Chronic obstructive pulmonary disease (COPD)

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Chronic obstructive pulmonary disease (COPD) is characterised by airflow limitation in the lungs, which can lead to mild or severe shortness of breath that is not fully reversible even with treatment. COPD is a serious long-term disease that mainly affects older people, and includes conditions such as emphysema and chronic bronchitis.

Findings from this report:
- COPD was the 5th leading cause of death in 2017
- About 1 in 20 Australians aged 45 years and over had COPD in 2017–18, according to self-reported survey data
COPD

What is COPD?

COPD is a serious, progressive condition that limits airflow in the lungs. COPD is characterised by airflow limitation that is not fully reversible with the use of medication. People with COPD may also have a persistent cough with sputum due to excessive mucus production in the airways (known as chronic bronchitis) or evidence of lung tissue destruction, enlargement of the air sacs and further impaired lung function (known as emphysema). The terms COPD, emphysema and chronic bronchitis are often used interchangeably. In 2015, COPD was the third leading specific cause of total disease burden [1]. In 2015–16, COPD cost the Australian health system an estimated $976.9 million, representing 24% of disease expenditure on respiratory conditions and 0.8% of total disease expenditure [2].

COPD may be associated with other chronic conditions such as asthma, respiratory cancers, diabetes and diseases of the heart and blood vessels due to shared risk factors and the effect of COPD on other parts of the body. The main cause of COPD is active smoking or exposure to smoking, however other causes may be involved, such as [3]:

- smoke from burning fuels of plant or animal origin
- outdoor air pollution
- fumes and dust in the workplace
- childhood respiratory infections
- chronic asthma.

It can be difficult to distinguish asthma from COPD because the symptoms of both conditions can be similar. Although the current definitions of asthma [4] and COPD [5] overlap, there are some important features that distinguish typical COPD from typical asthma. For example, people with COPD continue to lose lung function despite taking medication, which is not a common feature of asthma. More information on asthma can be found under Asthma.

There is increasing recognition of asthma-COPD overlap (also called asthma-COPD overlap syndrome, or ACOS). Overall, approximately 20% of patients with obstructive airway disease have been diagnosed with both asthma and COPD [6] (for more information on prevalence, see Asthma-COPD overlap 2017). It is important to identify people with asthma-COPD overlap, because they are at higher risk than patients with asthma or COPD alone, and because they should be treated differently from people with asthma or COPD alone [7]. The National Asthma Council Australia & Lung Foundation recently released an information paper on Asthma-COPD overlap, which includes recommendations for the treatment and management of the condition [7].

In February 2019, the Department of Health released the National Strategic Action Plan for Lung Conditions (the Action Plan), which includes COPD in its scope. The Action Plan provides a detailed, person-centred roadmap for addressing one of the most urgent chronic conditions facing Australians [8]. The Action Plan outlines a comprehensive, collaborative and evidence-based approach to reducing the individual and societal burden of lung conditions and improving lung health [8]. The Action Plan can be found here.

Who gets COPD?

The development of COPD occurs over many years and therefore affects mainly middle aged and older people while asthma affects people of all ages. The prevalence of COPD increases with age, mostly occurring in people aged 45 and over. COPD was the second leading cause of total disease burden for men aged 65-74 and 75-84 and the leading cause for women aged 65-74 [1].

The prevalence (the number of cases present in the population at a given time) of COPD is difficult to determine from routine health surveys. Since COPD is formally defined in terms of an abnormality of lung function, accurately estimating the prevalence of the disease requires clinical testing.

In the 2017-18 ABS National Health Survey (NHS), the prevalence of COPD (captured here as self-reported emphysema and/or bronchitis) in Australians aged 45 and over was 4.8%, an estimated 464,000 people [9]. Overall, the prevalence did not differ significantly between men and women (4.5% and 5.1%, respectively), however for those aged 55-64, COPD was more prevalent in women compared with men (6.2% and 3.6%, respectively).

