influence COPD development projects in the UK by highlighting

evidence-based practice and interdisciplinary collaboration (Magnusson, 2010).

RECOMMENDATIONS

Enhancing COPD person-centred care techniques, such as self-management and end-of-life care, requires several interconnected tactics.

- Structured, team-based follow-up programs that employ counselling techniques like Guided Self-Determination can help support self-management. Patients have found this method to be inspiring and beneficial in enhancing their self-management abilities since it promotes mutual introspection and decision-making between patients and medical providers (Gardener et al., 2018).
- Patient satisfaction with individualised attention and communication has been demonstrated to increase with the use of tools such as the PRISMS form, which enables patients to choose areas where they want self-management support prior to visits. This implies that by concentrating on patient-identified priorities like symptom treatment, including dyspnoea, organised tools can improve the quality of therapy (Kolltveit et al., 2023).

- Addressing a wide range of assistance needs is also crucial. These include understanding COPD, managing symptoms and medicines, psychological assistance (including anxiety and depression), practical help, social interactions, and navigating healthcare services. Person-centred care requires the recognition and response to psychological illness, as well as the support of carers (Gardener et al., 2018).
- Furthermore, public understanding of COPD should be increased to eliminate stigma and boost support (Kolltveit et al., 2023).

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