A large international study—Burden of Obstructive Lung Disease (BOLD)—tested the lung function of nearly 10,000 people [10]. The BOLD study estimated the prevalence of COPD using spirometry testing plus questionnaires about respiratory symptoms, health status, and exposure to COPD risk factors. BOLD estimated the overall prevalence of COPD in 12 countries (including Australia, China, Turkey, Iceland, Germany, USA and Canada) to be 10% for people aged 40 and over. In a later study conducted in Australia using a protocol that closely followed that used in the global BOLD study, the prevalence of COPD was estimated to be 7.5% for people aged 40 years and over and 30% for people aged 75 and over [11].

Figure 1: Prevalence of COPD among people aged 45 and over, by age and sex, 2017-18
COPD here refers to self-reported current and long-term bronchitis and/or emphysema.

COPD occurs mostly in people aged 45 and over. While it is occasionally reported in younger age groups, in those aged 45 and over there is more certainty that the condition is COPD and not another respiratory condition. For this reason only people aged 45 and over are included in this graph.


COPD is more common among Aboriginal and Torres Strait Islanders

COPD affects an estimated 8.8% of Indigenous Australians aged 45 and over—approximately 10,300 people [13], based on self-reported data, although this is likely to be an underestimate. The prevalence of COPD (across all age groups) among Indigenous Australians is 2.5 times as high as the prevalence for non-Indigenous Australians after adjusting for differences in age structure [13].

Inequalities

The prevalence of COPD among people (both men and women) did not differ significantly according to remoteness area.

However, the prevalence of COPD was higher in the lowest socioeconomic area compared with those in the highest area (men: 8.0% and 2.6%, respectively; women: 6.9% and 3.9%, respectively).

Figure 2: Prevalence of COPD among people aged 45 and over, by remoteness and socioeconomic area, 2017-18
1. Remoteness is classified according to the Australian Statistical Geography Standard (ASGS) 2016 Remoteness Areas structure based on area of residence.
2. Socioeconomic areas are classified according to using the Index of Relative Socio-Economic Disadvantage (IRSD) based on area of residence.
4. COPD occurs mostly in people aged 45 and over. While it is occasionally reported in younger age groups, in those aged 45 and over there is more certainty that the condition is COPD and not another respiratory condition. For this reason only people aged 45 and over are included in this graph.


How does COPD affect quality of life?
COPD can interrupt daily activity, sleep patterns and the ability to exercise. People with COPD rate their health worse than people without the condition. In 2017-18, 20% of those aged 45 years and over with COPD rated their health as poor, compared with 5.4% of those aged 45 years and over without it. At the same time, 17% of those with COPD rated their health as very good and 4.9% as excellent compared with 34% and 17% (respectively) of those without COPD (Figure 3).

Figure 3: Self-assessed health of people aged 45 and over with and without COPD, 2017-18

Notes
2. COPD occurs mostly in people aged 45 and over. While it is occasionally reported in younger age groups, in those aged 45 and over there is more certainty that the condition is COPD and not another respiratory condition. For this reason only people aged 45 and over are included in this graph.


In 2017-18, people with COPD were more likely to report high (19%) and very high (17%) levels of psychological distress compared to people without COPD (8.3% and 4.0%, respectively) (Figure 4).

Figure 4: Psychological distress experienced by people aged 45 and over with and without COPD, 2017-18
1. Psychological distress is measured using the Kessler Psychological Distress Scale (K10), which involves 10 questions about negative emotional states experienced in the previous 4 weeks. The scores are grouped into Low: K10 score 10-15, Moderate: 16-21, High: 22-29, Very high: 30-50.
3. COPD occurs mostly in people aged 45 and over. While it is occasionally reported in younger age groups, in those aged 45 and over there is more certainty that the condition is COPD and not another respiratory condition. For this reason only people aged 45 and over are included in this graph.


In 2017–18, people with COPD were more likely to report moderate (36%) and severe (22%) bodily pain compared to people without COPD (23% and 7.8%, respectively).

Figure 5: Pain experienced by people aged 45 and over with and without COPD, 2017–18

Comorbidities

People with COPD often have other chronic diseases and long term chronic conditions. See COPD, associated comorbidities and risk factors.

References
Treatment & management

What role do GPs play in treating COPD?

General practitioners (GPs) are often the first point of contact for people who develop COPD. According to the Bettering the Evaluation and Care of Health (BEACH) survey, in the ten year period 2006-07 to 2015-16 the estimated rate of COPD management in general practice was around 0.9 per 100 encounters (Figure 1) [1].

Figure 1: General practice encounters for COPD, all ages, 2006-07 to 2015-16

Notes

1. The Bettering the Evaluation and Care of Health (BEACH) year is April to March.
2. An encounter relates to a consultation between a patient and a GP.
3. COPD classified according to International Classification of Primary Care, 2nd edition (ICPC-2) codes R79001, R79003 and R95.
4. Statistics on general practice activities based on BEACH data are derived from a random sample survey of GPs and their encounters with patients, and should be interpreted with caution.

Source: [1] (Data table).

What interventions are used to treat COPD?

Management of COPD is mainly focused on preventing further deterioration and maintaining lung function and quality of life. The only intervention that has been shown to slow the long term deterioration in lung function associated with COPD is assisting smokers to quit [2,3]. Three other interventions for COPD that can help maintain quality of life and reduce symptoms are pulmonary rehabilitation, medications, and, for people with very severe disease, long-term oxygen therapy.

Some statistical information is available about supply of medications for COPD, however, there is currently a lack of nationally comparable information about access to and utilisation of pulmonary rehabilitation and oxygen therapy. Options for improving data about these interventions are discussed in the report Monitoring pulmonary rehabilitation and long-term oxygen therapy for people with chronic obstructive pulmonary disease (COPD) in Australia - a discussion paper [4].

Medications

Medications are used in COPD to prevent and control symptoms, reduce the frequency and severity of exacerbations and improve exercise tolerance. Some drugs used to treat COPD are also used to treat other respiratory conditions such as asthma.

For more information see Respiratory medication use in Australia 2003-2013: treatment of asthma and COPD [5].

Several new medications have recently been approved for treatment of COPD in Australia, including new long-acting bronchodilators both separately and in combination with inhaled corticosteroids or other bronchodilators.

Oxygen therapy
Long term oxygen therapy (LTOT)—the provision of supplemental oxygen therapy for 15 hours per day or more—can be prescribed for people with persistently low levels of oxygen in the blood, including from chronic lung disease, most commonly advanced COPD. LTOT reduces mortality in COPD and may also have a beneficial impact on aspects of quality of life [6]. Although effective, it is a potentially expensive and cumbersome therapy that should only be prescribed for those in whom there is evidence of benefit [6]. In Australia, LTOT is mostly delivered in the home using an oxygen concentrator, a device that removes nitrogen from room air, thereby increasing the concentration of oxygen. Sometimes oxygen cylinders are provided for short-term or portable use.

Pulmonary rehabilitation

Pulmonary rehabilitation is one of the most effective interventions for COPD, and it is recommended for all patients with COPD who are short of breath on exertion. It is a system of care that includes education, exercise training and psychosocial support delivered by an interdisciplinary team of therapists. Pulmonary rehabilitation reduces symptoms, disability and handicap, reduces hospitalisation and improves physical and emotional function. It can help people achieve and maintain an optimal level of independence and functioning in the community. It has favourable interactions with other interventions, such as nutritional counselling and pharmacotherapy [7].

Pulmonary rehabilitation may include [6,7,8]:

- **Exercise training**—which aims to build patient confidence, maximise skeletal muscle, improve breathing techniques, optimise cardiovascular fitness, and encourage regular, ongoing exercise. Pulmonary rehabilitation that includes exercise training is considered to be a key component of the management of people with COPD.
- **Education**—explains the disease progression, how to use medicines, how treatment works, and when to ask for help. A primary component of education advice is assisting smokers to quit and sustain quitting.
- **Nutrition counselling**—the provision of individually tailored dietary guidance to optimise nutritional intake and control weight loss or gain. In patients with COPD, both excess weight and low weight are associated with increased morbidity. Obesity increases the work of breathing, while poor nutritional status and insufficient energy intake may lead to impaired muscle functions causing breathing difficulties.
- **Psychosocial support**—provided by support groups and other organisations. It may include emotional support, social support, and new knowledge and coping strategies to help people with COPD and their carers better manage the condition. People with COPD are vulnerable to developing symptoms of anxiety and depression, which then worsen quality of life and disability. Additional intervention by mental health specialists may be required for clinically significant symptoms of anxiety or depression.

Pulmonary rehabilitation can be provided in hospital outpatient departments, in community facilities or at home. Home-based Pulmonary Rehabilitation programs that include regular contact to facilitate exercise participation and progression, or community-based Pulmonary rehabilitation of equivalent frequency and intensity as hospital-based programs, can be offered to people with COPD as an alternative to usual care [8].

What role do hospitals play in treating COPD?

Patients may require admission to hospital for severe acute exacerbations of COPD. Acute exacerbations of COPD (flare-ups) are frequently due to respiratory tract infections. They have also been associated with increases in exposure to air pollution and changes in ambient temperature. Episodes that are life threatening sometimes require temporary assistance with breathing.

Data from the AIHW National Hospital Morbidity Database (NHMD) show that in 2016–17 there were 78,100 hospitalisations of people 45 years and over where COPD was the principal diagnosis. The rate of hospitalisation for COPD among those aged 45 and over was 757 per 100,000 population—the highest recorded over the previous 10 years.

The hospitalisation rate for men aged 45 years and over declined 6% in the ten years from 2007–08 to 2016–17, from 885 to 831 per 100,000 population (Figure 2).

In contrast, the hospitalisation rate for women increased by 17% from 599 in 2007–08 to 703 per 100,000 population in 2016–17. The rate of hospitalisation for women in 2016–17 was the highest recorded over the previous 10 years.

Hospitalisation rates for both men and women aged 45 years and over have been increasing since 2013–14.

Figure 2: COPD hospitalisations of people aged 45 and over, 2007-08 to 2016-17
There is a strong seasonal driver of COPD exacerbations

Admissions to hospital for COPD are highest in winter and early spring. This matches and is related to the trend for acute respiratory infections (e.g. rhinovirus (common cold), influenza, pneumonia and acute bronchitis) (Figure 3).

Figure 3: Hospitalisations for acute respiratory infection (ARI) or COPD of people aged 45 and over, by month, 2012-16

Note: Data obtained from records of hospitalisations, reported by period of hospital admission.

Source: AIHW National Hospital Morbidity Database (Data table).

References


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Deaths

How many die from COPD?

COPD is a major leading cause of death in Australia. In 2017, 7,518 people were recorded as having died from COPD (4,005 men and 3,513 women) making it the fifth leading cause of death after coronary heart disease, dementia and Alzheimer disease, cerebrovascular disease, and lung cancer.

However, the attribution of cause of death in the elderly is often difficult, particularly in relation to COPD and asthma [1,2,3]. In the period 2007-2011, among those aged 55 and over in Australia, only 40% of deaths where COPD was listed on the death certificate had COPD listed as the underlying cause of death [4].

The statistics presented here relate to deaths where COPD was listed as the underlying cause of death. For information on long-term trends, see General Record of Incidence of Mortality (GRIM) books. For more information on how deaths are registered, coded and updated, see Deaths data.

Table 1: Leading five causes of death, 2017

<table>
<thead>
<tr>
<th>Rank</th>
<th>Underlying cause of death</th>
<th>Number</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Coronary heart disease (I20–I25)</td>
<td>18,590</td>
<td>11.6</td>
</tr>
<tr>
<td>2</td>
<td>Dementia and Alzheimer disease (F01, F03, G30)</td>
<td>13,729</td>
<td>8.5</td>
</tr>
<tr>
<td>3</td>
<td>Cerebrovascular disease (I60–I69)</td>
<td>10,186</td>
<td>6.3</td>
</tr>
<tr>
<td>4</td>
<td>Lung cancer (C33, C34)</td>
<td>8,262</td>
<td>5.1</td>
</tr>
<tr>
<td>5</td>
<td>COPD (J40–J44)</td>
<td>7,518</td>
<td>4.7</td>
</tr>
</tbody>
</table>

Note: Deaths are for all ages.

Source: AIHW National Mortality Database.

COPD mortality has declined over time

Mortality from asthma and COPD in Australia [4] presents detailed analysis of COPD mortality for the period 1965 to 2010. In Australia, the COPD mortality rate among men aged 55 and over decreased by two thirds between 1970 and 2010, from 393 to 136 per 100,000 population. However, the COPD mortality rate among women in this age group increased between 1965 and 1996, from 36 to 103 per 100,000 population. Between 1996 to 2010, this rate then showed a small decrease, from 103 to 82 per 100,000 population (Figure 1).

Tobacco smoking is the predominant cause of COPD [5] and improvements in COPD mortality rates are expected to follow improvements in smoking rates, with a lag period of 20 to 30 years. In Australia, smoking rates among men decreased from 1945 onwards, and for women decreased from 1976 onwards. It is likely that the decrease in COPD mortality rates among women occurred later than for men because the decline in smoking rates for women occurred later.

Figure 1: COPD death rates of people aged 55 and over, 3-year moving average, and smoking rates, 1945 to 2010
Notes
2. Smoking data were calculated by the Cancer Council of Victoria. See Scollo and Winstanley 2012 for methodological details [6].
3. COPD classified according to ICD-7 codes 501, 502, 526, 527.1, ICD-8 codes 518, 490, 491, 492, 519.8, ICD-9 codes 490, 491, 492, 494, 496 and ICD-10 codes J40-J44, J47. In addition to COPD these codes include a condition called bronchiectasis which can be difficult to distinguish from COPD.
4. This Figure and accompanying text will be updated to the most recent data in the near future.

Sources: [4,6] (Data table).

Higher death rate from COPD in certain population groups
COPD mortality rates are higher for people living in remote areas and for people living in lower socioeconomic areas [4]. COPD mortality rates are also higher among Indigenous Australians compared with non-Indigenous Australians after adjusting for differences in age-structure. During the period from 2013 to 2017, among those aged 45 and over, the mortality rate for COPD among Indigenous Australians was 198 per 100,000 population, which was 3 times that of non-Indigenous Australians (66 per 100,000 population), based on the five jurisdictions with adequate Indigenous identification (NSW, Qld, NT, WA and SA).

The differences between these population subgroups may be due to differences in smoking rates, access to preventative health services, or other factors. Smoking rates are higher among people living in more remote areas, among people living in areas of lower socioeconomic area, and among Indigenous Australians [7]. For more information about COPD mortality rates among Indigenous Australians, see Coronary heart disease and chronic obstructive pulmonary disease in Indigenous Australians.

References

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Notes

Amendments

6 Jan 2020 - Removal of age-standardisation footnote under Figure 1: Prevalence of COPD among people aged 45 and over, by age and sex, 2017-18. These data are all crude rates.

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Related material

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The burden of chronic respiratory condition in Australia: a detailed analysis of the Australian Burden of Disease Study 2011
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- Chronic disease

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